



THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION
ENVIRONMENTAL PROTECTION DEPARTMENT

Contract No. EP/SP/174/20

**Food Waste Pre-treatment Facilities at
Sha Tin Sewage Treatment Works**

EMPLOYER'S REQUIREMENTS

AECOM

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PREAMBLE TO THE EMPLOYER'S REQUIREMENTS

Parts 1 to 5 of the Employer's Requirements are related to amendments of and additions to the content of Parts 1 to 5 of the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition (including the addenda thereto up to and including the day before the closing date of tender) published by Drainage Services Department, using the same numbering system as Parts 1 to 5 of the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition. Hence, the clause numbers in these Parts of the Employer's Requirements will not be in sequential order, and the two documents shall be read together.

Part 6 are the requirements for the operations and maintenance and the works not covered by the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition and are to be read independently.

Some clauses of the Employer's Requirements are related to amendments of and additions to the content of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) published by Civil Engineering and Development Department. The Contractor shall also comply with the requirements of the General Specification for Civil Engineering Works 2020 Edition for necessary execution and completion of the Contract. Where there is contradiction between the requirements of the Employer's Requirements and those in the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition and the General Specification for Civil Engineering Works 2020 Edition, the requirements in the Employer's Requirements shall prevail.

All references to "Particular Specification" or "PS" in Parts 1 to 5 of the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition shall mean Parts 1 to 5 of the Employer's Requirements, "Chinese" shall mean "Traditional Chinese", "Engineer" shall mean "Supervising Officer", "Engineer's Representative" shall mean "Supervising Officer", "Drawings" shall mean "Employer's Drawings" and "Defects Liability Period" shall mean "Proving Period". All references to "General Specification" or "GS" or "GSEMSFI" in the Employer's Requirements shall mean the General Specification for Electrical and Mechanical Sewerage Facility Installations 2016 Edition as defined in this Preamble.

PART 1 GENERAL

1.1 Introduction

1.1.1S Compliance with General Specification

GS Clause 1.1.1 is deleted and replaced by the following: -

- (a) This General Specification aims to specify the basic requirements of design of electrical and mechanical (E&M) installations which are essential for application in the Contract.
- (b) All E&M installations shall be carried out to conform to this General Specification except where varied in accordance with Parts 1 to 5 of the Employer's Requirements.

1.1.2A Application of the General Specification for Electrical and Mechanical Sewerage Facility Installations

The following is inserted after GS Clause 1.1.2: -

Clause numbers shown in Parts 1 to 5 of the Employer's Requirements correspond to those in the GS or the external range in the GS in the following means: -

- (a) The suffix "S" indicates the substitution of the corresponding clause / sub-clause / table in the GS and the whole of that clause / sub-clause / table will be superseded.
- (b) The suffices "A", "B", "C", "D", "E" or "F" indicate amplification of the corresponding clause / sub-clause in the GS, and the clause / sub-clause of Parts 1 to 5 of the Employer's Requirements is to be read in conjunction with the GS.
- (c) When a clause / sub-clause / table in the GS is superseded by Parts 1 to 5 of the Employer's Requirements, any reference to the superseded clause / sub-clause / table shall be deemed to refer to the corresponding clause / sub-clause / table in Parts 1 to 5 of the Employer's Requirements.
- (d) Clause numbers or letters in Parts 1 to 5 of the Employer's Requirements not appearing in the GS denote additional clauses.

1.1.2B The Employer's Requirements

- (a) The Employer's Requirements shall be read in conjunction with the Conditions of Contract, the Employer's Drawings, and all other documents forming the Contract.
- (b) For the avoidance of doubt, nothing contained in the Employer's Requirements shall in any way limit the obligations of the Contractor under the Conditions of Contract (including without limitation to the Contractor's obligations or liabilities under Clause 9 of the Conditions of Contract)
- (c) Insofar as any requirement in the provisions of the Employer's Requirements conflicts or is inconsistent with any other provision in the Contract, the Contractor shall notify the Employer of such conflict or inconsistency, and the Employer shall instruct the Contractor in accordance with Clause 7 of the Conditions of Contract.
- (d) For other elements of the Works or the Operation not covered by the Employer's Requirements, the Contractor shall be allowed to adopt appropriate design standards and specifications suitable for the design intent as long as the selected standards and specifications can provide a safe system of work that can meet the Contract requirements, since the Contractor shall be responsible for the design, construction, operation and maintenance including where necessary replacement of the Works for the duration of the Contract including the Operation Period.

1.1.2C Employer's Drawings

- (a) Employer's Drawing No. 60634312/EP/1001 as listed in Appendix 1.01 to the Employer's Requirements show the general layout of the Site. It is provided for indication and information only and do not purport to include any necessary precautions, items or components required for construction or long-term site safety. Such precautions, items or components shall be supplied and/or executed by the Contractor.
- (b) Nothing shown or implied on the Employer's Drawings shall limit the Contractor's responsibilities under the Contract. In particular, but without limitations, no warranty is given that the dimensions, levels or clearances illustrated, shown or implied on the Employer's Drawings are sufficient to meet the requirements stipulated in the Employer's Requirements. The Contractor shall develop the Design, the Works and the Operation as illustrated on the Employer's Drawings to meet the requirements stipulated in the Employer's Requirements.

1.1.2D Copyrights

- (a) The copyright of the Employer's Drawings and other documents forming part of the Contract is reserved.
- (b) The Employer's Drawings and other documents forming part of the Contract shall only be used for carrying the Design, the Works and the Operation in accordance with the Contract.

1.1.3S Scope of the Contract

GS Clause 1.1.3 is deleted and replaced by the following: -

- (a) The Contract is known as 'Food Waste Pre-treatment Facilities at Sha Tin Sewage Treatment Works'. It is the intention of the Employer to award a single contract for the Design, the Works and the Operation of the Facility at the Site as specified in Clause 1.1.3B of the Employer's Requirements. The scope of the Contract includes: -
 - (i) to design, supply, procure, construct, install, test and commission the Facility and its associated facilities;
 - (ii) to operate and maintain the Facility and its associated facilities for 5 years, with an option to extend the operation for another 6 months upon instruction of the Employer;
 - (iii) to receive Food Waste collected and delivered to the Facility from others appointed by the Employer;
 - (iv) to pre-treat 50 tonnes per day of Food Waste at the Site within the Existing Facilities;
 - (v) to convey Pre-treated Food Waste to designated anaerobic digesters at the Existing Facilities for co-digestion;
 - (vi) to divert Food Waste and / or Pre-treated Food Waste to other Designated Organic Waste Treatment Facilities when instructed by the Employer;
 - (vii) to handle, transport, store and dispose Residue and Non-permitted Food Waste;
 - (viii) to monitor and control the traffic related to the Facility in the Existing Facilities;
 - (ix) to carry out any activity that is necessary to the Design, the Works and the Operation of the Facility;
 - (x) to provide any material and /or equipment that is necessary to the Design, the Works and the Operation of the Facility;
 - (xi) to monitor, record and report the performance of the Facility;
 - (xii) to carry out all sampling and testing required and necessary for the operation of the Facility;
 - (xiii) to liaise with relevant parties for the Design, the Works and the Operation of the Facility;
 - (xiv) to reinstate the Site at the end of the Operation Period upon the instruction of the Employer; and
 - (xv) to handover the Facility to the Employer at the end of the Operation Period upon the instruction of the Employer.

- (b) The Contractor shall, whether or not it is specifically referred to in the Conditions of Contract and/or in the Employer's Requirements, provide all equipment, Constructional Plant, Plant, Mobile Plant, Temporary Works, labour, materials, tools, work, skills, expertise, services and transport as necessary in accordance with the Employer's Requirements: -
- (i) to complete the Design and the Works including but not limited to the design, engineering procurement, construction, erection, installation, testing and commissioning of the Facility including site formation, civil works, electrical and mechanical works, pollution control, building services, building structural works, aesthetic works, and all other design and works required for the operation and maintenance of the Facility according to the Contract requirements within the Time of Completion stated in the Form of Tender calculated from and including the date for commencement of the Design and the Works notified by the Employer in accordance with Clause 83 of the Conditions of Contract or such extended time as may be determined in accordance with Clause 86 of the Conditions of Contract; and
 - (ii) for the safe, convenient, reliable, efficient and satisfactory Operation of the Facility for the period stated in the Form of Tender calculated from the day following the day the Certificate of Substantial Completion for the Works is issued.
- (c) The Works shall comprise, but not limited to, the following components of which each shall be designed by the Contractor to perform synergistically as an integral part of the Facility: -
- (i) Food Waste Pre-treatment Facilities: -
 - (1) Reception System;
 - (2) Pre-treatment System;
 - (3) Food Waste Conveyance System;
 - (4) Pre-treated Food Waste Conveyance System.
 - (ii) Ancillary and supporting facilities: -
 - (1) Not used;
 - (2) Weighing system for difference material;
 - (3) Not used;
 - (4) Land transport and the relevant charging facilities for the Employer and Supervising Officer;
 - (5) Drainage;
 - (6) Fire services installations;
 - (7) Potable and Process Water supply;
 - (8) Wastewater collection and discharge;
 - (9) Deodorisation System;
 - (10) Instrumentation and control;
 - (11) Electrical and power supply;

- (12) All necessary ancillary and supporting components, including Plant and Mobile Plant.
- (iii) Building blocks and/or approved structure(s) for housing the different components of the Facility;
- (d) The Contractor shall be responsible for: -
- (i) applying and obtaining all necessary approvals, licences and permits from all relevant authorities and undertakings for satisfactory completion of the Works and commencement of the Operation;
- (ii) liaising with utility undertakings for the provision of utilities for the Facility;
- (iii) providing all necessary environmental mitigation measures and monitoring during the construction of the Works and the Operation of the Facility;
- (iv) preparation and submission of the Operation and Maintenance Manual for the Facility as specified;
- (v) design, construction, operation and maintenance of the Facility as per the Employer's Requirements; and
- (vi) preparation and submission of the as-built drawings of the Facility.
- (e) The Contractor shall liaise and attend meetings with all parties and stakeholders relevant to the execution of the Contract.
- (f) The Contractor shall be responsible for the overall functionality of the Facility and the coordination of all interfaces arising from the Design, the Works and the Operation. The Contractor shall perform the work in a professional, honest, timely, safe and environmentally responsible manner.
- (g) The Contractor shall maintain or repair or overhaul or recondition or renovate or replace, where appropriate and subject to the approval of the Employer or the Supervising Officer, any process, electrical and mechanical systems / equipment, and building elements of the Works, or as the case may be, the Facility, upon expiry of its design life such that any element of the Works shall remain suitable for its designed purpose all time.
- (h) The Contractor shall design and provide all mitigation measures to comply with the Contract in regard with safety and environmental protection during the Works and the Operation of the Facility.
- (i) The Contractor shall be responsible for the following trainings as specified: -
- (i) Trainings of the operators;
- (ii) Training of the Employer's staff, his agents and representatives;
- (iii) Operation and maintenance training;
- (iv) Operation and maintenance attachment training;
- (v) Odour training for Employer's staff, his agents and representatives; and
- (vi) Safety and environmental training.
- (j) Unless otherwise instructed by the Employer, the Contractor shall decommission, dismantle, remove the Facility and associated utilities, and clear and reinstate the Site to the original condition at the end of the Operation Period or upon the termination of the Contract.

- (k) Upon instruction of the Employer, the Contractor shall handback the Facility to the Employer (and/or its nominee as directed). Should the Employer decide to instruct the Contractor to handback the Facility, the Contractor shall maintain or repair or overhaul or recondition or renovate or replace, where appropriate and subject to the approval of the Employer, any process, electrical and mechanical systems / equipment, and building elements of the Works, or as the case may be, the Facility, upon expiry of the Operation Period such that any element of the Works shall remain suitable for its designed purpose and, in a condition, possess the respective extended life suitable for the use of at least 5 years upon the completion of the Operation Period.

1.1.3A Hours of the Works and the Operation

- (a) Normal working hours for the Works shall be from 8.00am to 6.00pm on all days excluding General Holiday. The Contractor shall allow for working outside normal working hours to suit the Site conditions, his method of construction or compliance with conditions of permits etc. The Contractor shall be responsible for applying and obtaining all necessary permits and licences for working outside normal working hours at his own expense.
- (b) Working outside the normal working hours for the Works, i.e. on a General Holiday or outside the period from 8.00am to 6.00pm of any day, may be required. The Contractor shall be responsible for obtaining approval of all appropriate authorities as to the time when the work outside the normal working hours for the Works would be carried out and details of any necessary arrangements.
- (c) The Contractor's attention is drawn to the requirements of the Noise Control Ordinance Cap. 400 regarding noise mitigations.
- (d) To enable the Supervising Officer to supervise the Works adequately, the Contractor shall give the Supervising Officer at least 2 working days in advance in writing when the Contractor intends to carry out the Works outside the normal working hours.
- (e) The Contractor shall carry out the Operation of the Facility every day in a year continuously without interruption from the day following the day the Certificate of Substantial Completion for the Works is issued to the end of the Operation Period or the termination of the Contract. The working hours of the Facility shall be from 8.00am to 10.00pm on all days, while the reception hours shall be from 8.00am to 6.00pm. The Contractor shall carry out the Operation 24 hours a day under emergency conditions or anytime deemed to be necessary outside the working hours and consented by the Supervising Officer.
- (f) Notwithstanding the normal working hours stated in Clause 1.1.3A(e) of the Employer's Requirements, part or parts of the Operation shall be restricted to certain period or periods time during the Operation Period. The Contractor shall strictly follow such restrictions which are detailed in Part 6 of the Employer's Requirements or other permits and licences issued by the relevant authorities for the Operation of the Facility.

1.1.3B Use of the Site

- (a) The Site shall not be used by the Contractor for any purpose other than for executing the Works and the Operation or carrying out other works associated with the Works and the Operation and approved by the Supervising Officer.
- (b) In case concrete batching and mixing plant will be erected on the Site, no provision of concrete for works outside the Site shall be allowed.

- (c) In case bituminous materials batching and mixing plant will be erected on the Site, no provision of bituminous materials for works outside the Site shall be allowed.
- (d) Rock crushing plant shall not be erected on the Site unless stated in the Contract.
- (e) The location and size of stockpiles of materials, including excavated material, within the Site shall be agreed by the Supervising Officer. Stockpiles shall be maintained in a stable condition.
- (f) Entry to and exit from the Site shall only be gained at the location(s) stated in the Contract or agreed by the Supervising Officer.
- (g) The Site which will be made available to the Contractor for the execution of the Works and/ or the Operation are shown in the Employer's Drawings and the time of possession of the Site are summarised below: -

Time of Possession	Drawing No.
On the date of commencement of the Contract	60634312/EP/1001
- (h) The exact demarcation for the Site shall be certified by the Supervising Officer and consented by the Employer and agreed with the owners / occupants and the relevant Government authorities on the Site. The exact nature and extent of the Works and Operation to be performed is to be ascertained by reference to the Contract as a whole.
- (i) When the Site becomes available, the Contractor shall take possession and be responsible for its care and control where appropriate including keeping it clear of illegal occupation and free of nuisance.
- (j) The programme referred to in Clause 14 of the Conditions of Contract and Clause 1.12S of the Employer's Requirements shall take due account of the time the Site become available. The Employer may, however, give to the Contractor possession of the Site earlier than the time stated in the Contract and the Contractor shall accept them and take possession. The Contractor shall not be entitled to any additional payment for early possession of the Site.
- (k) The Contractor shall take possession, clear the area, install necessary drains, formation to reasonably flat surface covered with suitably durable material, and provide adequate fencing, signing and lighting etc. to the satisfaction of the Supervising Officer, and the Contractor shall assume full responsibility for the safety and care of the same.
- (l) On possession of the Site, the Contractor shall take charge and be responsible for its safe custody, care, control where necessary including keeping it clean and clear of illegal occupation. Where applicable, the Contractor's attention is drawn to Clause 1.5.4 of the Employer's Requirements on use of roads and footways. Upon completion of the Works, the Contractor shall vacate the Site and shall remove all temporary foundations, reinstate all damaged areas and leave the areas in a clean and tidy condition to the satisfaction of the Supervising Officer.
- (m) The Contractor shall immediately install/erect and maintain chain link fence around the Site in good condition as stipulated in the Employer's Drawings and the Employer's Requirements or as directed by the Supervising Officer until the completion of the Works or such earlier date as the Supervising Officer may advise in writing, or shall hand over the chain link fence to another contractors or the Employer or until the end of Operation Period.
- (n) Not used
- (o) The Contractor shall also comply with the following conditions for the use of the Site: -

- (i) No earth, debris, spoil, building materials or wastes shall be dumped on any adjoining Government land or public road not handed over to the Contractor. The Contractor shall take adequate measures to ensure that any earth debris or spoil deposited on these areas are removed daily.
- (ii) Any damage done to adjoining roads, street furniture, Existing Facilities etc. shall be made good to the satisfaction of the Supervising Officer and Drainage Services Department.
- (iii) The Contractor shall not interfere with any drain or nullah without the permission of the Chief Engineer of the relevant Region of Drainage Services Department.
- (iv) Damage or obstruction caused to any nullah, drain, water main or other installation within or adjoining the site shall be made good at the cost of the Contractor and to the satisfaction of the Supervising Officer and/or Chief Engineer of the relevant Region of Drainage Services Department and /or Director of Water Supplies.
- (v) The Contractor shall not do or permit anything to be done within the Site that may become a nuisance or annoyance or which cause any damage or inconvenience to the Government or to the owners or occupants of adjoining or neighbouring lots or premises.
- (vi) The Contractor shall not light bonfires on the site for burning of debris or other materials.
- (vii) The Contractor shall not store or transport dusty materials in an open manner without taking effective dust suppression measures.
- (viii) The Contractor shall not allow any wastewater to flow from the Site or allow any waste to be deposited within the Site without cover. The Contractor shall not discharge any wastewater into any public sewer, drainage or any water course or sea without the prior written consent of the Director of Environmental Protection.
- (ix) The Contractor shall note that the existing fields, footways, road and other structures may not be able to take the loading imposed by his construction vehicles or machinery. He shall check the strength of the existing pavements, pipes and the like, and carry out necessary temporary protection and strengthening installations and their subsequent removal. All such temporary protection and strengthening installations shall be at the Contractor's own cost.
- (x) No temporary structures shall be erected by the Contractor within the Site without prior written consent of the Supervising Officer.
- (xi) The Contractor shall not carry out works on adjoining Government land without prior written consent of the Supervising Officer and/or District Lands Officer.
- (xii) No tree growing on the Site or adjacent thereto shall be interfered with without the prior written consent of the Supervising Officer and /or District Lands Officer and/or the appropriate authority.
- (xiii) All temporary drainage works shall be carried out in such a manner that no damage or nuisance is caused by storm water or rainwater to adjacent property and any claims arising out of damage or nuisance caused by it shall be borne by the Contractor.

- (xiv) The Contractor shall not carry out or permit any activity or works on the Site which may adversely affect the stability of land, slopes or structures within or surrounding the Site.
- (xv) The Contractor shall comply with all requirements of the Director of Fire Services made under the Dangerous Goods Ordinance Cap. 295 and regulations made thereunder and any amendments thereto.
- (xvi) The Contractor shall provide adequate safety measures (including lighting and railing) within and in the vicinity of the Site to the satisfaction of the Supervising Officer to warn the public of the possible danger.
- (xvii) The Contractor shall keep the Site clean and tidy during and after work.
- (xviii) The Contractor shall take necessary precautions against disturbance to trees, turfed areas or shrubs beds. The Contractor shall be liable for any damage to trees, turfed areas or shrub beds resulting from the work and shall be required to make good the damage.
- (xix) The Contractor shall at all times during the Works and the Operation allow free access for the Government, his agents, contractors and any person authorised by him, whether with or without vehicles, to enter the Site.
- (xx) The Contractor shall, in connection with the occupation and use of the Site, ensure that the Site is free from contamination. In the event that the Site is found to be contaminated by any substance, the Contractor shall remove all contaminants from the Site and its adjoining area, if necessary, and reinstate the Site to the satisfaction of the District Lands Officer. Such de-contamination work shall be at the Contractor's own cost.
- (xxi) The Contractor shall indemnify and keep indemnify the Government from and against all claims, demands, actions taken or awarded against the Government and/or any of its officers in any way arising out of, or in conjunction with the operations on the areas while occupying the Site thereof.
- (p) The Contractor shall have no exclusive possession of the Site.
- (q) Unless otherwise stated, the Contractor shall clear up and reinstate and hand over the Site to the Employer in a condition which has been inspected and accepted in writing by the Employer and/or Supervising Officer and other relevant authorities within two weeks upon receipt of the notification issued by the Employer and/or the Supervising Officer.
- (r) The Contractor shall note that in the case where his design and construction method render the impositions of additional design requirements from relevant Government authorities including, but not limited to, further stability studies and design of stabilisation works for the geotechnical features beyond but in the vicinity of the site boundary (i.e. extended site boundary), the Contractor shall be responsible for preparing all the required design submissions and carrying out of the approved construction works to the satisfaction of the relevant Government authorities. The cost of such works deemed to have been included in the Contractor's Capital Value and in no case shall the Contractor be entitled to any additional payment. The Contractor shall also be responsible for handling any land issue arisen thereof, including liaison with relevant Government authorities and outside parties, as a result of the extended site boundary.
- (s) Not used.

1.1.4S Definitions

GS Clause 1.1.4 is deleted and replaced by the following: -

- (a) In the GS and the Employer's Requirements, the word 'shall' is mandatory, the word 'will' is informative, the word 'should' is advisory, the word 'provide' means supply and fix or supply and install.
- (b) The definitions used in the GS and the Employer's Requirements shall be as defined in Clause 1.2 of the Conditions of Contract.

1.1.4A Units

- (a) Specifications in imperial units shall not be substituted for specifications in metric units stated in the Contract unless consented by the Employer or the Supervising Officer.
- (b) Conversion of metric units to imperial units and of imperial units to metric units shall be in accordance with the Hong Kong Government Metric Reference Guidebook.
- (c) The International System of Units (Système International d'Unités, SI) of weights and measures shall be used for all materials, equipment and measurements.
- (d) If any material or equipment specified in the Registered Design is described by dimensions in the metric or imperial units and, having used his best endeavours, the Contractor cannot procure such material or equipment in the measurement units specified in the Registered Design, but can obtain such material or equipment in another units to measurements approximating to those described in the Registered Design or can obtain alternative material or equipment in the same measurements as described in the Registered Design, then the Contractor shall forthwith give written notice to the Supervising Officer of these facts stating the measurements to which such material or equipment is procurable in the other measurement units or the alternative material or equipment. Such notice shall be given in accordance with Clause 44 of the Conditions of Contract and with sufficient time to enable the Supervising Officer to consider and certify any change which may be required.
- (e) If any material or equipment is not available in the measurement specified in the Registered Design from any known sources, local or overseas, at the time the material or equipment is required for the Contract, the Supervising Officer may, upon application from the Contractor, give permission in writing to the use of such material or equipment in another units to measurements approximating to those described in the Registered Design or alternative material or equipment in the same measurements as described in the Registered Design as a substitute, provided that: -
 - (i) no statutory specification is to be altered unless relevant legal provision exists;
 - (ii) the Supervising Officer is satisfied that the Contractor has made every reasonable effort to obtain the material or equipment in the measurements specified in the Registered Design;
 - (iii) in the Supervising Officer's opinion that the substituting material or equipment is suitable for the Works in all aspects;

- (iv) in the Supervising Officer's opinion that the substituting material or equipment complies with all the specifications for the material or equipment being substituted, allowing for any minor discrepancies between the measurements specified in the Registered Design and the corresponding measurements of the substitute, provided that such discrepancies can be effectively and satisfactorily compensated for by the provision of an extra quantity of the material or equipment;
- (v) the Contractor shall be responsible for all extra quantities of the material or equipment and hence the extra costs needed for meeting all requirements for the Works due to the use of the substitute; and
- (vi) no permission given by the Supervising Officer shall relieve the Contractor from any of his obligations under the Contract.

1.1.5S Standards and publications relevant to the Design, the Works and the Operation

GS Clause 1.1.5 is deleted and replaced by the following: -

- (a) The Contractor shall comply with the standards and publications listed in Appendix 1.02 to the Employer's Requirements. A change in the standards and publications or the introduction of new standards and publications, effected on or after the date 10 days prior to the tender closing date, and its implication will be dealt with in accordance with the Contract as a Change in Law as stipulated in Clause 1.2 of the Conditions of Contract.
- (b) Except as specified elsewhere in the Contract, the editions of British Standards (BS), European Standards (EN), BS EN Standards, International Electrotechnical Commission (IEC) Standards, International Organisation for Standardisation (ISO) Standards and Codes of Practice that shall apply to the Contract shall be those of which the latest editions are in force at the date 10 days prior to the tender closing date.
- (c) The Contractor shall provide for the use of the Supervising Officer the standards and publications listed in Appendix 1.02 to the Employer's Requirements as the Supervising Officer may call for as being required in the execution of the Contract. These shall remain the property of the Contractor.
- (d) The Contractor shall give notification to the Supervising Officer as soon as practicable should later edition of a standard / publication listed in Appendix 1.02 to the Employer's Requirements arise and provide him with a legal copy of the relevant standard / publication for information.
- (e) Notwithstanding specific references to particular standards as specified elsewhere in the GS and/or in the Employer's Requirements, all materials and workmanship shall comply in all aspects with the appropriate standards and codes of practice. It is the Contractor's responsibility to acquaint himself with the above requirements and bring to the Supervising Officer's attention promptly, as early as possible in the submission stage, any discrepancy between the standards/codes of practice and the specified works.

- (f) Where no standard is stated in the GS, the Employer's Requirements, and/or agreed in the Contract, all details, equipment, materials and workmanship shall be in accordance with the most appropriate standard or code of practice issued by the British Standards Institution or other acceptable international standards or codes of practices. Where standards other than standards or codes of practice issued by the British Standards Institution are proposed by the Contractor, the acceptance will be subject to such standards being equal or superior to the relevant standards or codes of practice issued by the British Standards Institution. The Contractor shall submit copies of all alternative standards together with their English translation certified by qualified person to the Supervising Officer for prior approval.
- (g) The Works and the Operation to be carried out shall comply in particular with the Construction Site (Safety) Regulations enforced by the Labour Department of the Government of the HKSAR and the Construction Site Safety Manual issued by the Environmental, Transport and Works Bureau and Safety Manual and relevant Practice Notes issued by Drainage Services Department of the Government of Hong Kong Special Administrative Region.
- (h) The Contractor shall follow the relevant requirements on Integrated Management System (IMS) of DSD (including the IMS for E&MP Division and the IMS for ST1 and ST2 Divisions), including environmental and occupational health & safety requirements as stipulated by the ISO 14001 and OHSAS 18001 and guidance notes issued by DSD.
- (i) The Works and the Operation shall conform to all statutory ordinances, regulations or orders enforced in Hong Kong Special Administrative Region.
- (j) Where the Employer's Requirements has stated specifically that a certain element or characteristic of the Works or the Operation shall conform to one of the documents a document listed in Appendix 1.02 to the Employer's Requirements, then the requirements of the document referred to with respect to the said element or characteristic shall prevail over any conflicting requirement of the documents listed in Appendix 1.02 to the Employer's Requirements.
- (k) Where there are differences between the requirements of the Hong Kong and overseas standards, the requirement of the Hong Kong standards shall prevail. Where there are differences between the Employer's Requirements and a document listed in Appendix 1.02 to the Employer's Requirements, the Employer's Requirements shall prevail.

1.1.7 Design brief

- (a) The Design shall be suitable for the Contractor to execute the Works and Operation in accordance with the Contract requirements.
- (b) The Contractor shall review the available ground investigation information and carry out all necessary ground investigation works together with the necessary topographical and bathymetric surveys to substantiate all geological models and geotechnical parameters adopted in the design of the civil engineering works. Where appropriate or when considered necessary by the Supervising Officer, the Contractor shall carry out additional boreholes, laboratory or field tests to verify the design parameters. The Contractor shall comply with the technical guidance given in relevant standards, including but not limited to Geoguide 2, Geoguide 3 and Geospec 3 issued by CEDD, HKSARG for ground investigation, logging and soil testing.

- (c) The Contractor shall be responsible for analysing and assessing the Food Waste composition and characteristics disposed of at relevant waste facilities in Hong Kong to satisfy himself the Food Waste parameters to be adopted for the Design and Operation to comply with the Contract requirements. In assessing the Food Waste composition and characteristics for the Design and Operation of the Facility, the Contractor shall take into account the waste management policies, initiatives and action programmers being implemented or with a definitive time line for implementation in Hong Kong, in particular the "Waste Blueprint for Hong Kong 2035" and "Waste Disposal (Charging for Municipal Solid Waste) (Amendment) Bill 2018". The Contractor shall also make reference to the Food Waste survey data/information given in the "Monitoring of Solid Waste in Hong Kong" published by the Employer. The Contractor shall conduct additional waste survey, sampling, testing and analysis to obtain and/or work out additional Food Waste information and/or data necessary for his Design and Operation. The Contractor's attention is also drawn to Clause 2.2 of the Conditions of Contract and the Employer shall not take any responsibility for or provide any guarantee of the quality, composition or characteristics of the Food Waste as received by the Facility.

1.2 Site Conditions and Housekeeping

1.2.1S Access and site utilities

GS Clauses 1.2.1(b) and (c) are deleted and replaced by the following: -

- (b) The access routes from public roads to the Site may be unpaved or rough ground. The Contractor shall maintain all access routes from public roads to the Site in a clean, passable and stable condition with regular suppression of dust as a frequency agreed by the Employer or the Supervising Officer. It shall be the Contractor's responsibility to make his own arrangement to ensure the routes are in a condition suitable for vehicular access and for execution of the Works. For avoidance of doubt, no access walkways and roads within the boundary of Sha Tin Sewage Treatment Works shall be considered as public roads.
- (c) No supply of utilities, including but not limited to water, electricity, sewerage, drainage, gas, heat, telephone and broadband internet facilities, to the Site shall be arranged by the Employer. The Contractor shall provide all kinds of utilities which he requires for carrying out the Works and the Operation to the Site. As-built records of existing utilities in the Existing Facilities are appended in Appendix 1.26 of the Employer's Requirements. The Contractor shall make all arrangements with and obtain all necessary approvals from the relevant authorities or Utility Undertakings for providing the utilities to the Site during the Works and the Operation. The Contractor shall allow sufficient time for seeking approval from relevant authorities or Utility Undertakings. The Contractor shall only make connections to any existing utilities by arrangement with the relevant authorities or Utility Undertakings and shall bear all costs of arranging and making such connections and the appropriate rents and costs and charges, including charges for disconnection and costs for obtaining all necessary approvals from the relevant authorities or Utility Undertakings. The Contractor shall also bear all costs of any short-term facilities provided as alternatives to the supply of utilities during the Works and the Operation.
- (b) The Contractor shall maintain close liaison with other contractors employed by the Employer, and Utility Undertakings or other authorities who are carrying out works on or adjacent to the Site. The Contractor shall ensure as far as possible that the progress of the Works and the Operation is not adversely affected by the activities of such other contractors.

- (c) The Contractor shall liaise with the appropriate contractors, Utility Undertakings and other duly constituted authorities on details of the interfacing requirements and constraints where necessary.
- (d) The Contractor shall not be given exclusive possession of the but he shall be allowed to make access to the Site to carry out the Works and the Operation. If an activity of the Works or the Operation is to be carried out on the Site or any other location within Sha Tin Sewage Treatment Works, the Contractor shall at least two weeks before he commences the activity submit a Site Work Authorisation Certificate / Plant Modification Authorisation Certificate (SWAC / PMAC) to the Plant Manager of Sha Tin Sewage Treatment Works via the Employer or the Supervising Officer for authorisation of making access to the Site or the other location within Sha Tin Sewage Treatment Works. A sample of SWAC / PMAC is shown in Appendix 1.04 to the Employer's Requirements. The certificate shall be endorsed by the Employer or the Supervising Officer before being submitted to the Plant Manager of Sha Tin Sewage Treatment Works. Together with the SWAC / PMAC, the Contractor shall submit a list of names and recent photographs (satisfying the requirements for a Hong Kong passport) of the staff and workers of his and his sub-contractors and the Design Checker who are to carry out and supervise the activity of the Works or the Operation on the Site or the other location within Sha Tin Sewage Treatment Works. The Contractor shall issue passes of the details agreed by the Plant Manager of Sha Tin Sewage Treatment Works to the staff and workers of his and his subcontractors and the Design Checker to be worn whenever they are carrying out and supervising the activity of the Works or the Operation in the Site or the other locations within Sha Tin Sewage Treatment Works. The Contractor shall also refer to Clause 1.4.1B of the Employer's Requirements for the details of making access to Sha Tin Sewage Treatment Works.
- (e) The Contractor shall provide safe access to all parts of the Works and the Facility and where necessary provide and maintain suitable scaffolding, ladders and gangways to facilitate supervision and inspection by the Employer and the Supervising Officer and the Design Checker.

1.2.1A Fences and gates on the Site

- (a) The Contractor shall supply and install and maintain all fences and gates on the Site in a clean, presentable, stable and secure condition. All logos, pictures and text shall be legible and not visually obstructed at all times.
- (b) Not used.
- (c) Where in-situ concreting works are to be carried out, steel container rooms and curing tanks shall be provided, at the discretion of the Supervising Officer, according to the requirements stated in General Specification for Civil Engineering Works 2020 Edition Appendix 1.2 and Appendix 1.3 respectively. In this connection, concreting works shall not commence until curing tanks and container rooms (or the like) are completed and accepted by the Supervising Officer or unless otherwise approved by the Supervising Officer. Where directed by the Supervising Officer, Employer's laboratories shall be given sole access and use of the steel container rooms and curing tanks togethering with all the equipment provided under the Contract.
- (d) The Contractor shall be responsible for repairing and repainting of fences and gates installed at the Site during the Works and the Operation. The Contractor shall not remove any fences and gates without the Supervising Officer's permission.
- (e) Not used.

- (f) The Contractor shall also be responsible for the regular maintenance of the surrounding environment of fences and gates to ensure that they are free of grasses, shrubs, rubbishes, debris and stains such that the logos, pictures and texts painted or mounted on such fences and gates can be seen without any obstruction.
- (g) Not used.
- (h) The Contractor shall erect chain link fences of which the details are shown in **Appendix 1.25** of the Employer's Requirements, within the Site. The schematic plan of chain link fences is illustrated in Employer's Drawing No. 60634312/EP/1001. The Contractor shall agree the exact arrangement with the Supervising Officer and the operator of the Existing Facilities on site.
- (i) The Contractor shall fence off the existing gas burner of the Existing Facilities as stated in Clause 1.5.6 of the Employer's Requirements. Exact locations shall be agreed and confirmed with the operator of the Existing Facilities on site.

1.2.1B Welfare facilities for workers

- (a) Immediately after the award of the Contract, the Contractor shall arrange to provide and maintain welfare facilities specified below for workers employed on the Works and the Operation for the sole purpose of this Contract, irrespective of whether they are in the employment of the Contractor or his sub-contractors. The Contractor shall maintain the welfare facilities provided on the Site throughout the Contract and shall remove the facilities and reinstate the Site after removal of the facility or upon completion of the Works where necessary. The sufficiency of provision for the welfare facilities shall be monitored and reviewed in the progress meetings. The Contractor shall replenish the insufficiency of provision to meet the specified requirements and shall not be entitled to claim the cost of such replenishment after commencement of the Works.
- (b) Storage compartments
 - (i) The Contractor shall provide storage compartments for use by the workers. The storage compartment shall be placed at a location close to the Site entrance to facilitate workers to obtain/ place their personal protective equipment such as safety helmet, reflective vest, eye protectors, safety harness etc. when they enter/ leave the Site.
 - (ii) The Contractor shall ensure adequate provision of storage compartments taking into account the fluctuation in labour workforce. The Contractor shall determine the dimensions of the storage compartments. To facilitate monitoring and control, each storage compartment shall be designed for use by not more than five persons unless otherwise approved by the Supervising Officer. The Contractor shall propose the number, location and layout arrangement for the placement of storage compartments on the Site for approval of the Supervising Officer within 14 days from the date of commencement of the Works on the Site. The Supervising Officer shall review regularly the adequate provision of storage compartments on the Site for use by the workers throughout the Contract.

(c) Drinking water facilities

- (i) The Contractor shall provide free drinking water facilities for workers working on the Site throughout the Contract to minimise waste plastic bottles. The drinking water facility can be in the form of a water pot with a cover at the top for water refilling and a tap at the bottom for drinking water, a distilled water drinking fountain or any other form that the Contractor considers appropriate. The drinking water facilities shall be provided indoors and each of which shall have a storage capacity of not less than 20 litres.
- (ii) The Contractor shall be responsible for maintaining the drinking water facilities in clean and hygienic condition and refilling drinking water to the facilities when empty. The number of drinking water facilities provided on the Site shall be at a ratio of not less than one for every 20 workers. The Contractor shall propose the number, location of placement and the refilling frequency for drinking water facilities provided on the Site for the approval of the Supervising Officer within 14 days from the date of commencement of the Works on the Site. The supervising Officer shall review regularly the adequacy of drinking water facilities provided by the Contractor throughout the Contract.

(d) Toilet facilities

- (i) The Contractor shall provide toilet facilities for workers working on the Site throughout the Contract, unless otherwise approved by the Supervising Officer that the provision is not necessary. The toilet facilities shall be suitable for use bisexually and placed at convenient locations close to workers' workplace. The toilet facilities shall be either one of the following types: -
 - (1) wet type with flushing water supply and the toilet waste properly collected and discharged into a sewerage system, septic tank, soakaway system, or in-situ sewage treatment facilities proposed by the Contractor and approved by the Supervising Officer; or
 - (2) chemical type completes with containers for regularly cleaning and removal by specialist contractor.
- (ii) Not used.
- (iii) The number of toilet facilities provided on the Site shall be at a ratio of not less than one for every 20 workers. The Contractor shall propose the toilet type, number and their locations of placement for the approval of the Supervising Officer within 14 days from the date of commencement of the Works on the Site. The Contractor shall maintain the toilet facilities in clean and hygienic condition. The Supervising Officer shall review regularly the adequacy of toilet facilities provided by the Contractor on the Site and the cleanliness and hygienic conditions of these toilets throughout the Contract.

(e) Hand-wash facilities

- (i) The Contractor shall provide hand-wash facilities in the form of water points and sinks for workers working on the Site throughout the Contract, unless otherwise approved by the Supervising Officer that the provision is not necessary. The number of hand-wash facilities provided on the Site shall be at a ratio of not less than one for every 20 workers. The discharge from hand-wash facilities shall be collected to prevent spillage on the floor and discharged to a water reception tank or flushing water supply tank for recycling/reusing as appropriate. The Contractor shall propose the number of hand-wash facilities, their locations and the system of how to collect the discharge from the wash-water basin for reuse/recycle on the Site for the approval of the Supervising Officer within 14 days from the date of commencement of the Works on the Site. The Supervising Officer shall review regularly the adequacy of hand-wash facilities provided by the Contractor on the Site and the effectiveness of the discharge collection system throughout the Contract.

(f) Showering Facilities

- (i) The Contractor shall, in addition to the provision of hand-wash facilities pursuant to sub-clause (e) above, provide showering facilities on the Site unless otherwise approved by the Supervising Officer that the provision is not appropriate. The showering facilities shall be provided indoors or inside containers with appropriate drainage connections. The number of showering points provided on the Site shall be at a ratio of not less than two for the first 100 workers and an additional one for every additional 50 workers.
- (ii) The Contractor shall provide showering facilities at different locations/rooms for use by male or female workers separately. Each showering point shall be furnished with hot and cold water supply. The Contractor shall be responsible for the water and electricity charges for providing the facilities. Details of installation of the facilities shall be submitted for the approval of the Supervising Officer within 30 days after the commencement of the Works on the Site.

(g) Rubbish Bins

- (i) The Contractor shall provide sufficient rubbish bins with covers at strategic locations on the Site for collection and disposal of general wastes generated by workers throughout the Contract. The rubbish bins shall be provided in pairs, one for aluminium cans and plastic bottles and the other for general refuses. The locations for the rubbish bins in pairs shall be placed at convenient locations close to the workers' workplace to facilitate use. The number of paired rubbish bins in pairs provided on the Site shall be at a ratio of not less than one pair for every 20 workers. The size of the rubbish containers shall be of minimum 1m high and have an opening of at least 0.28m² at the top for collecting wastes.

- (ii) The Contractor shall maintain the cleanliness of rubbish bins, and arrange collection and disposal of general waste inside the rubbish bins regularly, but in any case shall be not less than once in every three days. The Contractor shall also make arrangement for collecting papers and packaging on the Site to reduce disposal of wastes to landfills. The Contractor shall propose the number and the location of placement of rubbish bins provided on the Site together with the arrangement for on-site sorting of aluminium cans, plastic bottles and papers for the approval of the Supervising Officer within 14 days from the date of commencement of the Works on the Site. The Supervising Officer shall review regularly the adequacy of rubbish bins provided on the Site by the Contractor and the effectiveness of on-site sorting of general wastes throughout the Contract. The Contractor shall include this requirement to form part of his waste management plan if appropriate.
- (h) Rest areas
 - (i) The Contractor shall provide rest areas, equipped with tables and chairs, for workers to take lunch or refreshment on site. If the rest area is at outdoors, it can be in the form of a shelter to protect from the rain. The rest area shall be of sufficient size. The Contractor shall determine the dimensions of the rest area to suit the prevailing site conditions and propose to the Supervising Officer for agreement. The areas can also be used for conducting toolbox talks, safety briefings and other safety related gatherings. The Contractor shall ensure that the rest areas are cleaned daily and provided with rubbish bins.
 - (i) The costs for the provisions and maintenance of the facilities for workers employed on the Works shall be priced in the Schedule of Prices under the Item "Temporary accommodation for the Contractor". The costs for the operation and maintenance of the welfare facilities to the workers throughout the Operation Period shall be deemed to be included in the monthly Operation Fee.

1.2.1C Not used

1.2.1D Accommodation for the Contractor

- (a) During the Design, the Works and the Operation, the Contractor shall provide and maintain necessary accommodation in the Site to centralise all his necessary staff including but not limited to the Contractor's Key Staff as stated under Clause 1.10S of the Employer's Requirements, and remove the same within four weeks upon receipt of an instruction from the Employer. The accommodation shall be maintained in a clean, stable and secure condition. Living accommodation shall not be provided on the Site unless stated in the Contract or approved by the Employer.
- (b) No structure shall be erected by the Contractor within the Site without the written consent of the Employer. Such consent shall not relieve the Contractor of the responsibility of siting temporary structure clear of any part of the Facility. Disposal of solid waste and wastewater from the Contractor's accommodation shall be by a means approved by the Employer and the relevant authorities.

1.2.1E Transport for the Employer and the Supervising Officer

- (a) New motor vehicle as transport for the Employer and Supervising Officer will not always be required. However, where a used motor vehicle will suffice, it shall not be more than 2 years old when first brought to the Site. The requirements of the land transport shall refer to Clause 2.22 of the Employer's Requirements. Transport for the Employer and the Supervising Officer shall be provided within 2 weeks from the date of commencement of the Contract unless otherwise permitted or instructed by the Employer or the Supervising Officer.
- (b) Land transport for the Employer and the Supervising Officer provided under this Clause of the Employer's Requirements shall be for the exclusive official use of the Employer and the Supervising Officer and their staff and other visitors as directed by the Employer and/or the Supervising Officer in connection with: -
 - (i) Matters arising from this Contract;
 - (ii) Matters arising from any other Employer's contracts; and
 - (iii) Any other official journeys, including but not limited to, regular pick-up and drop-off of staff and visitors, as may be authorised by the Employer and/or the Supervising Officer.
- (c) The land transport for the Employer and the Supervising Officer provided under this Clause of the Employer's Requirements shall be kept available for use at all times during the following periods: -
 - (i) 7.30 am to 10.30 pm on Monday to Sunday and such other times when the Contractor is working, and
 - (ii) when requested by the Employer or the Supervising Officer including but not limited to the periods of red or black rainstorm warnings, landslide warning, and periods with the hoisting of any tropical cyclone signals, or for the discharge of his duties outside the period stated in Clause 1.2.1E(c)(i) of the Employer's Requirements. The Contractor shall extend the insurance coverage of the land transport and the drivers to that effect.
- (d) The Contractor shall not use the transport for his own purpose and he shall ensure that the transport is not used by other persons who are not authorised by the Supervising Officer.
- (e) The Contractor shall permit the land transport for the Supervising Officer provided under this Contract to be driven in an emergency by any other qualified drivers nominated by the Supervising Officer.
- (f) The land transport services shall include but not limited to daily mail run between the Site, the Employer's offices and the Supervising Officer's main office.
- (g) The contract transport for the Employer and the Supervising Officer shall be properly painted or affixed by adhesive plastic labels with the contract number, Contractor name, Department name, Department logo, Department complaint hotline (or other suitable identifications) and the phrase "For Official Use Only" "只供公務用途" in good size letters for easy identification.

- (h) The transport shall be maintained in a good, clean and serviceable condition and shall be serviced regularly. Fuel, oil, electricity and other consumables, charging facilities, drivers/crew, taxes, licenses, insurances, toll charges and parking and mooring fees shall be provided by the Contractor. The transport shall be covered by fully comprehensive insurance, which includes passenger liability and which allows the vehicle to be driven by any driver.
- (i) The Contractor shall provide the services of competent English and Cantonese speaking driver approved by the Supervising Officer for each vehicle but the Contractor shall nevertheless permit the transport to be driven in an emergency by any other qualified driver nominated by the Contractor and approved by the Supervising Officer. The Contractor shall make due allowance for the services of drivers at all times as specified in Clause 1.2.1E(c)(i) of the Employer's Requirements. The driver shall each possess a mobile phone with hands-free kit and with telephone service provided by a service provider.
- (j) Records of journeys shall be kept in logbooks provided by the Employer or the Supervising Officer. Records shall include details of the times and purpose of journeys with appropriate odometer readings and distances travelled. The person using the transport or authorising the journey shall be required to sign his name and title against the logbook entries. The Contractor shall obtain logbooks from the Employer or the Supervising Officer and shall present the logbooks for inspection when required by the Employer or the Supervising Officer. All completed logbooks shall be handed over to the Employer or the Supervising Officer.
- (k) The Contractor shall make available similar alternative transport when the land transport provided under this Clause is unavailable for any reason.

1.2.1F Contract Computer Facility and Electronic Document Management System for the Employer

- (a) The Contractor shall provide, service and maintain the Contract Computer Facility in the form of notebook computer for the use of the parties authorised by the Employer at all times up to the date of issue the Certificate of Completion for the Works or such earlier date as directed by the Supervising Officer.
- (b) The Contract Computer Facility shall comprise items satisfying the technical and functional requirements to facilitate the Employer's monitoring and supervision of the Works and serve the intended purposes. The standard software to be provided by the Contractor at minimum shall be as follows: -
 - (i) The latest version of Microsoft 365 Business Edition, or its generic descendent, with at least the components Word, Excel, PowerPoint, and Outlook;
 - (ii) Anti-virus and anti-spyware protection;
 - (iii) The latest version of Adobe Acrobat, or its generic descendent;
 - (iv) Adequate software for viewing the CAD files of drawings; and
 - (v) Adequate software for viewing the BIM models.
- (c) The Contractor shall, within 14 days from the date of the commencement of the Contract, submit for the Supervising Officer's approval details of Contract Computer Facility to be provided for the purposes of this Contract. The proposed equipment shall be well proven and must not infringe any Intellectual Property Rights or any other rights. The Contractor shall, within 14 days from the date of the commencement of the Contract, submit for the Supervising Officer's approval details of the wireless broadband internet service on Site.

- (d) The Contractor shall deliver the Contract Computer Facility to the Supervising Officer within 14 days of the Supervising Officer's approval unless otherwise stated in the Contract or agreed by the Supervising Officer. All software shall be delivered to the locations specified by the Supervising Officer, in intact shipping cartons with all seals unbroken. At the time of delivery, the originals of all warranty agreements, invoices and other supporting documents related to the price of the equipment shall be produced for inspection by the Supervising Officer. The Contractor shall, within 21 days from the date of the commencement of the Contract, provide the Supervising Officer with the notebook computer.
- (e) Software included in the Contract Computer Facility shall be compatible with the Contract Computer Facility supplied by the Contractor, and be licensed in the name of Environmental Protection Department, Government of the Hong Kong Special Administrative Region.
- (f) Within five working days of delivery, the Contractor shall arrange for the equipment to be installed and tested to complete working order to the satisfaction of the Supervising Officer.
- (g) The Contractor shall license and be responsible for the provision, servicing and maintenance of the Contract Computer Facility (including hardware, application software, consumables, replacements, replacement parts, licences, subscriptions, renewals, broadband internet service, documentation, training, on-site technical supports, debugging service etc.) throughout the Contract from the commencement of the Contract until the date of issue the Certificate of Completion for the Works unless otherwise stated in the Contract or directed by the Supervising Officer. The Contractor shall enter into a maintenance contract with the suppliers or with accredited local agents for regular servicing of all items including application software and for immediate replacement of worn out, damaged or defective parts. The Contractor's service providers shall be subject to the approval of the Supervising Officer. Unless stated otherwise, the maintenance shall also comply with the following requirements:
 - (i) Provide technical support via e-mail or telephone within 4 hours of breakdown/malfunction of the Contract Computer Facility or any part thereof.
 - (ii) Provide same day (and in any case no later than next day) on-site technical support/servicing/repair after breakdown/malfunction of the Contract Computer Facility or any part thereof.
- (h) In the event of a breakdown in the Contract Computer Facility or any part thereof, the Contractor must provide replacements of at least the same functional requirements for the period of breakdown.
- (i) In the event of a burglary incident where the Contract Computer Facility or any part thereof are stolen, the Contractor must provide replacements of at least the same functional requirements within 5 days after the burglary incident.
- (j) The Contract Computer Facility shall revert to the Contractor upon the date of issue the Certificate of Completion for the Works unless otherwise stated in the Contract or ordered by the Supervising Officer. On assignment of ownership to the Employer, the Contractor shall at the same time assign to the Employer existing warranty agreements on the equipment.
- (k) The EDMS shall be provided and maintained by the Contractor through an independent service provider, of relevant speciality and with good track records, subject to the approval of Supervising Officer. The requirement of the EDMS is stated in Appendix 1.07 to the Employer's Requirements.

- (l) The Contractor shall supply all consumable for the Contract Computer Facility. The Contractor shall keep the Contract Computer Facility in conditions that the facilities can operate at their maximum performance and repair any defects immediately. Replacement of parts or whole of the equipment shall be necessary if they are damaged or deteriorated beyond repair.

1.2.6S Environmental protection

GS Clause 1.2.6 is deleted and replaced by the following: -

- (a) The Contractor shall refer to Section 25 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) for the requirements for environmental protection.
- (b) The Contractor shall observe all requirements stipulated in Section 25 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) throughout the Works and the Operation. For avoidance of doubt, unless otherwise agreed by the Employer or the Supervising Officer, all references to "the Works" in Section 25 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) shall mean the Works and the Operation.

1.4S Liaison with Other Parties

GS Clause 1.4 is deleted and replaced by the following: -

- 1.4.1A General(a) The Contractor shall make all necessary arrangements with and obtain the necessary approvals from Government departments, Utility Undertakings and other duly constituted authorities for carrying out the Works and the Operation. The Contractor shall allow sufficient time for seeking approval from Government departments, Utility Undertakings and other duly constituted authorities.
- (b) The Contractor shall maintain close liaison with other contractors employed by the Employer, and Utility Undertakings or other authorities who are carrying out works on or adjacent to the Site. The Contractor shall ensure as far as possible that the progress of the Works and the Operation is not adversely affected by the activities of such other contractors.
- (c) The Contractor shall liaise with the appropriate contractors, Utility Undertakings and other duly constituted authorities on details of the interfacing requirements and constraints where necessary.
- (d) The Site may be shared by other contractors and personnel who will be working within or in the vicinity of the Site. These may include but not limited to the following: -
- (i) operators of Existing Facilities;
- (ii) contractors for minor improvement works, including maintenance / reconstruction / construction of pavements and surface channels / pipes, in the roads / tracks / footways / alleys of the Site and Sha Tin Sewage Treatment Works;
- (iii) contractors and suppliers and agents employed by the Drainage Services Department and his representatives to work in Sha Tin Sewage Treatment Works;

- (iv) the Utility Undertakings or contractors for the Utility Undertakings;
 - (v) contractors for collecting and delivering food waste to the Facility;
 - (vi) operators of Designated Landfill and Designated Food Waste Treatment Facilities; and
 - (vii) other interfaces as stipulated in the Employer's Requirements.
- (e) The Contractor shall make all necessary arrangements to phase his Works and Operation with the aforementioned contractors and personnel working on or adjacent to the Site. The Contractor shall be deemed to have taken all these requirements into account and no extra claim on time or money shall be entertained.
- (f) The Contractor shall be responsible for liaising with other contractors / personnel as to the time and manner of executing their works and shall copy all correspondence to the Employer and the Supervising Officer during the Works and the Operation. The Contractor's attention is also drawn to the list of interfacing projects when preparing his programme. Any agreed programme of works with other contractors / personnel shall be submitted to the Supervising Officer for information. The Supervising Officer shall also be informed immediately of any delays in work by other contractors which will affect the progress of the Works and the Operation.
- (g) The Contractor shall allow for providing the other contractors/personnel working within or in the vicinity of the Site as stated in sub-clause (e) of this Clause of the Employer's Requirements with reasonable access to the Site and any other adjacent works sites and shall where necessary liaise with the appropriate contractors, Utility Undertakings and other duly constituted authorities on details of interdependent phasing and execution of the interfacing works. The Contractor shall notify the Supervising Officer and other concerned contractors at least 14 days in advance should he wish to alter these access arrangements during the course of the Works and the Operation.
- (h) The Contractor shall arrange and attend meetings as necessary for the timely execution of the Works and the Operation and as required by the Contract. The Contractor shall use his best endeavours to ensure that his sub-contractors, relevant Government departments, Utility Undertakings, other duly constituted authorities, interested parties and other contractors attend meetings when so required by the Employer or the Supervising Officer.
- (i) The Contractor shall inform the Supervising Officer of all liaison meetings at least 5 working days before they are to be held, or such shorter period permitted by the Supervising Officer, and shall give the Supervising Officer the opportunity to attend such meetings. The Contractor shall prepare the meeting minutes of each meeting within 5 working days after the meeting.
- (j) When required by the Supervising Officer, the Contractor shall attend meetings related to the Contract, which are arranged by the Supervising Officer or the Employer with other relevant authorities and interested parties.
- (k) Correspondence in relation to the Contract received from or dispatched to Government departments, Utility Undertakings, other duly constituted authorities, interested parties and other contractors shall be copied to the Supervising Officer for information within 2 working days of receipt or dispatch.
- (l) The Contractor shall allow in his prices for affording reasonable facilities including suitable protection and security work for the Facility, and access to other contractors and personnel working on or adjacent to the Site and for any possible interference with the Works and the Operation.

- (m) The Contractor shall allow in his prices for affording reasonable protection and security work to prevent the Works and the Facility from being damaged by other contractors and personnel working within or in the vicinity of the Site. The Contractor shall also allow in his prices for affording reasonable protection and security work for the works done or being done by other contractors and personnel working within or in the vicinity of the Site. The Contractor shall make good all damages he made to the works done or being done by other contractors and personnel working within or in the vicinity of the Site to the satisfaction of the Supervising Officer.
- (n) If the Works and the Operation are carried out in existing structures or buildings of Existing Facilities in which machinery is in operation, the Contractor shall obtain appropriate Work Permit from the operator(s) of the Existing Facilities through the Employer or the Supervising Officer for each admittance to these areas for work. The Works Manager and his staff shall have full authority to suspend any work in these areas due to safety and operational reasons and the Contractor shall not be entitled to any extra costs and time.

1.4.1B Sha Tin Sewage Treatment Works

- (a) The Contractor shall liaise and coordinate with the operators of the Existing Facilities for all issues related to power supply of the Site and the Facility. The Contractor shall submit his design of all electrical works which may affect the Existing Facilities to the operators of the Existing Facilities for consent as well as the Employer and the Supervising Officer. The Contractor's attention is drawn to Clause 3.1.1S of the Employer's Requirements in relation to the requirements of electrical works.
- (b) The Contractor shall liaise and coordinate with the operators of the Existing Facilities for all issues related to the stormwater drainage, sewerage and potable water supply of the Site and the Facility. The design of the stormwater drainage, sewerage and potable water supply shall be submitted to the operators of the Existing Facilities for consent. The design requirements of the stormwater drainage, sewerage and potable water supply are stated in Clauses 1.5.4 (a), (b) and (c) of the Employer's Requirements respectively.
- (c) The Contractor shall liaise and coordinate with the operators of the Existing Facilities for all issues related to the Pre-treated Food Waste Conveyance System. The Contractor shall prepare and submit the design of the Pre-treated Food Waste Conveyance System to the operators of the Existing Facilities as well as the Employer and the Supervising Officer for consent. The design requirements of the Pre-treated Food Waste Conveyance System are stated in Clauses 1.5.4 (d) and 2.21 of the Employer's Requirements.
- (d) The Contractor shall liaise and coordinate with the operators of the Existing Facilities for all issues related to the fire services installation of Existing Facilities. The design requirements of the fire services installation are stated in Clause 5.1S of the Employer's Requirements.
- (e) The Contractor shall follow the general procedures of conveying the Pre-treated Food Waste as stated in Part 6 of the Employer's Requirements. The Contractor shall agree the detailed procedures and the relevant emergency arrangements with the operators of the Existing Facilities before commencement of the Operation. The detailed procedures shall be stated clearly in the Operation Plan for the Supervising Officer's consent. The Contractor shall observe the relevant requirements as stated in Clause 6.2.7 of the Employer's Requirements.

- (f) The Contractor shall note his responsibility of traffic control and management related to the Works and Operation of the Facility. The Contractor shall liaise and coordinate with the operators of the Existing Facilities on all access arrangement during the Works and the Operation, including the SWAC/ PMAC as stated in Clause 1.2.1(d) of the Employer's Requirements. The construction and operation of the Facility shall not affect any existing roads in the Existing Facilities. If temporary suspension of any road is unavoidable, the Contractor shall prepare traffic arrangements for the affected parties to consent and at least one lane of the affected road shall be reserved for continuous traffic during the temporary suspension. The Contractor shall note the requirements of Temporary Traffic Arrangement stipulated in Clause 1.5.4(f) of the Employer's Requirements.
- (g) The Contractor shall have detailed plans on use of the weighbridge in the Existing Facilities when the weighing system of the Facility is not in operation. The Contractor shall liaise and coordinate with the operators of the Existing Facilities on the details of all relevant arrangements. The Contractor shall note the requirements related to the use of existing weighbridge in the Existing Facilities in Clause 6.2.4 of the Employer's Requirements.

1.4.1C Food Waste Collection and Delivery

- (a) The Contractor shall note that Food Waste is delivered to the Facility during the Operation by Food Waste Collection and Delivery contractor who is/are appointed by the Employer under separate contract(s).
- (b) The Contractor shall liaise and coordinate with the Food Waste Collection and Delivery contractor for the detailed arrangements on Food Waste delivery to the Facility, including but not limited to a forecast delivery schedule containing, for each Food Waste collection vehicle, its estimated arrival time, license plate number and type of Food Waste to be delivered. The Contractor shall notify and coordinate with the appointed contractor on the scheduled maintenance or inspection as required under Clause 1.5A.3 of the Employer's Requirements. The Contractor shall provide all assistance to the Employer when liaising with the Food Waste Collection and Delivery contractor.
- (c) The Contractor shall minimise the impacts to the Existing Facilities due to the delivery of Food Waste. The Contractor shall liaise and coordinate with the Food Waste Collection and Delivery contractor to arrange the Food Waste delivery time properly to ensure a smooth and reliable operation of the Facility and the Existing Facilities. The traffic control requirements are stated in Clause 6.2.2 of the Employer's Requirements.

1.4.1D Operator(s) of the Designated Landfill

- (a) The Contractor shall not dispose of any Food Waste and Pre-treated Food Waste at the Designated Landfill unless a prior consent is given by the Employer. In the event that a prior consent is given by the Employer to the Contractor's proposal of disposing of Food Waste and/or Pre-treated Food Waste at the Designated Landfill, the Contractor shall liaise and coordinate with the operator(s) of the Designated Landfill for all issues related to such disposal, and shall observe all requirements of the operator(s) of the Designated Landfill.
- (b) The Contractor shall liaise and coordinate with the operator(s) of the Designated Landfill for all issues related to disposal of Residues during the Operation Period.

1.4.1E Operator(s) of the Designated Food Waste Treatment Facilities

- (a) The Contractor shall not divert and/or deliver Food Waste and/or Pre-treated Food Waste from the Facility to the Designated Food Waste Treatment Facilities unless a prior consent is given by the Employer.
- (b) In the event that a prior consent is given by the Employer to the Contractor's proposal of diverting/delivering Food Waste and/or Pre-treated Food Waste to the Designated Food Waste Treatment Facilities, the Contractor shall liaise and coordinate with the operator(s) of the Designated Food Waste Treatment Facilities for all issues related to diversion/delivery of Food Waste and/or Pre-treated Food Waste from the Facility to the Designated Food Waste Treatment Facilities, and shall observe all requirements of the operator(s) of the Designated Food Waste Treatment Facilities.

1.4.1F Contractor(s) of other Contract working at the Existing Facilities

- (a) Contractor shall liaise and coordinate with the contractor(s) of other Contract working at the Existing Facilities for all issues related not limited to the traffic control, cleaning of access road within Existing Facilities and working area out of site.

1.5S Civil Engineering and Builder's Works

GS Clause 1.5 is deleted and replaced by the following: -

1.5.1 General Design and Construction Requirements

- (a) All civil engineering and builder's works of the Works and the Operation shall be carried out by the Contractor.
- (b) The Contractor shall aware that any civil engineering and builder's works design given in the Employer's Drawings are for information only. The Contractor shall be responsible for the civil engineering and builder's works design to suit his plant and equipment installation and subsequent testing and commissioning and operation and maintenance.
- (c) Unless otherwise specified in the Employer's Requirements and the Employer's Drawings, all civil engineering and builder's works of the Works and the Operation shall be in compliance with the requirements stipulated in the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender).
- (d) The Contractor shall carry out the design of the configuration of the Facility and the whole civil engineering works for the Facility and the design shall be under his entire responsibility.
- (e) The Contractor shall design the configuration of the Facility and provide all buildings and civil engineering works for the clearance, support and housing of the plant and equipment and machinery contained in the Facility together with all necessary internal and external infrastructure works to enable safe and efficient operation of the Site and the Facility.
- (f) The Contractor shall be responsible for the detailed design and co-ordination of all element of the civil engineering and building works with the process, mechanical and electrical works, the operation requirements and all relevant parties and authorities.

- (g) All design shall be carried out with due regard to current engineering practice consented by the Supervising Officer and in strict accordance with all relevant current legislation, regulations, standards and codes of practices. All design shall take into account of constructability, potential disturbance to and interfacing with operation and maintenance requirements and shall facilitate inspection, cleaning, lubrication and repair to ensure satisfactory operation under all service conditions.
- (h) Structural elements shall be designed to carry specific loads imposed by plant and equipment and machinery and design loads taken from the Employer's Requirements and all relevant current legislation, regulations, standards and codes of practices. Structural elements shall also be designed to carry temporary loads induced by the Temporary Works and/or Contractor's method of construction.
- (i) Except otherwise stated, the Works as a whole shall be new, of sound workmanship and robustly designed for a long and reliable operating life. The design life of the Facility is defined as the period during which the Facility is designed to fulfil its intended functions and meet all criteria set in the Employer's Requirements when inspected and maintained in accordance with agreed procedures. The design life of an element of the Facility means that the element will continue to be suitable for its intended purpose until the end of the design life, with regular inspection and routine maintenance in accordance with the respective servicing and maintenance schedules recommended by the manufacturers and the relevant codes of practices where applicable.
- (j) Where there are differences between the requirements stipulated in the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) and the Employer's Requirements, the requirement of the Employer's Requirements shall prevail.

1.5.2 Tolerances

- (a) The Contractor shall refer to the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender) for the tolerances for the civil engineering and builder's works of the Works and the Operation, except the in situ concrete and precast concrete in the Works and the Operation for which the tolerances shall be as follows: -
 - (i) Variation from plumb in any 3m: 6mm
Variation from plumb in any 12m: 8mm
 - (ii) Variation of level or lateral position of any point from its level or lateral position indicated or completed: 12m
 - (iii) Variation in slab and wall thickness: +6mm, -3mm
 - (iv) Variation of level or lateral position of any point, for machinery installation, from its level or lateral position indicated or completed: +5mm, -12mm
 - (v) The permitted tolerances for precast concrete construction shall be those given in BS 8110.
- (b) Tolerances for the civil engineering and builder's works stated in the Contract shall be measured perpendicular to the specified lines or planes unless otherwise stated in the Contract.
- (c) If adjacent parts of the Works are subject to different dimensional tolerances then the most critical tolerance shall apply to all such works that relate to each other in respect of dimension, lines and level.

1.5.3 Workmanship

- (a) Workmanship shall comply with best trade practice and with relevant standards.

1.5.4 Specific Requirements

- (a) Stormwater drainage system

- (i) During the Works, the Contractor shall design and construct the stormwater drainage system, including but not limited to the pipe size, pipe alignment, manhole, connection to and modification of existing manhole and all necessary fittings, of the Site to collect all surface runoff to be generated during the Operation. The Contractor shall design the stormwater drainage system of the Site according to the latest edition of DSD's Stormwater Drainage Manual and submit the design of the system for the approval of the operator of Existing Facilities and the Employer prior to construction.
- (ii) The layout of existing drainage system and proposed connection point as shown on Employer's Drawing No. 60434312/EP/1002 are indicative only. The Contractor shall conduct necessary investigation on site and carry out liaison with the operator of Existing Facilities to confirm the arrangement of the existing stormwater drainage system for facilitating their design and construction.
- (iii) During the Works, the surface runoff generated within the Site shall be collected by temporary stormwater drainage system such that all the surface runoff shall be directed to silt removal facilities such as sand/silt traps and sediment basins to remove sand/silt particles from runoff before being discharged to existing drainage system as agreed and approved by the operator of Existing Facilities and the Supervising Officer. The sand/silt removal facilities shall be adequately designed and properly operated and maintained. No contaminated surface runoff shall be discharged to outside site boundary, existing stormwater drainage system and adjacent water bodies without being appropriately treated.
- (iv) During the Operation, the Contractor shall utilize the constructed stormwater drainage system to convey surface runoff generated within the Site to the existing system. The Contractor shall collect and use the surface runoff generated within the Site as process water to reduce fresh water consumption. Drainage works constructed by the Contractor in this Contract shall not interfere and cause damage to the existing stormwater drainage system. Damages should be rectified to the satisfaction of the operator of Existing Facilities at the Contractor's own time and cost.

- (b) Sewerage system

- (i) During the Works, the Contractor shall design and construct sewerage system, including but not limited to pipe size, pipe alignment, manhole, chambers, valves, pumps, connection and associated fittings, to collect all wastewater to be generated during the Operation. The Contractor shall design the sewerage system of the Site in accordance with the latest edition of DSD's Sewerage Manual and submit the design of the system for the approval of the operator of Existing Facilities and the Employer prior to construction.

- (ii) The wastewater generated from the Facility during Operation shall be pumped and discharged to the existing distribution sewage channel of the primary sedimentation tank at the Existing Facilities. The location of the proposed discharge point as shown on Employer's Drawing No. 60434312/EP/1002 is indicative only. The Contractor shall liaise, coordinate and seek agreement from the operator of the Existing Facility to confirm the exact location of the discharge point and connection arrangement.
 - (iii) During the Works, approved means for the collection, treatment and disposal of wastewater generated within the Site shall be provided at the Contractor's own cost to the satisfaction of the operator of Existing Facilities and the Employer. No wastewater shall be discharged to outside site boundary. Unless otherwise approved by the operator of the Existing Facilities, no wastewater shall be discharged to any part of the Existing Facilities during the Works.
 - (iv) During the Operation, the Contractor shall utilize the constructed sewerage system to convey wastewater generated within the Site (except for wastewater from cleaning activities) to the existing sewerage system. Wastewater generated from cleaning activities as specified in Clause 1.28 of the Employer's Requirements shall be pumped to the process water tank for reuse. Sewerage system constructed by the Contractor in this Contract shall not interfere and cause damage to the existing sewerage system. Damages should be rectified to the satisfaction of the operator of Existing Facilities at the Contractor's own time and cost.
- (c) Potable water supply system
- (i) During the Works, the Contractor shall design and construct the water supply system, including but not limited to pipe size, pipe alignment, chambers, valves, pumps, connection and associated fittings, to supply potable water to the Facility for the operation of the Facility. The Contractor shall design the water supply system of the Site in accordance with the latest edition of WSD's Manual of Mainlaying Practice and submit the design of the system for the approval of the operator of Existing Facilities and the Employer prior to construction.
 - (ii) The proposed collection point for potable water supply as shown on Employer's Drawing No. 60434312/EP/1002 are indicative only. The Contractor shall liaise, coordinate and seek agreement from the operator of the Existing Facility to confirm the exact location of the collection point and connection arrangement.
 - (iii) The Contractor shall be responsible for provision of all kinds of water to the Site and the Facility at his cost in connection with the construction of the Works and the Operation.
 - (iv) Water supply installations shall comply with Water Supplies Department regulations and shall be carried out by licensed plumbers.
 - (v) The Contractor shall ensure water supply to the Site would not interfere and cause damage to the existing supply system. Damages should be rectified to the satisfaction of the operator of Existing Facilities at the Contractor's own time and cost.

- (d) Pre-treated Food Waste transfer pipe
- (i) The Contractor shall design and construct a pre-treated food waste transfer pipe system, including but not limited to pipework, pumps, connections, road-crossing pipework and all associated facilities, between the Facility and the existing DSD's digesters. The design shall be submitted to the operator of the Existing Facilities and the Supervising Officer for approval prior to construction.
 - (ii) The schematic arrangement of the pre-treated food waste transfer pipe as illustrated on Employer's Drawing No. 60634312/EP/1004 is indicative only. The Contractor shall liaise, coordinate and seek agreement from the operator of the Existing Facility to confirm the pipe alignment and connection arrangement on site.
 - (iii) The material of Pre-treated Food Waste transfer pipe shall be of stainless steel grade 316/ 316L complying with BS EN 10088-1:2014 with a pressure rating of at least PN25.
 - (iv) The pipe shall be assembled by flange connection for maintenance purpose.
 - (v) The surfaces of pipework shall be protected by suitable prime/ coating before installation at where flange adaptors/ couplings are to be fitted and seating surfaces of flange faces of pipeworks to prevent crevice corrosion between contacting surfaces.
 - (vi) Manual isolation valves shall be installed at each branch tee off from the ring main for control and isolation of pre-treated food waste entering designated digesters.
 - (vii) Requirements of the Pre-treated Food Waste transfer pipe in the Pre-treated Food Waste Conveyance System shall refer to Clause 2.21.2 of the Employer's Requirements.
- (e) Road crossing of pipework/ ductwork
- (i) Prior approval shall be sorted from corresponding government departments/ utility undertakers on the minimum depth requirement for underground services and installation.
 - (ii) No above ground pipework/ ductwork at road crossing section shall be allowed. The road crossing section of the transfer pipe of the Pre-treated Food Waste Conveyance System shall be installed in prefabricated concrete trench structure with heavy-duty detachable vehicular cover. The cover shall be designed to withstand a traffic loading of minimum 400kN. At least 300mm of working space shall be provided for maintenance of the pipe. Pipe bends should be minimized to minimise clogging of bones and impurities in pipe. No bends of greater than 45 degrees shall be allowed unless otherwise consented by the Supervising Officer.
 - (iii) Isolation gate valves shall be installed at the two ends of the road crossing Pre-treated Food Waste transfer pipe to facilitate the maintenance of the pipe. Exact locations of the valves shall be agreed with the Employer and the operator of the Existing Facilities and relevant authorities on site.

- (f) Temporary traffic arrangement for works on existing roads
- (i) The Contractor shall design and make all arrangement with the temporary traffic arrangements in accordance with the conditions and restrictions imposed by the operator of Existing Facilities. In case works with temporary traffic arrangement affecting carriageway, including that with pedestrian diversion onto carriageway, the details of the temporary traffic arrangements, including necessary supporting materials such as staging of works, drawings and diversion plans shall be prepared and submitted by the Contractor for the approval of the operator of the Existing Facilities.
 - (ii) Temporary traffic diversions and pedestrian routes shall be provided where work in roads or footways obstructs existing vehicular or pedestrian access. The relevant work shall not commence until the approved temporary traffic arrangements and control have been implemented.
 - (iii) The Contractor shall design the temporary traffic arrangement proposals in accordance with the latest edition of Transport Planning and Design Manual (TPDM) and any other Highway Standards and guidance notes.
 - (iv) The Contractor shall design the temporary lighting, signage, guarding and traffic control arrangements in accordance with the HyD's Code of Practice for Lighting, Signing and Guarding of Road Works.
 - (v) Temporary traffic light signals shall be of a type approved by the Commissioner for Transport and shall comply with the requirements contained in the current editions of the documents 'Type Approval Procedure for Portable Traffic Light Signals' and 'Specification for Vehicle Actuated/Fixed Time Portable Traffic Signal Equipment' issued by the Government of the HKSAR.
 - (vi) Temporary, traffic signs, including posts, backing plates and faces, shall comply with the requirements for traffic signs contained in Section 12 of the CEDD's General Specification for Civil Engineering Works except as stated in (vii) and (viii) of this Clause.
 - (vii) The thickness of backing plates for temporary traffic signs that will be erected for less than 6 months may be reduced to 1.5 mm. The posts for signs may be constructed of timber or other material provided that in the opinion of the Supervising Officer the traffic signs will be stable and safe.
 - (viii) The Contractor shall design the arrangement of information on traffic sign for temporary traffic directional signs. The details of the background, borders and legends, including letters, numerals, characters and symbols, shall follow the requirements of the Commissioner for Transport for approval of the operator of the Existing Facilities.
 - (ix) The Contractor shall inspect and regularly maintain the temporary traffic arrangements and control every day. He shall keep the traffic lights, lights and signs clean and easy to read, and shall immediately repair or replace the equipment that is damaged, dirty, incorrectly positioned or not in working order.
 - (x) The following particulars of proposed temporary traffic arrangements and control shall be submitted to the Supervising Officer for approval at least 7 days before the traffic arrangements and control are implemented:
 - (1) Details of traffic diversions and pedestrian routes
 - (2) Details of lighting, signage, guarding and traffic control arrangements and equipment, and

- (3) Any conditions or restrictions imposed by the operator of Existing Facilities or any other relevant authority, including copies of applications, correspondence and approvals.
- (xi) Work on roads on the Site shall be carried out in sections such that the length of road occupied at any time does not exceed that allowed by the relevant authorities and the width of road occupied at any time does not exceed the width of one traffic lane (i.e. 4m) unless permitted by the Supervising Officer. Work on each section shall be completed and the road shall be reinstated and opened to traffic before work commences on the next section. Work on any section, including loading and unloading, shall be carried out in such a manner that traffic and utilities on the adjacent road and pedestrian access in the adjacent footway are adequately maintained.
- (xii) Excavated material shall not be stored adjacent to excavations in roads or footways unless permitted by the Supervising Officer.
- (xiii) Any vehicular access across excavations in roads shall be provided with steel covers. The covers shall be designed to BS EN 1993-1 unless otherwise specified and shall be capable of withstanding the full load of traffic permitted to use the road. The covers shall be secured in position and shall have anti-skid coating so that the skid resistance values of the covers measured in accordance with BS EN 1436 shall be Class S1. Sufficient steel covers shall be kept on the Site adjacent to excavations in roads to permit access for vehicles across the excavations in case of emergency. When installed, the steel covers shall be set to match the road surface smoothly so as to avoid/minimize any noise nuisance by rocking under the action of traffic.
- (xiv) Work on roads, footways and cycle-tracks shall be carefully planned to minimize the period of temporary excavation. If the Contractor is unable to proceed with the works after any excavation is carried out, he shall immediately backfill or temporarily reinstate the excavation.
- (xv) Temporary diversions, pedestrian access and lighting, signage, guarding and traffic control equipment shall be removed immediately they are no longer required. Roads, footways and other items affected by temporary traffic arrangements and control shall be reinstated to the condition existing before the work started or to such other condition as may be agreed or instructed by the Supervising Officer.
- (g) Building blocks
- (i) “Building block” in this Contract is defined as a building or a structure within the Site which is intended to house and accommodate auxiliary provision supporting the Operation, plant and equipment and machinery of the process, mechanical and electrical works which are designed and supplied by the Contractor in accordance with the Employer’s Requirements so as to enable the Operation to be carried out in a safe and efficient manner for satisfying the requirements stipulated in the Contract.
- (ii) The Contractor shall design and construct all building blocks as a stand-alone, fully enclosed structure and submit the design to the Supervising Officer for consent. The building blocks shall include but not limited to the following:
- (a) Process block(s); and
- (b) Administration block

- (iii) The Process block(s) shall house the process systems required for all activities of the Operation required by the Contract, including but not limited to the following:
 - (a) Reception System;
 - (b) Food Waste Pre-treatment System;
 - (c) Food Waste Conveyance System;
 - (d) Transfer pumps of Pre-treated Food Waste Conveyance System; and
 - (e) Any other system or equipment proposed by the Contractor and consented by the Employer.
- (iv) Requirements of the process systems shall refer to Part 2 of Employer's Requirements. Requirements of the administration block shall refer to Clause 1.5.4 (h) of Employer's Requirements.
- (v) Notwithstanding that the Contractor is not required to submit any documents to the Building Authority for approval, the Contractor shall observe all requirements stipulated in the Buildings Ordinance (Cap. 123). The Contractor shall also comply with the standards and code of practices published by the Buildings Department and other relevant government authorities including but not limited to those listed in Appendix 1.02 of Employer's Requirements for the design of the building blocks.
- (vi) The Contractor shall take the assumption that the external surfaces of all building blocks shall be subjected to corrosive environment through airborne contact in his design. All materials for the buildings and structures shall be selected so as to withstand such corrosive or severe exposure environment.
- (vii) The Contractor shall generally determine dead loads and minimum imposed loads for design of the building blocks according to the Code of Practice of Dead and Imposed Loads 2011 (2021 Edition) published by the Buildings Department of the Hong Kong Special Administrative Region. Designs of the substructure, superstructure and foundation of all building blocks shall comply with the laws of mechanics and recognised engineering principles.
- (viii) Where imposed loads for specific uses are not prescribed in the Code of Practice of Dead and Imposed Loads 2011 (2021 Edition) published by the Buildings Department of the Hong Kong Special Administrative Region, the Contractor shall provide sufficient reliable information or data about the specific uses to the satisfaction of the Supervising Officer to establish the design imposed loads.
- (ix) Unless otherwise agreed by the Supervising Officer, the Contractor shall not adopt performance-based approach as a means to establishing the design imposed loads for the specific uses which are not prescribed in the Code of Practice of Dead and Imposed Loads 2011 (2021 Edition) published by the Buildings Department of the Hong Kong Administrative Region.
- (x) The Contractor shall design and construct the foundations of the building blocks in accordance with the Code of Practice for Foundations published by the Buildings Department of the Hong Kong Special Administrative Region and the Foundation Design and Construction (GEO Publication No. 1/2006) published by the Geotechnical Engineering Office of the Hong Kong Special Administrative Region. The Contractor shall adopt an appropriate approach to design the foundation of a building block to achieve compatibility of load and deflection between the superstructure and the associated substructure.

- (xi) The Contractor shall determine the design wind force on the building blocks or parts of the building blocks according to the Code of Practice on Wind Effects in Hong Kong 2019 published by the Buildings Department of the Hong Kong Special Administrative Region.
- (xii) All building blocks shall be designed and constructed to the Code of Practice for Fire Safety in Buildings 2011 (October 2015 version) published by the Buildings Department of the Hong Kong Special Administrative Region. The Contractor shall provide means of access for firefighting and rescue according to the Code of Practice on Provision of Means of Access for Firefighting and Rescue Purposes published by the Buildings Department of the Hong Kong Special Administrative Region. All building blocks shall also be designed and constructed to the satisfaction of the Fire Services Department of the Hong Kong Special Administrative Region. The Contractor shall also design and construct fire service installations in the building blocks according to the Code of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment published by the Fire Services Department of the Hong Kong Special Administrative Region.
- (xiii) The structural systems of the building blocks which support dynamic and/or moving plant and equipment shall be designed for vibration and impact forces for machinery and moving loads. Unless otherwise agreed by the Supervising Officer, the ratio of the natural frequency of the structural system supporting dynamic plant and equipment to the frequency of the dynamic and/or moving plant and equipment in concern shall be greater than 1.5.
- (xiv) Unless otherwise stated in the Contract, all parts or elements of a building blocks which are considered as water retaining structures shall be designed in accordance with BS EN 1992-3: 2006. No movement joints shall be permitted in the design of water retaining structures.
- (xv) Unless otherwise agreed by the Supervising Officer, all process areas, storage of chemicals and other consumables for the Operation shall be fully enclosed.
- (xvi) The Contractor shall provide the following architectural finishes for the building blocks: -
 - (i) Internal Finishes

The Contractor shall design the internal finishes of the building blocks in consideration of environmental friendliness and comfortable. The design shall be plain and simple, and adopts long-lasting materials that can be easily maintained.
 - (ii) External Finishes

The Contractor shall design the external finishes of the building blocks and the colour of the facades such that the aesthetics and overall appearance of the building blocks blend into the surrounding environment/ Existing Facilities. The design shall be plain and simple, and adopts long-lasting materials that can be easily maintained.

- (xvii) The Contractor shall provide safe, convenient and straightforward accesses and means in all building blocks to take plant, equipment, machinery, chemicals and consumables in and out of all rooms, at all levels using suitable stair wells and suitable electric hoists. Where necessary, vehicular accesses shall be provided in the building blocks and all vehicular accesses shall be provided directly to the point of operation and maintenance with sufficient headroom and turning radius in a building block.
 - (xviii) Walkways and stairs of adequate width shall be provided in the building blocks for safe access to the Plant for operation, monitoring, inspection and maintenance. Access platforms shall be provided for the Plant which cannot be operated, monitored, inspected or maintained from floor level. Access routes shall be provided for the removal of large plant components on trolleys or other similar handling appliances. Stairways shall be provided for access to different levels. For areas where stairways are not practical, cat ladders or other means shall be provided for access.
 - (xix) Sufficient lighting shall be provided in all walkways and stairways and vehicular accesses in the building blocks.
 - (xx) The Contractor shall provide all signage required for safe and efficient operation and maintenance which includes but not limited to internal signage and labelling of rooms and equipment as well as labelling of the building blocks, road signage and road marking.
- (h) Specific Requirements for administration block
- (i) The Contractor shall design and construct the administration block to house the control room, testing laboratory, storage room, administration facilities and other welfare facilities, including but not limited to toilet and shower facilities, for the Employer's staff, agents and representatives, the Supervising Officer, the Contractor's staff and the operators of the Facility.
 - (ii) The Contractor shall design and submit a layout plan of the administration block detailing the space allocation and facilities arrangement for the consent of the Supervising Officer prior to construction.
 - (iii) The administration block shall be equipped with all necessary heating, air-conditioning, ventilation, lighting, fire extinguishers, fresh water, flushing water, electricity supply, drainage, sewerage, telephone and facsimile services, toilets, maintenance, equipment supplies and accommodation consumables, and first aid cabinet and consumables.
 - (iv) The Contractor shall provide and maintain the following facilities in the administration block:-
 - (1) Control room and switchroom

The control room shall house the master workstations of the operation management system for the daily operation of the Facility. The switchroom shall house all switchboard and motor control centre of the Facility.

(2) Testing laboratory

The Contractor shall set up an on-site laboratory with all necessary building services installation, testing equipment, instruments, accessories, consumables, chemicals for sampling, sample preservation and to conduct on-site testing of the sample before and during the Proving stage and Post commissioning stage. The on-site lab shall, as a minimum, have the capacity to conduct testing on dry solids content and pH of the Pre-treated Food Waste. The testing methods shall be agreed with the Employer and stated in the Operation Plan.

(3) Storage room

Storage room shall house all the spare parts and routine consumable materials/goods for operation and maintenance of Facility.

(4) Toilet and shower room

Toilet and shower room shall accommodate all toilet and shower facilities for operators or staff of Facility. The water heater shall be provided for heat water tap point inside shower room. Requirements of toilet and shower room shall refer to Clauses 1.2.1B (d) and (f) of the Employer's Requirements.

(i) Dedicated access to existing pipe gallery

- (i) The Contractor shall construct a dedicated access to existing pipe gallery of Existing Facilities next to the Facility. The access shall be paved. The indicative location of the existing pipe gallery is shown in Employer's Drawing No. 60634312/EP/1001. The Contractor shall liaise, coordinate and confirm the arrangement of the dedicated access with the operator of the Existing Facilities on site.
- (ii) The Contractor shall propose and submit a design of chain link fences, details of which are described in the Appendix 1.25 to the Employer's Requirements, access's cover and paving for the consent of the Supervising Officer prior to construction.

(j) Access

- (i) The Contractor shall carefully plan the access locations of the Facility to facilitate the daily operation of the Facility. The access shall be provided with proper security control and CCTV monitoring for security purpose. The Contractor shall have due considerations in his design to limit odour from escaping at the access.
- (ii) Vehicle access and man access shall be separated for safety purpose.
- (iii) The Contractor shall allow access to the operators of the Existing Facilities to use the dedicated access to existing pipe gallery as described in Clause 1.5.4(i) of Employer's Requirements.

1.5.5 Removal of Existing Trees

- (a) The Contractor shall observe all relevant requirements related to tree removal as stated in Clause 26.05 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender).

- (b) Contractor's attention is drawn to Technical Circular DEVB TC(W) No. 4/2020 on tree preservation. The Contractor shall carry out tree survey for all the trees that will be affected, including dead trees, within and, if appropriate adjacent to the project site according to Clause 26.03 of the General Specification for Civil Engineering Works 2020 Edition. If tree removal is deemed to be necessary in order to carry out the Works, the Contractor shall prepare and submit a Tree Preservation and Removal Proposal (TPRP), including the tree survey plan, as part of the Design Plan to the Tree Works Vetting Panel under DSD for approval, as stipulated in Clause 1.27.2 of the Employer's Requirements. The Contractor shall allow a minimum of 6 weeks for TWVP's processing, counting from the date of first submission of TPRP to the TWVP.
- (c) The indicative locations of the existing trees within the Site are shown on Employer's Drawing No. 60434312/EP/1005. All of the existing trees shall be compensated within the Existing Facilities if they are to be felled by the Contractor for the execution of the Works and the Operation, with the compensatory planting ratio of 1:1 in terms of number. The indicative locations of the compensated trees are given in Employer's Drawing No. 60434312/EP/1006. The Contractor shall note that the indicative locations are for reference only and the exact planting location shall comply with that given in the approved TPRP.
- (d) Trees which are to be retained or which are not required to be removed in order to carry out the Works, shall be protected from damage at all times by methods agreed by the Supervising Officer. Material, including excavated material, shall not be banked around such trees and they shall not be trimmed or cut without the approval of the Supervising Officer.
- (e) The Contractor shall draw the attention of the Employer and the Supervising Officer that the execution of the Works and/or the Operation are likely to be affected by existing trees or other obstructions. The Contractor shall not remove any of the trees and obstructions without the Supervising Officer's approval.
- (f) Any plant or similar obstructions with diameter at breast height (1.3m from ground level) measuring less than 95mm shall only be removed after obtaining approval from the corresponding maintenance party of the Drainage Services Department.
- (g) For tree pruning works involving the use of chainsaw, the Contractor shall assign worker(s) with relevant training to undertake such works. The assigned worker(s) must have passed the Vocational Assessment in Safety Use and Maintenance of Chainsaw Operation and Basic Tree Pruning for the Arboriculture Industry organised by the Vocational Training Council ("VTC") or possesses equivalent qualification from a recognised local/overseas training institute or professional body. The Contractor shall submit to the Supervising Officer for approval of the particulars of the assigned worker(s) (including the name and position) together with a copy of the certificate(s) issued by VTC or other recognised training institute or professional body confirming that the worker(s) has/have obtained the required qualification.

1.5.6 E&M equipment near existing gas burner

- (a) The Contractor shall note that the existing gas burner of the Existing Facilities and the area within three metres radial distance from its boundary is classified as Zone 1 hazardous area as specified in Clause 1.3 of GSEMSFI. The electrical equipment including E&M facilities, building services equipment and instrumentation equipment shall be certified to international standard for the application in the hazardous zones in accordance with Clause 1.3 of GSEMSFI.

1.5A Process Design Considerations

1.5A.1 Waste Quantity

- (a) The Facility shall be designed to receive and treat 50 wet tonnes per day of Food Waste from the food waste collectors assigned by the Employer. The Food Waste shall be delivered to the Facility by Food Waste collection vehicles.
- (b) The Food Waste collection vehicle can be generally divided into two types, namely: -
 - (i) Tanker with side loader and rear unloading door which stores Food Waste directly in an enclosed tank; and
 - (ii) Truck with tail-lift which stores Food Waste in 120L storage bins.
- (c) The Facility shall be designed to receive Food Waste by different types of Food Waste collection vehicles. The Contractor shall confirm the dimensions of Food Waste collection vehicles when designing the Facility.
- (d) The Contractor shall assist the Employer in liaising with the food waste collectors to ensure quantity and quality of Food Waste are adequate throughout the entire Operation.

1.5A.2 Waste Quality

- (a) The Food Waste to be delivered to the Facility shall be from different sectors, including but not limited to domestic, commercial, industrial and institutional establishments, in Hong Kong. The Contractor shall ensure the Facility can cater for the fluctuation in quality of the Food Waste.
- (b) Not used.

1.5A.3 Annual Availability

- (a) The Contractor shall guarantee the Facility shall not be shut down for a period longer than 12 days in a 12-month period in Post-commissioning Stage and shall not be shut down for a period longer than 1 day in any month in Post-commissioning Stage.
- (b) Not used.
- (c) The Facility is considered shut down on the day where the Contractor carries out scheduled maintenance or inspection of the Facility. The Contractor shall notify the Supervising Officer and the Employer 30 days before the day of scheduled maintenance or inspection.
- (d) The Contractor shall design in accordance with the mechanical and process design requirement as specified in the Part 2 of the Employer's Requirements while achieving the annual availability of the Facility. The Contractor shall establish the emergency procedures arrangement as part of the Contractor's Plans, as specified in Clause 1.27.3 of the Employer's Requirements, in case of any emergency.

1.5A.4 Design Life

- (a) The equipment, buildings, structures, infrastructures, Plant and Mobile Plant in the Facility shall be designed based on the principle of "reasonably suitable for purpose" for a 5-year Operation Period.

- (b) For the modification works of the switchboard of the Existing Facilities, the design life shall be at least 50 years for civil structures and 15 years for electrical and mechanical equipment.

1.5A.5 Pre-treated Food Waste Quality Requirements

- (a) The Contractor shall guarantee the quality of the Pre-treated Food Waste and the minimum quality requirements of the pre-treated food waste are as follows: -

Parameter	Unit	Value
Dry solids content	%DS	3-5
Particle size	mm	≤ 6
Organic recovery rate	% w/w of solids	≥ 90
Impurities in Pre-treated Food Waste	% w/w of solids	≤ 5.0 %

- (b) The organic recovery rate is calculated by dividing the organic dry matter in Pre-treated Food Waste by the organic dry matter of the Food Waste. The organic dry matter in Food Waste and Pre-treated Food Waste shall be measured weekly in an offsite HOKLAS laboratory.
- (c) The impurities in Pre-treated Food Waste shall be measured weekly in an offsite HOKLAS laboratory. Impurities shall include all inorganic material such as glass, rock, grit, sand, metal, plastics, etc.

1.7 **Design Checking Procedures, Design, Materials, Construction Checking Procedures and Workmanship**

The title of GS Clause 1.7 is replaced by the above.

1.7.1S General

GS Clause 1.7.1

is deleted and replaced by the following: -

- (a) All Plant and materials for the Works shall be new, of good workmanship complying with the best trade practices and relevant standards and of robust design.
- (b) If during the testing period of the Works and the whole period of the Operation any moving parts show, in the opinion of the Employer or the Supervising Officer, signs of undue wear or sustainability for the purpose for which they are installed, they shall be replaced by the Contractor free of cost notwithstanding that they may otherwise be working in a satisfactory manner.
- (c) Unless otherwise approved by the Employer or the Supervising Officer, service platform shall be provided for Plant or any portion of the Plant installed/located at or higher than 2m from the finished floor level, or finished ground level where necessary, and requiring regular inspection, operation or maintenance/repair of frequency more than 4 times per year or at an interval of less than 3 months.

- (d) The procedures for the Design and design checking, certification, consent and registration referred by Clause 73 of the Conditions of Contract are set out in Clause 1.7 of the Employer's Requirements.
- (e) The Design shall satisfy the requirements stipulated in the Employer's Requirements.
- (f) The Design shall be checked and certified by the Design Checker before submitting to the Supervising Officer for consent and registration.
- (g) Unless otherwise stated in the Contract, the Contractor will not be required to submit his Design to the Buildings Department of the Government of Hong Kong Special Administration Region, as the Site remains vested in the Employer as the property of the Government and the Contractor has only a right of possession in accordance with Clause 39.6 of the Conditions of Contract. Nonetheless the Contractor's Design shall comply with all requirements of the Buildings Department stated in its codes of practice, design manuals, guidelines, practice notes and circular letters and other publications and the Authorised Person of the Design Checker shall confirm such compliance by the Contractor's Design through his certification in accordance with the Design Checking Procedures. With reference to Clause 73.7 of the Conditions of Contract, submissions to statutory authorities and other Government departments shall be required, without limitation, as follows: -

Authorities / Government departments	Concerned issues
Architectural Services Department (ArchSD)	<ul style="list-style-type: none">Aesthetics, design and specification of structures above ground
Civil Engineering and Development Department Fill Management Division	<ul style="list-style-type: none">Delivery of filling materials for reclamation and surplus inert C&D materials to disposal ground
Environmental Protection Department Environmental Assessment Division	<ul style="list-style-type: none">Environmental Permit
Environmental Protection Department Environmental Compliance Division	<ul style="list-style-type: none">Construction noise permitDischarge license for the Works and the Operation
Environmental Protection Department Food Waste Management Group	<ul style="list-style-type: none">All aspects in relation to this Contract
Environmental Protection Department Landfills and Development Group	<ul style="list-style-type: none">C&D materialsConstruction waste disposal chargingResidues disposal
Fire Services Department	<ul style="list-style-type: none">Matters relating to the provision of emergency vehicular access and water supply for firefighting; fire protection for any building/structure/premises in regard to its intended use; matter involving/relating to dangerous goods under the Dangerous Goods Ordinance; rescue arrangement during emergencies; and any other related fire safety aspects

Authorities / Government departments	Concerned issues
Labour Department	<ul style="list-style-type: none"> • Occupational safety and health • Matters relating to the registration and periodic examination of lifting gears/appliances in the Facility
Drainage Services Department	<ul style="list-style-type: none"> • Tree felling • Matters relating to the Existing Facilities
Transport Department	<ul style="list-style-type: none"> • Temporary traffic diversions • Vehicle registration, licencing and examination
Sha Tin District Office, Home Affairs Department (HAD)	<ul style="list-style-type: none"> • Matters affecting the public interest at large including those relating to traffic, noise and other environmental impacts
Electrical and Mechanical Services Department (EMSD)	<ul style="list-style-type: none"> • Matters relating to the facilities of EMSD which are affected by the Works or the Operation; matters relating to the design and installation of the electrical and mechanical works for the Works and the Operation
Food and Environmental Hygiene Department (FEHD)	<ul style="list-style-type: none"> • Matters relating to pollution control measures
Standards and Testing Division, Geotechnical Engineering Office (GEO), Civil Engineering and Development Department (CEDD)	<ul style="list-style-type: none"> • Matters relating to site investigation and material testing
Lands Department (LandsD)	<ul style="list-style-type: none"> • Matters relating to preservation of trees, land administration, land survey and mapping, resumption and surrender of private land, Government land allocations and grants, and road (opening) works
Sha Tin, Tai Po and North District Planning Office, Planning Department	<ul style="list-style-type: none"> • Matter relating to the population and district planning matters, the development of the areas affected by the Works or the Operation
Security Bureau, Government Secretariat	<ul style="list-style-type: none"> • on military land/property and security measures of Government installations;
Property Vetting Committee on Schedule of Accommodation	<ul style="list-style-type: none"> • for proposed buildings of the Facility;

Authorities / Government departments	Concerned issues
Water Supplies Department (WSD)	<ul style="list-style-type: none">• Interfaces with water supply project in the project area, matter related to protection of water gathering ground, the supply of water, existing and proposed waterworks installations• Matter relating to the fire service installation, firefighting and fire protection system;
Utility Undertakings	<ul style="list-style-type: none">• Matters affecting the supply of their services within the area affected by the Contract;

- (h) No undertaking is given that the list of Government departments given in Clause 1.7.1(g) of the Employer's Requirements is exhaustive, , and the Contractor shall make all submissions as required by the Employer, the Contract and any statutory requirements, as are necessary from time to time.

1.7.1A Design Checking Procedures

- (a) The Design Checking Procedures comprise two stages: -
- (i) Approval in Principle (AIP) of which the details of the requirements are set out in Clause 1.7.1B of the Employer's Requirements; and
 - (ii) Detailed Design Approval (DDA) of which the details of the requirements are set out in Clause 1.7.1C of the Employer's Requirements.
- (b) The definitions of the terms used in the Design Checking Procedures are given in the following: -
- (i) “Approval in Principle” means the consent given by the Supervising Officer in respect of the Contractor’s design submitted for Approval in Principle after the endorsement of appropriate Government Departments and statutory authorities and the submission of a Check Certificate by the Contractor, signed by the designer, the Contractor and the Design Checker.
 - (ii) “Detailed Design Approval” means the consent given by the Supervising Officer in respect of the Contractor’s design submitted for Detailed Design Approval after the endorsement of appropriate Government Departments and statutory authorities and the submission of a Check Certificate by the Contractor, signed by the designer, the Contractor and Design Checker.
 - (iii) “Certified Working Drawing” means a drawing, and/or document prepared by the Contractor’s designer and endorsed as being checked and approved by the Design Checker.
 - (iv) “Check Certificate” means a certificate submitted to the Supervising Officer for Approval in Principle or for Detailed Design Approval as the case may be, in the forms specified in Appendix 1.08 of the Employer's Requirements: -
 - (1) identifying the nature and description of the submission and a description of the Works to which the submission refers;

- (2) signed by the designer to certify that the design complies with the Contract requirements and the Contractor's Plan, has been checked in-house to confirm the completeness, adequacy and validity of the design of the Works covered by the submission and that all necessary and required approvals have been obtained from Government Departments and statutory authorities;
 - (3) signed by the Contractor to certify that the design complies with the Contractor's Plan and is endorsed by the Contractor;
 - (4) signed by the Design Checker to certify that the design has been independently checked by the Design Checker using all reasonable skill and care and complies in all respects with the terms and conditions of the Contract.
- (c) The Contractor shall appoint a Design Checker in accordance with Clause 5 of the Conditions of Contract to undertake the independent checking of the Contractor's designs of the Works. The Design Checker shall be a firm or company of consultants with civil engineering, E&M engineering, organic waste treatment, hydraulic engineering, sewage treatment and environmental expertise.
 - (d) The objective of design checking is to ensure that the design is checked for compliance with the Contract requirements and that the detailed design has met the requirements of Government Departments, statutory authorities and interested parties affected by the Works. The objective of the Design Checking Procedures is to ensure the progressive process of submissions, discussion and endorsements to avoid delays to the project.

1.7.1B Approval in Principle (AIP)

- (a) The specific purpose of AIP is to check that appropriate design criteria, codes of practice, design standards and preliminary design will be adopted for the detailed design. The AIP document on the basis of which the Supervising Officer has given his consent to proceed will serve as a yardstick for subsequent consent to the detailed design.
- (b) AIP submissions shall include as appropriate but without limitation:
 - (i) List of design standards to be adopted;
 - (ii) List of codes of practice to be adopted;
 - (iii) List of design criteria to be adopted;
 - (iv) List of design parameters, with highlights on whether they are in accordance with the relevant design standards or codes of practice and reasons why they should be deviated from the relevant design standards or codes of practice, if it is the case;
 - (v) List of compliance testing proposals, if they are deviated from those dictated by the relevant design standards or codes of practice, and reasons supporting the deviation;
 - (vi) Description of analysis methods to be used;
 - (vii) List of computer programs to be adopted;
 - (viii) Preliminary design;
 - (ix) Check Certificate in the form given in Appendix 1.08 to the Employer's Requirements; and

- (x) Evidence of all necessary approvals from Government departments, interested parties, relevant authorities and undertakings and statutory authorities.
 - (c) A flow chart indicating the sequence for AIP submissions is shown in Appendix 1.09 to the Employer's Requirements. The time to be allowed for certain activities is stipulated in the sub-clauses below.
 - (d) In each AIP submission, the Contractor shall submit certified copy of the respective Design Report to the Supervising Officer in accordance with the latest Design Plan consented by the Supervising Officer. The number of hardcopy submission shall be agreed with the Supervising Officer.
 - (e) The Supervising Officer shall within 28 days of receipt of the Contractor's submission, part or parts thereof submitted in accordance with the Design Plan, notify the Contractor in writing: -
 - (i) that consent to proceed to detailed design is given; or
 - (ii) that consent to proceed to detailed design is given but with conditions; or
 - (iii) that consent not given in which case reasons for not granting consent shall be given; or
 - (iv) that further information is required to be submitted, in which case the information required shall be stated.
- Provided that if none of the above actions is taken within the said period of 28 days, the Supervising Officer's consent to proceed to detailed design shall be deemed to have been given.
- (f) The Contractor shall within 7 days of receiving notification under Clause 1.7.1B(e)(iv) of the Employer's Requirements or within such further period as the Supervising Officer may allow in writing, provide the further information requested failing which consent to proceed to detailed design have not been granted. The Supervising Officer shall within 7 days of receipt of such further information grant or not grant consent to proceed to detailed design in accordance with the Clause 1.7.1B(e) of the Employer's Requirements.
 - (g) In the event that consent to proceed to detailed design is not granted under Clause 1.7.1B(e)(iii) of the Employer's Requirements or deemed to have not been granted under Clause 1.7.1B(f) of the Employer's Requirements, the Contractor shall within 7 days thereafter resubmit his design, part of parts thereof taking account of the reasons given for the rejection or incorporating the further information requested by the Supervising Officer, as the case may be.
 - (h) Having received consent to proceed to detailed design for an element or the whole of the Works, the Contractor shall not vary any of the design criteria used in the AIP submission without seeking the consent of the Supervising Officer by making a revised AIP submission.
 - (i) The AIP submission shall contain the proposed methods of design analysis. Computer programs must be based on established design principles and evidence shall be provided that such programmes have been validated and calibrated. If any part of the design is to be done by computer programs developed in-house by the Contractor's designer then they shall be verified also by an alternative method.

- (j) Where the Contractor proposes to use a computer program to support his design, he shall submit to the Supervising Officer as part of the AIP submission, without limitation, relating to that computer program: -
- (i) Problem documentation
 - (1) A presentation of the type of problems that can be processed by the computer program together with the information expected from the computer.
 - (2) The simulation of the problem by a mathematical model.
 - (3) Justification for the choice of parameters.
 - (ii) Program documentation
 - (1) Method and theory of analysis and assumptions made.
 - (2) Design constants and equations.
 - (3) Flow chart to indicate step-by-step calculation.
 - (4) Description of all notations.
 - (5) Limitation of the programme's use.
 - (6) Relevant norms, standards and building codes (if applicable).
 - (7) Coding of input and interpretation of output.
 - (iii) Program verification
 - (1) By test running of simple problems that can be checked by hand calculations and/or by other independent programs.

1.7.1C Detailed Design Approval (DDA)

- (a) A flow chart indicating the sequence for checking of detailed design drawings and calculations is shown in Appendix 1.10 to the Employer's Requirements.
- (b) The scope of the design check to accompany DDA shall include: -
 - (i) To ensure compliance of the design with the terms and conditions of the Contract;
 - (ii) To ensure compliance with any relevant AIP documents;
 - (iii) To ensure compliance of the design with the requirements of Government Departments/Offices, relevant authorities and interested parties;
 - (iv) To ensure that any computer programs used have been properly validated, calibrated or verified as appropriate;
 - (v) To check input data to computer programs and carry out a separate check of critical elements using the output data;
 - (vi) To carry out an analytically separate design check of critical elements without reference to the calculations if hand calculations are submitted;
 - (vii) To review in detail the general arrangement and other drawings and to ensure that the design is accurately translated to the drawings; and
 - (viii) To assess in detail any required Temporary Works proposals and influence of construction methods and sequence on the Site and design of permanent Works.

- (c) A DDA submission shall include as appropriate but without limitation: -
 - (i) A Design Report as detailed under Clause 1.7.1B of the Employer's Requirements;
 - (ii) Evidence of all necessary approvals from Government departments, interested parties, relevant authorities and undertakings and statutory authorities;
 - (iii) Check Certificates in the form given in the Appendix 1.08 to the Employer's Requirements.
 - (d) In each DDA submission, the Contractor shall submit certified copy of the respective Design Report to the Supervising Officer in accordance with the latest Design Plan consented by the Supervising Officer. The number of hardcopy submission shall be agreed with the Supervising Officer.
 - (e) The Supervising Officer shall within 28 days of receipt of the detail of the Contractor's design, part or parts thereof submitted in accordance with the Design Plan, notify the Contractor in writing: -
 - (i) that consent for the respective construction to proceed is given; or
 - (ii) that consent for the respective construction to proceed is given but with conditions; or
 - (iii) that consent not given in which case reasons for not granting consent shall be given; or
 - (iv) that further information is required to be submitted, in which case the information required shall be stated.
- Provided that if none of the above actions is taken within the said period of 28 days, the Supervising Officer's consent for construction shall be deemed to have been given.
- (f) The Contractor shall within 7 days of receiving notification under Clause 1.7.1C(e)(iv) of the Employer's Requirements or within such further period as the Supervising Officer may allow in writing, provide the further information requested failing which consent for construction to proceed shall be deemed to have been rejected. The Supervising Officer shall within 7 days of receipt of such further information grant or not grant consent for construction to proceed in accordance with Clause 1.7.1C(e) of the Employer's Requirements.
 - (g) In the event that consent for construction to proceed is not granted under Clause 1.7.1C(e)(iii) of the Employer's Requirements or deemed to have been not granted under Clause 1.7.1C(f) of the Employer's Requirements, the Contractor shall within 7 days thereafter resubmit his detailed design, part or parts thereof taking account of the reasons given for the rejection or incorporating the further information requested by the Supervising Officer, as the case may be.
 - (h) The design consented to by the Supervising Officer under this Clause 1.7.1C of the Employer's Requirements becomes the Registered Design.
 - (i) If at any time it becomes apparent to the Contractor that an amendment to the Contractor's design is required for the proper completion of that part of the Works involved in such design, then he shall: -
 - (i) immediately advise the Supervising Officer of the proposed amendment; and
 - (ii) resubmit drawings, Plant and equipment schedules and/or documents to the Supervising Officer in accordance with Clause 1.7.1C(d) of the Employer's Requirements hereof for approval.

- (j) For the design of the type of permanent works which in the local construction industry is commonly designed by a manufacturer or supplier, the Contractor may propose for the Supervising Officer approval not to include such design in a DDA submission but submit it to the Supervising Officer for consent as a material or equipment submission. In such a case, such design shall be checked and certified by the Design Checker and be submitted to the Supervising Office for consent, as if it was a DDA submission, following the flowchart in Appendix 1.10 to the Employer's Requirements. The design consented to by the Supervising Office becomes the Registered Design. The procedure for design changes laid down in Clause 1.7.1E of the Employer's Requirements is applicable to such design.

1.7.1D Method statements and Temporary Works

- (a) Method statements, phasing diagrams and other drawings which are required for demonstrating the feasibility and constructability of the Contractor's permanent works design and/or which have implications on the Contractor's permanent works design, shall be submitted under the relevant DDA submissions.
- (b) Subject to the agreement of the Supervising Officer, method statements which do not fall under the categories stated in Clause 1.7.1D(a) of the Employer's Requirements may be omitted from the relevant DDA submissions. These types of method statements shall be checked and certified by the Design Checker and be submitted separately.
- (c) The design of all Temporary Works shall be checked and certified by the Design Checker in accordance with Clause 1.7.1D(d) of the Employer's Requirements and the design so certified shall form part of the Registered Design.
- (d) The Design Checker before certifying the design of any Temporary Works in the checking certificate shall: -
- (i) examine the Contractor's detailed design and method statements concerning the design, construction, installation, use and removal of the Temporary Works, and
 - (ii) consider the ground conditions, the adequacy of foundations and support of the Temporary Works and any other factors which may affect the stability and safety of such Temporary Works during their installation, use and removal, so that he shall be able to certify that the Temporary Works are properly and safely designed of such Temporary Works during their construction, installation, use and removal.
- (e) Before commencing construction of any such Temporary Works, the Contractor shall submit to the Supervising Officer in sufficient time for the Supervising Officer to comply with Clause 1.7.1D(f) of the Employer's Requirements : -
- (i) design details and method statements concerning the design, construction, installation, use and removal of Temporary Works, and
 - (ii) the original checking certificate signed by both the Design Checker and by or on behalf of the Contractor.
- (f) Further to the provisions of Clause 75 of the Conditions of Contract, the Supervising Officer shall examine the documentation referred to in Clause 1.7.1D(e) of the Employer's Requirements and shall satisfy himself that it contains no obvious deficiency and that the Design Checker has carried out his duties set out in Clause 1.7.1D(d) of the Employer's Requirements. Upon being so satisfied the Supervising Officer shall issue his consent in writing for such work to commence.

- (g) The Contractor shall ensure that such Temporary Works are constructed, installed, used and removed in accordance with the Registered Design and method statements. If the Contractor wishes to deviate from the Registered Design on the Temporary Works, the Contractor must first obtain the Design Checker's certification under Clause 1.7.1D(e) of the Employer's Requirements and the Supervising Officer's consent under Clause 1.7.1D(f) of the Employer's Requirements before any changes may be implemented.
- (h) Where Temporary Works will be subject to loading after being put into operation, the Contractor must, before any loading may be applied, submit to the Supervising Officer a further certificate signed by or on behalf of the Contractor and by the Design Checker confirming that the same has been constructed in accordance with the Registered Design. In other cases where the loading is an integral part of the construction of Temporary Works, the Contractor shall submit to the Supervising Officer such a certificate as soon as is reasonably possible after completing the construction of the same.
- (i) No certificate issued by the Design Checker or the Supervising Officer, with or without amendment, shall absolve the Contractor from his liability under the Contract for the design, construction, installation, use or removal of the Temporary Works.
- (j) The Contractor shall bear the Cost of such checking of the design, construction, installation, use and removal of Temporary Works by the Design Checker.

1.7.1E Design Changes

- (a) Subject to the approval of the Supervising Officer, minor design changes relating to previously consented DDA submissions due to correction or errors or instructed Changes may be permitted to follow a streamlined process. The corresponding flow chart is shown in Appendix 1.11 to the Employer's Requirements.
- (b) Where, in the opinion of the Supervising Officer, changes are not minor, the Design Checking Procedures as described in Clause 1.7.1A of the Employer's Requirements shall be repeated.

1.7.1F Registered Design and Commencement of the Works

- (a) Pursuant to Clause 73 of the Conditions of Contract, the construction of any part of the Works shall not commence until a Registered Design has been consented to. Thereafter, the Contractor shall construct the concerned part of the Works in strict accordance with the Registered Design.

1.7.2 Design

The following is added after GS Clause 1.7.2(h): -

- (i) The Contractor shall refer to Clause 1.5 of the Employer's Requirements for the requirements for the design of the civil engineering and builder's works.

1.7.3 Materials

The following is added after GS Clause 1.7.3(e): -

- (f) The Contractor shall refer to Clause 1.5 of the Employer's Requirements for the requirements for the materials of the civil engineering and builder's works.

1.7.4 Workmanship

The following is added after GS Clause 1.7.4(c): -

- (d) The Contractor shall refer to Clause 1.5 of the Employer's Requirements for the requirements for the workmanship of the civil engineering and builder's works.

1.7.4A Construction Checking Procedures

- (a) Stage notification and inspection of Works
- (i) The Works shall be carried out under a formalised system of written application for inspection.
 - (ii) The Works or any part or element or article of the Works which is carried out without being appropriately sanctioned by the Supervising Officer could be classified as defective work.
 - (iii) The stage appropriate to each type of work shall be proposed by the Contractor before the commencement of the Works for the consent of the Supervising Officer. Only after the appropriate sanction by the Supervising Officer shall the Contract proceed with the next stage.
 - (iv) If any articles of the Works are required to be constructed or fabricated in workshops or places outside the Site, the Contractor shall submit to the Supervising Officer for approval a plan detailing the locations and facilities of these workshops and places, the means of transportation of the articles from these workshops and places to the Site, and the arrangement for the inspection. The Contractor shall not commence any works outside the Site without prior approval of the plan by the Supervising Officer.
 - (v) For the avoidance of doubt, should the staff of the Employer or his agents (including the Supervising Officer) be required to carry out inspection at any workshops and places which are located outside the Hong Kong Special Administrative Region, the Contractor shall bear all costs in relation to and arising from the inspection including but not limited to travel and accommodation costs etc.
- (b) Inspection of materials and workmanship
- (i) The Contractor shall submit to the Design Checker a "Quality Check Form" stating the place, time and type of test/inspection of materials or workmanship and giving the location of the particular element of construction. The format of the "Quality Check Form" shall be agreed with the Design Checker before use. An example of a typical "Quality Check Form" is contained in Appendix 1.12 to the Employer's Requirements. The Contractor's submission to the Design Checker shall be made at least 24 hours prior to the planned commencement of the element of construction, and at the same time copied to the Supervising Officer.
 - (ii) The Design Checker will consider whether it is necessary for the test/inspection to be witnessed. If witnessing is considered unnecessary, the Design Checker will notify the Contractor by signing the "Quality Check Form" and returning it to the Contractor at least 12 hours prior to the planned commencement.

- (iii) If considered necessary, the Design Checker will witness the testing carried out by the specialist off-Site testing laboratory or the Contractor, or witness the inspection of the work carried out by the specialist off-Site testing laboratory or the Contractor. The Design Checker will signify by signing the "Quality Check Form" that they have been present as a witness.
 - (iv) In the event that the test/inspection is not acceptable to the Design Checker, whether witnessed or not, the Design Checker will complete the "Quality Check Form" signifying non-acceptance and return the "Quality Check Form" to the Contractor accordingly. The Contractor shall arrange to substitute the unaccepted element of construction with proper and suitable materials, or provide details of remedial measures to the Design Checker. The Design Checker will check the Contractor's proposals and, if satisfactory, the Contractor shall submit a new "Quality Check Form", cross-referenced to the original form, for re-test/re-inspection.
 - (v) In the event that the test/inspection is acceptable to the Design Checker whether witnessed or not, the Design Checker will complete the "Quality Check Form" accordingly and return it to the Contractor.
 - (vi) The use of the "Quality Check Form" shall not relieve the Contractor of any of the duties, responsibilities, obligations or liabilities imposed upon him by any of the provisions of the Contract nor restrict the Design Checker from carrying out any other inspections or tests. The Contractor shall make due allowance in the programme of the Works for the use of this Request for Inspection system at no additional cost to the Employer.
- (c) Inspection before covering up
- (i) The Contractor shall submit to the Design Checker a "Quality Check Form" stating the place and time that the particular element of construction is to be covered up or put out of view. The Contractor's submission to the Design Checker shall be made at least 48 hours prior to the planned commencement of covering up, and copied to the Supervising Officer.
 - (ii) The Design Checker will consider whether it is necessary for the inspection to be witnessed before the covering up takes place. If witnessing is considered unnecessary, the Design Checker will notify the Contractor by signing the "Quality Check Form" and returning it to the Contractor at least 12 hours prior to the planned commencement.
 - (iii) If considered necessary, the Design Checker will witness the inspection carried out by the specialist off-Site testing laboratory or the Contractor before covering up. The Design Checker will signify by signing the "Quality Check Form" that they have been present as a witness.
 - (iv) In the event that the inspection is not acceptable to the Design Checker, whether witnessed or not, the Design Checker will complete the "Quality Check Form" signifying non-acceptance and return the "Quality Check Form" to the Contractor accordingly. The Contractor shall arrange to substitute the unaccepted element of construction with proper and suitable materials, or provide details of remedial measures to the Design Checker. The Design Checker will check the Contractor's proposals and, if satisfactory, the Contractor shall submit a new "Quality Check Form", cross-referenced to the original form, for re-inspection.

- (v) In the event that the inspection is acceptable to the Design Checker whether witnessed or not, the Design Checker will complete the "Quality Check Form" accordingly and return it to the Contractor.
- (d) Not used.
- (e) Notice of Construction of Works and Installation of Plant
 - (i) Notwithstanding the Contractor's programme, notice of installation of Plant shall be given to the Supervising Officer and the Design Checker in writing 7 days in advance of the time of the installation to enable the Supervising Officer and the Design Checker to make such arrangements as may be deemed necessary for its inspection.
 - (ii) The Contractor shall give to the Supervising Officer and the Design Checker not less than 24 hours' notice of any Works to be implemented, especially Works that involve the covering-up of Works previously done.
 - (iii) The Works shall be carried out under a formalised system of written notification for inspection of Works. The Contractor shall submit the proforma of the notification to the Design Checker for certification and the Employer for consent and arrange for his own supply of such forms. The Supervising Officer and the Design Checker will define the stages of notification appropriate to each type of work. In addition to the above, the Contractor shall submit to the Design Checker and the Supervising Officer on every Friday a detailed programme of work to be carried out in the following week. This shall include exact locations, nature of each operation and time when the work is to be carried out.
- (g) Specialist testing laboratory and independent expert
 - (i) The Supervising Officer may decide it is not necessary for him to witness a test or inspection, but may advise in writing to the Employer to require or order the Contractor to provide a specialist testing laboratory or independent expert to carry out the test or inspect the work prior to the work being continued or covered up. Should the Employer or the Supervising Officer decide it is required and to so order, the Contractor shall carry out such test / inspection and submit the results of the test / inspection carried out by the specialist testing laboratory / independent expert to the Supervising Officer within 48 hours the results are released.
 - (ii) The specialist testing laboratory and the independent expert shall be independent of the Contractor.
 - (iii) Where specialist testing has to be carried out under the Contract in an off-Site laboratory, or where specialist on-site testing is required, the Contractor shall submit details of the specialist testing laboratory for the Supervising Officer's consent. Only accredited laboratories shall be used; in particular any laboratory used in Hong Kong shall be HOKLAS accredited for the relevant tests. Where one or more laboratories are accredited by HOKLAS for the relevant tests, then tests shall be carried out by one of those laboratories, and results shall be issued on HOKLAS Endorsed Test Reports. Where no laboratory is accredited by HOKLAS in Hong Kong for the relevant tests, then the Contractor shall carry out the tests overseas in a laboratory accredited for the specific tests by an accreditation scheme with which HOKLAS has a Memorandum of Understanding, if available. Details of tests to be carried out shall be submitted to the Supervising Officer for consent.

- (iv) The Contractor shall also advise: -
 - (1) Not used.
 - (2) the period of notice necessary between commissioning the specialist testing laboratory and the first sample being accepted for testing (including any shipping or air freight lead time);
 - (3) the period needed for testing; and
 - (4) the period after testing before the results will be delivered to the Supervising Officer.
- (v) No testing at the specialist testing laboratory shall be carried out until the Supervising Officer's consent has been given.
- (vi) The laboratory test reports shall be sent to the Supervising Officer directly by the laboratory / independent expert in order to ensure the integrity of the laboratory test reports.

1.10S Works Execution and Site Management by Contractor

GS Clause 1.10 is deleted and replaced by the following: -

1.10.1 Key staff in the Team

- (a) With reference to Clauses 15 and 15A of the Conditions of Contract, all Contractor's key staff in the Team for the Design, the Works and the Operation are subject to the approval of the Employer. For the avoidance of doubt, the key staff in the Team shall include the staff stated in Clauses 15A.1(a) to (j) of the Conditions of Contract.
- (b) When submitting his programme under Clause 14 of the Conditions of Contract, the Contractor shall also submit a statement describing the organisation which he proposes to adopt for the management of the Design, the Works and the Operation. This organisation shall cover all aspects and the functions, responsibilities and authority of each member of the management and supervisory staff. The statement for the Operation shall be included in the Operation Plan in accordance with the requirements stated in Clause 1.27.3 of the Employer's Requirements.
- (c) Within 7 days of signing of the Contract the Contractor shall notify the Employer of the name, qualification and experience of the person he intends to appoint as the Project Manager. The Contractor's Project Manager shall be approved by the Employer. The Contractor shall not make or change such appointment without receiving the prior approval of the Employer (which shall not be unreasonably withheld). Within 28 days of signing of the Contract, following the approval by the Employer, the Contractor shall appoint a Project Manager who shall have full authority to act on the Contractor's behalf in connection with the Contract.
- (d) The Employer may on any reasonable ground withdraw his approval and require the removal and replacement of the Contractor's Project Manager. After receiving such notice of withdrawal in writing the Contractor shall within 21 days replace the Project Manager by another competent manager approved by the Employer following equivalent notification to that required under Clause 1.10.1(c) of the Employer's Requirements.

- (e) The Contractor shall submit, for the written approval of the Employer, the names, nationality, qualifications and experience of each of the key staff under the Project Manager in the Team as stipulated in Clause 15A.1 of the Conditions of Contract, prior to reporting their duties for the Contract, including a certified true copy of their Hong Kong Identity Cards or passport details, as appropriate, and certified true copy of the documentary proof of their qualifications and experience. All key staff in the Team shall be able to communicate and speak in English.
- (f) Any changes to either the Team or any of the key staff shall be subject to the prior written consent of the Employer. Without limiting the rights and discretion of the Employer, the Employer may refuse to approve a proposed change if, in the opinion of the Employer, the proposed replacement's relevant qualification and experience are not as good as those of the key staff being replaced.
- (g) Each of key personnel can only take up one post amongst the posts stated in Clauses 15A.1(a) to (j) of the Conditions of Contract.

1.10.2 Project Manager

- (a) The Contractor shall appoint a Project Manager who is suitably qualified and experienced to be responsible for the Contract in accordance with Clause 15.2 of the Conditions of Contract. The Project Manager shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, AND shall be a corporate member of the Hong Kong Institution of Engineers, or the Institution of Civil Engineers (UK), or the Institution of Structural Engineers (UK), or Membership of the Institution of Chemical Engineers (UK), or the Institution of Mechanical Engineers (UK), or the Institution of Engineering and Technology (UK), or the Institution of Engineers Australia, or the Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience as a Project Manager responsible for managing multi-disciplinary infrastructure project(s) which refer to infrastructure projects involving more than two of the following engineering disciplines: (i) building services, (ii) civil and structural, (iii) geotechnical, (iv) environmental, and (v) electrical and mechanical.
- (b) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Project Manager may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Project Manager is not as good as those of the Project Manager proposed by the Contractor in his Tender submissions.

1.10.3 Design Manager

- (a) The Contractor shall appoint a Design Manager who is suitably qualified and experienced to be responsible for the design of the facility for Food Waste Pre-treatment. The Design Manager shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, AND shall be a corporate member of the Hong Kong Institution of Engineers, or the Institution of Civil Engineers (UK), or the Institution of Structural Engineers (UK), or the Institution of Chemical Engineers (UK), or the Institution of Mechanical Engineers (UK), or the Institution of Engineering and Technology (UK), or the Institution of Engineers Australia, or the Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience as a Design Manager responsible for managing multi-disciplinary infrastructure project(s) which refer to infrastructure projects involving more than two of the following engineering disciplines: (i) building services, (ii) civil and structural, (iii) geotechnical, (iv) environmental, and (v) electrical and mechanical.
- (b) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Design Manager may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Design Manager is not as good as those of the Design Manager proposed by the Contractor in his Tender submissions.

1.10.4 Food Waste Treatment Technology Specialist

- (a) The Contractor shall appoint a Food Waste Treatment Technology Specialist who is suitably qualified and experienced to be responsible for the design, construction, and operation of the Facility. The Food Waste Treatment Technology Specialist shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, or shall be a corporate member of the Hong Kong Institution of Engineers, the Institution of Chemical Engineers (UK), or the Institution of Mechanical Engineers (UK), or the Institution of Engineers Australia, or the Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in the design, construction and / or operation of organic waste treatment technology.
- (b) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Food Waste Treatment Technology Specialist may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Food Waste Treatment Technology Specialist is not as good as those of the Food Waste Treatment Technology Specialist proposed by the Contractor in his Tender submissions.

1.10.5 Site Agent

- (a) The Contractor shall appoint a Site Agent who is suitably qualified and experienced to be responsible for the design, construction, and operation of the Facility. The Site Agent shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, or shall be a corporate member of the Hong Kong Institution of Engineers, the Institution of Chemical Engineers (UK), or the Institution of Mechanical Engineers (UK), or Institution of Engineers Australia, or the Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in construction project(s).

- (b) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Site Agent may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Site Agent is not as good as those of the Site Agent proposed by the Contractor in his Tender submissions.

1.10.6 Project Coordination Engineer

- (a) The Contractor shall appoint a Project Coordination Engineer who is full time on site and responsible for overseeing the civil works construction and coordinating works as stated in Clause 1.4S of the Employer's Requirements to ensure smooth execution of the Design, Works and Operation of the Facility.
- (b) The Project Coordination Engineer shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, or shall be a corporate member of the Hong Kong Institution of Engineers, or Membership of the Institution of Chemical Engineers (UK), or the Institution of Mechanical Engineers (UK), or Institution of Engineers Australia, or Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have not less than 3 years of relevant experience in piling works and 5 years of experience in coordination with design teams / interfacing parties / stakeholders.
- (c) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Project Coordination Engineer may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Project Coordination Engineer is not as good as those of the Project Coordination Engineer proposed by the Contractor in his Tender submissions.
- (e) If piling works are included in the Contract, the Project Coordination Engineer is required to supervise the piling works, visit the site at such time and frequency as necessary and shall be present to supervise inter alia, but not limited to, the following items: -
- (i) 100% check on the depth of excavation and the quality of retrieved material at the founding stratum; and
- (ii) 100% verification on the depth of the constructed piles by proof drilling (for large-diameter bored piles) including the retrieval of concrete and rock core samples for inspection and testing.

1.10.7 Other Contractor's Staff

- (a) The Contractor shall appoint sufficient number of suitably qualified and experienced staff as shown in the following to assist the Project Manager to ensure satisfactory completion of the Design and Works and satisfactory Operation throughout the Operation Period: -
- (i) Safety Manager
- (1) The Contractor shall appoint a Safety Manager to be responsible for safety at the Facility as stated in the Employer's Requirements. The Safety Manager shall be suitably qualified and experienced; shall have at least one of the following professional qualifications: Registered Safety Officer under the Factories and Industrial Undertakings (Safety Officer and Safety Supervisor) Regulations, International Diploma in Occupational Safety

and Health (issued by the British Safety Council), or equivalent qualification recognised by the Government of the HKSAR.

- (2) The Safety Manager shall have not less than 5 years of experience in health and safety issues in Hong Kong.
- (3) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Safety Manager may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Safety Manager is not as good as those of the Safety Manager proposed by the Contractor in his Tender submissions.

1.10.8 Equipment Installation Superintendent

- (a) The Contractor shall appoint an Equipment Installation Superintendent who shall be in attendance on Site for the duration of the installation of electrical and mechanical equipment of the Facility.
- (b) The Equipment Installation Superintendent shall have at least 10 years on site experience for installation of electrical and mechanical equipment.
- (c) The Equipment Installation Superintendent shall be responsible for all issues related to the installation of electrical and mechanical equipment on Site.
- (d) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Equipment Installation Superintendent may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Equipment Installation Superintendent is not as good as those of the Equipment Installation Superintendent proposed by the Contractor in his Tender submissions.

1.10.9 Surveyor

- (a) The Contractor shall employ on the Site a Surveyor for setting out the Works.
- (b) The Contractor shall submit for the approval of the Supervising Officer within 14 days after the date of the Letter of Acceptance the following particulars of the Contractor's proposed Surveyor: -
 - (i) Name with a certified true copy of any identification documents;
 - (ii) Academic qualifications with dates of courses and diplomas, degrees etc. (whichever applicable), together with certified true copies of the certificates; and
 - (iii) Past experience with contract titles, positions held and dates, together with certified true copies of any documentary proofs.
- (c) The Surveyor shall possess a degree in land surveying or equivalent plus a minimum of 5 years of experience appropriate to the nature of the survey work included in the Contract, OR a diploma in land surveying or equivalent plus a minimum of 7 years of experience appropriate to the nature of the survey work included in the Contract.
- (d) The Contractor's Surveyor shall be responsible for land survey work in connection with the Works. He shall supervise the survey work to ensure that the accuracy of the survey work meets the Contract requirements. All survey work shall be duly checked and endorsed by the Contractor's Surveyor before submitting to the Design Checker and Supervising Officer.

- (e) The Supervising Officer shall not carry out any checking of the setting out and survey work performed by the Contractor until the proposed Surveyor is approved by the Supervising Officer and the Surveyor have checked and endorsed the setting out and survey work.
- (f) The Supervising Officer shall have the authority to withdraw the approval of the Contractor's Surveyor and to require the Contractor to make replacement. Upon notification of replacement of the Contractor's Surveyor, the Design Checker and Supervising Officer shall not carry out any further checking of the setting out and survey work performed by the Contractor until the replacement is approved.
- (g) The Contractor's Surveyor shall be authorised to receive from the Design Checker and Supervising Officer all survey data relevant to the Contract and shall be available on the Site for this purpose and / or attending site meetings when necessary. The Contractor shall ensure that all necessary equipment and labour for setting out and survey work are available when required.
- (h) The Contractor shall give at least 24-hour notice to the Design Checker and Supervising Officer when making a request for checking setting out and survey work. In case the checking of setting out and survey work is to be carried out on a General Holiday or on the day immediately following a General Holiday, the Contractor must give the notice 24 hours before the start of the General Holiday.

1.10.10 Not Used

1.10.11 Operation Superintendent

- (a) The Contractor shall appoint an Operation Superintendent who shall be in attendance on Site full-time for the duration of the Operation of the Facility.
- (b) The Operation Superintendent shall have at least 5 years on site experience for operation of maintenance of sewage / waste treatment facilities.
- (c) The Operation Superintendent shall be responsible for all issues related to the Operation.
- (d) The Contractor shall note that in accordance with Clause 1.10.1(f) of the Employer's Requirements, the Contractor's proposed Operation Superintendent may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Operation Superintendent is not as good as those of the Operation Superintendent proposed by the Contractor in his Tender submissions.

1.10.12 Laboratory technician

- (a) The Contractor shall appoint a laboratory technician who shall be full-time on site during Operation period and responsible for the sampling and testing works of the Facility. The laboratory technician shall be familiar with the testing methods and procedures of the parameters as required in the Employer's Requirements.

1.10.13 Particulars of agent and employees

- (a) The following particulars of the proposed superintendents, engineers, supervisors, foreman and technicians shall be submitted to the Supervising Officer: -
 - (i) Name with a certified true copy of any identification documents;
 - (ii) Details of qualification, including certified true copies of any documentary proofs; and

- (iii) Past experience with contract titles, positions held and dates, together with certified true copies of any documentary proofs.
- (b) The particulars of the proposed superintendents, engineer and supervisor shall be submitted to the Supervising Officer for approval and the particulars of the proposed foreman and technician shall be submitted to the Supervising Officer for information.
- (c) The particulars of the proposed superintendent, engineer and supervisor related to the Works shall be submitted to the Supervising Officer within 7 days of commencement of the Works. The particulars of the proposed superintendent and supervisor related to the Operation shall be submitted to the Supervising Officer within 7 days of commencement of the Operation. The particulars of the proposed superintendent, foreman and technician shall be submitted within 7 days of his appointment.

1.10.14 Appointment of Design Checker

- (a) The Contractor shall appoint a Design Checker in accordance with Clause 5 of the Conditions of Contract to undertake, as stipulated in Clause 74.2 of the Conditions of Contract, the independent checking of the Contractor's Plans, the Contractor's designs of the Works including methods of construction, the inspection and monitoring of the execution of the Works and the checking and certification that the Works are constructed in accordance with the Registered Design and the methods of construction (including tests of the Works as specified in and in accordance with the Contract).
- (b) The Design Checker shall be a firm or company or firms or companies of consultants with civil engineering, E&M engineering, organic waste treatment process, and environmental expertise under the direct employment of the Contractor.
- (c) The members of the Design Checker shall include at least the following specialist who shall meet the requirements for qualification and experience stated in the following: -
 - (i) Organic waste treatment technology specialist who is suitably qualified and experienced to be responsible for the design checking of Food Waste Pre-treatment of the Facility. The specialist shall have a Bachelor's degree or equivalent in a relevant science or engineering disciplines, OR shall be a corporate member of The Hong Kong Institution of Engineers, or The Institution of Chemical Engineers (UK), or The Institution of Mechanical Engineers (UK), or The Institution of Engineering and Technology (UK), or The Institution of Engineers Australia, or The Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in design of organic waste treatment facilities.
 - (ii) Electrical specialist who is suitably qualified and experienced to be responsible for the design checking of electrical works of the Facility. The specialist shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, OR shall be a corporate member of The Hong Kong Institution of Engineers, or The Institution of Mechanical Engineers (UK), or The Institution of Engineering and Technology (UK), or The Institution of Engineers Australia, or The Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in design of low voltage electrical works.

- (iii) Civil engineering specialist who is suitably qualified and experienced to be responsible for the design checking of all civil engineering design for the Facility, including the Temporary Works. The specialist shall be a corporate member of The Hong Kong Institution of Engineers, or The Institution of Civil Engineers (UK), or The Institution of Structural Engineers (UK), or The Institution of Engineers Australia, or The Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in civil engineering design.
 - (iv) Mechanical engineering specialist who is suitably qualified and experienced to be responsible for the design checking of mechanical engineering design for the Facility. The specialist shall be a corporate member of The Hong Kong Institution of Engineers, or The Institution of Mechanical Engineers (UK), or The Institution of Engineering and Technology (UK), or The Institution of Engineers Australia, or The Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in mechanical engineering design.
 - (v) Control, instrumentation and automation specialist who is suitably qualified and experienced to be responsible for the design checking of control, instrumentation and automation works of the Facility. The specialist shall have a Bachelor's degree or equivalent in a relevant science or engineering discipline, OR shall be a corporate member of The Hong Kong Institution of Engineers, or The Institution of Mechanical Engineers (UK), or The Institution of Engineering and Technology (UK), or The Institution of Engineers Australia, or The Institution of Professional Engineers New Zealand, or an institution of equivalent standing; AND shall have at least 5 years of experience in design of control, instrumentation and automation works.
 - (vi) Authorised Person who is suitably qualified and experienced to check and ensure the Contractor's design of the buildings, geotechnical works, drainage and structures are in compliance with the respective regulations and codes of the Buildings Ordinance (Cap. 123).
- (d) The Contractor shall note that the Contractor's proposed Design Checker may be refused by the Employer if in the Employer's opinion that the relevant qualification and experience of the Contractor's proposed Design Checker is not as good as those of the Design Checker proposed by the Contractor in his Tender submissions.
 - (e) In the event that the Contractor wishes to replace any of the members of the Design Checker, he shall give the Employer at least 28 days written notice together with the name and all particulars reasonably required by the Employer of the replacement member who shall be deemed to be approved by the Employer provided such replacement is not expressly disapproved by the Employer in writing, but not unreasonably, within 14 days from the serving of a notice in writing on the Employer by the Contractor of the appointment of the replacement of the member of the Design Checker.

1.10.15 Sub-contractors for Pre-treatment System

- (a) The Sub-contractors shall be either a contractor specified on the "List of Approved Suppliers of Materials and Specialist Contractors for Public Works" under Development Bureau for category of "Electrical and Mechanical Installation for Sewage Treatment and Screening Plant" or a contractor who has minimum one (1) number of experience in installation of waste treatment facility at Organic Waste Treatment Facilities.

- (b) The following particulars of the proposed party(ies) for the installations of Pre-treatment System shall be submitted to the Supervising Officer within 1 month from the date of the Letter of Acceptance: -
- (i) Name of the proposed party(ies) the installations of Pre-treatment System; and
 - (ii) Past experience with contract titles, dates together with certified true copies of any documentary proofs.

1.11 Information to be Submitted by Contractor

GS Clause 1.11(g) is deleted.

1.11A Further information to be Submitted by Contractor

1.11A.1 General

- (a) All reports and records, including but not limited to the Contractor's Plans and design submissions, that are to be submitted to the Employer, and, where appropriate, the Supervising Officer, shall be in a format agreed by the Employer.
- (b) The Project Manager of the Contractor shall sign all reports and records that are to be submitted to the Employer, and, where appropriate, the Supervising Officer.

1.11A.2 Submission of Contractor's Plans

- (a) The Contractor shall submit the Contractor's Plans within the specified period stated in the relevant clauses of the Employer's Requirements. The Contractor's Plans shall include the Project Management and Technical Resources Plan, Design and Works Plan and Operation Plan. The Contractor's Plans shall provide the framework and structure with the related requirements as stipulated in the Employer's Requirements.
- (b) Unless otherwise specified in the Employer's Requirements, the Contractor shall submit a draft of each plan of the Contractor's Plans to the Employer, the Design Checker and the Supervising Officer within 28 days from the date of the Letter of Acceptance.
- (c) The draft plans shall meet the requirements and contain the matters and details set out in the relevant clauses of the Employer's Requirements. The draft plans shall be developed based on and shall not differ in any material respect from the outline format of the Contractor's Plans submitted in the Contractor's tender, unless the material in the outline Contractor's Plans submitted in the Contractor's tender does not comply with the requirements stipulated in the Contract. The Contractor shall revise all materials in his outline Contractor's Plans which do not comply with the requirements stipulated in the Contract such that all contents of the draft Contractor's Plans shall comply with the requirements stipulated in the Contract. Within 14 days of receipt by the Design Checker of the draft plan, the Design Checker shall: -
 - (i) certify that the draft plan is in accordance with the Contract;
 - (ii) request further information from the Contractor to clarify or substantiate the draft plan; or
 - (iii) refuse to certify the draft plan and notify the Contractor reasons for such rejection.
- (d) The Contractor shall within 7 days of receiving notification from the Design Checker under Clause 1.11A.2(c)(ii) of the Employer's Requirements, provide the further information requested, failing which the draft plan will be deemed to have been rejected.

- (e) In the event that the draft plan is refused to be certified by the Design Checker under Clause 1.11A.2(c)(iii) of the Employer's Requirements or deemed to have been rejected under Clause 1.11A.2(d) of the Employer's Requirements, the Contractor shall, within 14 days thereafter, amend and resubmit the draft plan for certification by the Design Checker.
- (f) Within 14 days of the receipt by the Supervising Officer of the certification issued by the Design Checker under Clause 1.11A.2(c)(i) of the Employer's Requirements, the Supervising Officer shall inform the Contractor in writing that the Supervising Officer consents or does not consent to the certified draft plan. In the event that the Supervising Officer does not consent to the certified draft plan, he shall specify those parts of the certified draft plan with which he is not satisfied and the Contractor shall prepare a further draft plan in accordance with Clause 1.11A.2(b) of the Employer's Requirements for the certification by the Design Checker and consent by the Supervising Officer.
- (g) The submission to the Employer or the Supervising Officer of the draft plans or the giving of consent (or withholding of consent) by the Supervising Officer or the certification (or refusal thereof) by the Design Checker shall not relieve the Contractor of any duty, obligation or responsibility under the Contract.
- (h) The plans relevant to the Operation of the Facility are set out in Clause 6.1.2 of the Employer's Requirements. The Contractor is required to review, update and submit for the Employer's approval in accordance with Clause 6.1.2 of the Employer's Requirements.
- (i) The Contractor shall refer to Clause 1.27 of the Employer's Requirements for the requirements for each of the Contractor's Plans.

1.11A.3 Design Reports and Submissions

- (a) The Contractor shall prepare and submit Design Reports for each of the design packages set out in the Design and Works Plan for carrying out the Design Checking Procedures. A Design Report of a design package shall comprise calculations and/or drawings with accompanying text to describe the Contractor's design of all elements and components covered by that design package.
- (b) To the extent applicable, each of the Design Reports shall include the following relevant information and/or documents: -
 - (i) Contents;
 - (ii) Description of design approaches;
 - (iii) Design criteria, parameters, assumptions and methods used for the design;
 - (iv) Test procedures, analyses and results;
 - (v) Calculations and schedules;
 - (vi) Drawings;
 - (vii) Method of construction (if any), Temporary Works, construction and installation sequence and major plant and equipment;
 - (viii) Construction risks and mitigation measures with due consideration to including without limitation site constraints, availability of necessary labour and plant, interface with adjacent facilities and development and programming;

- (ix) References, specification requirements, codes, manuals and supporting documents used, drawing numbers and titles of drawings which are based on the design;
 - (x) Monitoring and instrumentation arrangements;
 - (xi) Material specification;
 - (xii) Specifications including details of required compliance checking;
 - (xiii) Relevant check certificate(s) in accordance with Appendix 1.08 to the Employer's Requirements;
 - (xiv) Testing proposals with detailed procedures and relevant testing standards for monitoring/verifying the performance of the system/equipment during the Operation Period; and
 - (xv) Any other relevant information.
- (c) All Design Reports shall not differ in any material respect from the Contractor's Plans. The Supervising Officer shall not consent to any relevant submissions under the Design Checking Procedures should the information provided in the Design Report deviates in material respect from the Contractor's Plans.

1.11A.4 Design and Working Drawings

- (a) The Contractor shall be responsible for producing all design and working drawings necessary to carry out the Contract.
- (b) Drawings and other documents that are required to be submitted by the Contractor shall be of sizes complying with the ISO "A" Series specified in British Standard BS3429; sizes larger than A1 shall not be used.
- (c) Drawings and other documents shall show the project title, Contractor's name, designer's name, Design Checker's name, Employer's name, date and revision. Drawings shall additionally show the title, number, scale and, where appropriate, north point and shall have a blank area 90 mm x 70 mm adjacent to the title block, for use by the Design Checker, the Supervising Officer, and the Employer.
- (d) Drawings shall not include any freehand lettering or stencilling less than 2.5 mm in height.
- (e) Calculations shall clearly indicate to which element of the work they relate and shall commence with a brief summary of the design concept and design criteria.
- (f) Drawings shall not include any freehand lettering or stencilling less than 2.5 mm in height.
- (g) The detailed design drawings shall clearly show the layout of the Works, all structures, installed plant and services. The Contractor shall be responsible for ensuring the accuracy of the dimensions and for co-ordinating the various disciplines involved. The drawings shall accurately reflect the information presented in the calculations. The Contractor shall be responsible for ensuring the correctness of the drawings.
- (h) In view of the complexity of the installations, the Contractor shall submit combined services drawings showing all E&M services to be installed to the Design Checker for certification and the Supervising Officer for consent before commencement of the E&M installations. The combined services drawings shall be well co-ordinated with due consideration to aesthetic, operational and maintenance requirements.

- (i) Modifications to drawings or diagrams shall be clearly indicated and the revision references shall be changed at each revision.
- (j) Drawings shall be specific to the Contract and shall be detailed in SI Units.
- (k) The Design shall include a coloured artist's impression of the completed scheme, at A1 scale, including plans, perspectives, layouts, elevations (including interiors and landscape works) of the Facility.

1.11A.5 Record Drawings

- (a) In accordance with Clause 52 of the Conditions of Contract, the Contractor shall be responsible for the production of record drawings showing the Works as constructed, which shall be certified by the Design Checker and submitted to the Employer within 28 days of the date of completion stated on the relevant Certificate of Substantial Completion for the Works. The number of hardcopy submission shall be agreed with the Employer and, where necessary, the Supervising Officer. Where drawings are produced on a CAD system, an electronic copy of the record drawings shall be provided. The Employer will consider the completion of the certification procedures for the record drawings as one of the Contractor's obligations to be completed before issue of a Certificate of Completion of the Works.
- (b) The record drawings shall show the positions of all structures, equipment and components as constructed and installed. For the avoidance of doubt, the record drawings shall include all drawings in respect of process, electrical and mechanical engineering works, civil engineering works, structural engineering works, geotechnical engineering works, building services, architectural and landscaping works, utilities, wiring drawings and control diagrams and other miscellaneous shop drawings
- (c) The record drawings shall include all the prints of record drawings of the Works complete with a list of the record drawings submitted.
- (d) If the Facility is modified during the Operation, the Contractor shall amend any previously issued record drawings in accordance with Clauses 1.11A.5(a) to (c) of the Employer's Requirements and submit them to the Employer within 28 days of the date of completion of the modification.

1.11B Survey

1.11B.1 Survey and setting out

- (a) Before the commencement of the Works, the Contractor shall obtain information concerning the Government Survey Stations from the District Survey Office that shall be used for the control of all survey work.
- (b) The Contractor shall employ on the Site a surveyor responsible for setting out the Works and for conducting slope and retaining wall record surveys. The surveyor shall receive from the Employer all survey data relevant to the Contract and shall be available on Site for this purpose when necessary. Any assistants employed by the surveyor for the purpose of setting out the Works shall be suitably experienced and competent to carry out the required surveys. The Contractor shall ensure that all necessary equipment and labour for accurate survey work and setting out is available when required.

- (c) Prior to the commencement of the setting out of the Works including control traversing, and the calculation of survey control data for both line and level, the Contractor shall submit the details of his proposed methods to establish such control to the Design Checker for certification and subsequently to the Employer for consent. Proposals for the establishment of control marks subsequent to the initial control shall also be submitted. The Contractor shall not carry out any setting out until he has obtained the Design Checker's certification and the Employer's consent to his methods.
- (d) The Contractor shall establish survey stations and bench marks on stable ground adjacent to the Works and at intervals not exceeding 500 m so as to enable the Design Checker and the Supervising Officer to check readily any part of the Works to which they refer. The locations and levels of such survey stations and bench marks shall be checked and certified by the Design Checker prior to the commencement of the Works to which they refer. The stations and marks shall be of such construction and sufficiently well protected as to ensure that they are not moved or damaged during construction of the Works. The Contractor shall check the positions and levels of the survey stations and bench marks at not less than monthly intervals and immediately notify the Design Checker and the Supervising Officer in writing of any discrepancy.
- (e) The Contractor shall, as soon as practicable, supply the Design Checker and the Supervising Officer with records in an approved form relating to all survey stations and bench marks and shall keep such records up-to-date for the Design Checker's and the Supervising Officer's reference.
- (f) Survey stations and bench marks shall be carefully preserved and properly replaced if broken, except where construction requires their removal, and before such removal, the Supervising Officer's consent shall be obtained.
- (g) The Contractor's attention is drawn to the presence of Government Survey Stations in or about the Works and the relevant Government instructions pertaining thereto.
- (h) The setting out of the Works shall be based on the control lines laid down in the Contract. The Contractor shall be responsible for co-ordinating with setting out lines or control lines of adjacent works and existing buildings and roads. In the event that any discrepancy arises relative to such setting out or control lines, the Contractor shall, subject to the Supervising Officer's consent, make suitable adjustments.

1.11B.2 Record surveys

- (a) Before the Contractor commences any excavation or filling, a joint record survey of the relevant area shall be carried out with the Design Checker and the results shall be recorded on drawings that shall show plans and sections of the land surface with horizontal intervals not exceeding 15m and on which all levels shall be referred to Principal Datum.
- (b) The Contractor shall agree with the Design Checker the proposed methods of executing and recording these surveys, and shall notify the Design Checker, in writing at least 14 days before such excavation or filling commences, that a joint record survey of the relevant areas is required.
- (c) One set of coloured record photographs consisting of negatives plus one copy of 4R size prints from each negative recording existing buildings, structures, road furniture, roadworks and other features in and around the vicinity of the Site shall be submitted to the Design Checker and the Supervising Officer within 7 days from the date of taking possession of the the Site. The Contractor shall supply approved albums to accommodate the photographs and negatives.

1.11B.3 Reference documents

- (a) Further to Clause 52 of the Conditions of Contract, the Contractor shall keep in the Facility one copy of the record drawings, the Operation and Maintenance Manuals, and any other relevant manual or maintenance document relating to the Facility. These drawings, manuals and other documents shall be available at all reasonable times for inspection and use by the Design Checker, the Supervising Officer, the Employer and his agents or employees, and by any other person authorised by the Employer in writing.

1.12S Programme

GS Clause 1.12 is deleted and replaced by the following: -

1.12.1 General

- (a) In addition to the programme to be submitted to the Employer and the Supervising Officer in accordance with Clause 14 of the Conditions of Contract, the Contractor shall submit to the Employer and Supervising Officer the following: -
- (i) a programme showing a detailed breakdown of the work to be carried out for the whole of the Design and the Works together with a three month rolling programme; the programmes shall be submitted within a further 14 days of the programme submitted in accordance with Clause 14 of the Conditions of Contract;
 - (ii) a programme showing the work completed to date and a breakdown of the work to be carried out for the remainder of the Design and the Works together with a three month rolling programme: setting out the work to be carried out in the following three months; the programme shall be submitted not later than three days before the end of each month. The first three-month rolling programme shall be submitted within 14 days of notification of acceptance of the tender;
 - (iii) detailed sub-programmes for separate parts of the work; each programme shall be submitted at least two weeks before the relevant part of the work starts and revised sub-programmes shall be submitted at times agreed by the Supervising Officer;
 - (iv) a financial programme showing the expenditure pattern for the whole of the Design and the Works including the monthly payments based on the programmes submitted in accordance with Clause 1.12.1(a)(i) of the Employer's Requirements; and
 - (v) The Contractor shall submit three hard copies and one digital editable copy and one non-editable digital copy of a progress report at the end of each calendar month, describing the status of the Works at least up to and including the twenty-ninth day of the calendar month. The report shall include the following particulars: -
 - (1) the programme stated in Clause 1.12.1(a) of the Employer's Requirements showing the work completed to date and a breakdown of the work to be carried out for the remainder of the Works;
 - (2) the three month rolling programme stated in Clause 1.12.1(a)(i) and (ii) of the Employer's Requirements;
 - (3) details of actual or potential departures from the programme;

- (4) an up-to-date schedule of critical materials and equipment originating outside Hong Kong;
 - (5) proposals for improving progress and making good any delays to the programme if necessary;
 - (6) a schedule of labour and Constructional Plant employed on the Works during the month;
 - (7) a summary of extensions of time claimed;
 - (8) an up-to-date schedule of critical drawings and other information to be provided by the Employer or the Supervising Officer;
 - (9) the financial programme stated in Clause 1.12.1(a)(iv) of the Employer's Requirements showing the payments made to date and the revised expenditure pattern for the remainder of the Works; and
 - (10) the progress photographs as detailed in Clause 1.13.4 of the Employer's Requirements.
- (b) Programmes submitted in accordance with Clause 1.12.1(a) of the Employer's Requirements shall be in the form of a bar chart showing the earliest and latest start and finish dates for each activity, and the critical path.
- (c) The breakdown of the work to be shown for each Section of the Works on the programme submitted in accordance with Clause 1.12.1(a) of the Employer's Requirements shall be comprehensive. It shall include the key activities, key dates and milestones from the programme submitted under Clause 14 of the Conditions of Contract, the information required under Clause 14 of the Conditions of Contract and the effects of the matters listed in Clause 91 of the Conditions of Contract, together with the following: -
- (i) Work to be carried out, including testing and commissioning;
 - (ii) Fabrication, delivery and installation of materials to be fabricated off the Site;
 - (iii) Delivery of critical materials originating from outside the HKSAR;
 - (iv) Activities for which the Employer or the Supervising Officer is responsible, including the issue of critical drawings and other information, provision of materials by the Employer, nomination and approval of Nominated Sub-contractors and consideration and approval of drawings and proposals; and
 - (v) Work to be carried out by Government departments, Utility Undertakings and other contractors.
- (d) The Contractor shall be responsible for arranging, co-ordinating and agreeing with the Utility Undertakings a programme for their works. The Contractor shall make full allowance for time and provision of facilities for the Utility Undertakings in the preparation of his programmes.
- (e) The Contractor's particular attention is drawn to the requirements of liaison with all relevant parties and others and makes allowances in his programme and in tender rate. The Contractor's attention is also drawn to the issues and constraints stipulated in Clauses 1.4S of the Employer's Requirements in planning and programming his works.
- (f) In amplification of the requirements of Clause 14 of the Conditions of Contract; without limitation: -

- (i) the particulars supplied by the Contractor with the programme submitted under Clause 14 of the Conditions of Contract shall include but not limited to the following details: -
 - (1) a statement giving the numbers and categories of supervisory and technical staff and skilled and unskilled labour to be employed on the Works; and
 - (2) a list and typical details of Constructional Plant to be used on the Works.
 - (ii) the details of the programme for the Design and the Works shall encompass all activities of the Design and the Works from the date of the Letter of Acceptance until the completion of the Design and Works.
- (g) The Contractor's programmes, including that required by Clause 14 of the Conditions of Contract, shall make due allowance for the performance of those activities necessary for the proper performance of the Contract including, without limitation: -
- (i) surveys, trials, testing, obtaining all necessary permits, licences, approvals and consents, (in particular those required for the Design before the Works may commence);
 - (ii) taking mitigation measures to reduce environmental impacts and nuisances arising from the Works; and
 - (iii) the performance if required of items of work described as "provisional" in the Contract.
- (h) The Contractor shall submit to the Employer and the Supervising Officer, in addition to hard copies, one digital copy of each of the programme referred to in Clause 14 of the Conditions of Contract and Clause 1.12.1(a) of the Employer's Requirements. The digital copies of these programmes should be prepared by a computer software agreed by the Employer and the Supervising Officer.
- (i) This Clause 1.12.1 of the Employer's Requirements shall not relieve the Contractor of his obligations to provide records and reports as stipulated in other parts of the Contract.

1.12.2 Critical Path Scheduling

- (a) The progress of the Works shall be kept under continuous review by means of critical path analysis. To achieve this, the Contractor shall submit to the Employer and the Supervising Officer, a critical path network within 28 days of the date of the Letter of Acceptance. This critical path network shall show the order of procedure and method of carrying out the Works, together with the Constructional Plant and resources to be employed and the issue of documents for information and approval.
- (b) The critical path network shall be submitted at the same time as the programme required under Clause 14 of the Conditions of Contract, and for the Employer's consent under Clause 14.4 of the Conditions of Contract.
- (c) The critical path network shall be in such detail as may be certified and consented to by the Employer or the Supervising Officer and shall subsequently be updated at monthly intervals or such other intervals as required by the Employer or the Supervising Officer.
- (d) The submission by the Contractor of such a programme or revised programme or the furnishing of such particulars shall not relieve the Contractor of any duty or responsibility under the Contract.

- (e) After the critical path network has been submitted to, certified and consented to by the Employer or the Supervising Officer, the Contractor shall carry out the Works in accordance with the approved critical path network. The Contractor shall adhere to the order of procedure and method stated therein unless he obtains the written permission of the Employer to vary such order or method except in an emergency that threatens the safety of the Works or of persons or other property. The Contractor may carry out such emergency works as are necessary without previous consent.
- (f) If, at any time during the course of the Works, the Contractor finds it necessary to request a modification of the approved critical path network, the Contractor shall inform the Employer immediately in writing and shall submit a modified critical path network for Supervising Officer's certification and the Employer's consent. If in the opinion of the Employer, such modification will adversely affect the time for completion, and is due to cause within the Contractor's responsibility, no modification to the programme will be allowed and the Contractor shall take all steps necessary to adhere to the approved programme or submit a further revised critical path network meeting the required programme targets.

1.13 Keeping of Works Records during Execution of the Works

GS Clause 1.13.1 is deleted and replaced by the following: -

1.13.1S Site Diary

- (a) The Contractor shall keep a daily site diary showing, amongst other things, the amount of workmen, constructional plant, equipment, materials, amount of works done, weather conditions, safety records and miscellaneous instructions for the works being carried out. The Contractor shall produce these site diaries for inspection when required by the Employer or the Supervising Officer.
- (b) The Contractor's attention is drawn to Clause 6.5.2 of the Employer's Requirements wherein his general obligations in respect of the submission of Site Diary during the Operation are set out.

GS Clause 1.13.2 is deleted and replaced by the following: -

1.13.2S Records of Correspondence

- (a) Colour copies of correspondence relevant to the execution of the Design, the Works and the Operation (and not of a confidential nature) received from or despatched to Government departments, Utility Undertakings and other contractors employed by the Employer or DSD shall be submitted to the Employer, and, where necessary, the Supervising Officer for information as soon as possible, but in any case not later than 7 days after receipt or dispatch.

GS Clause 1.13.4 is deleted and replaced by the following: -

1.13.4S Photographs and Videos

- (a) Colour progress photographs showing the progress of the Works and the quality of the materials and workmanship shall be taken by the Contractor using approved digital camera. The photographs shall be taken at locations selected by the Supervising Officer. Photographs shall be taken once every month and at other times instructed by the Supervising Officer.

- (b) The photo taking date, time and location shall be printed on each photograph. The Contractor shall be responsible for informing the Supervising Officer when photographs are taken and for completing the information on each photograph. The Supervising Officer shall then sign the photographs to signify his agreement to such information.
- (c) One print of each progress photograph shall be provided to the Supervising Officer not more than 3 days after the photographs are taken. The Supervising Officer shall select the set of progress photographs to be provided. The selected sets shall be provided not more than 3 days after the Supervising Officer has selected the set. The following shall be provided for the Supervising Officer:-
 - (i) One set (40 nos.) of printed colour digital photographs in 5R size in duplicate on paper of A4 size of quality suitable for good quality photograph; and
 - (ii) a DVD-ROM containing the following items:-
 - (1) The digital images, in JPEG format, of the progress photographs; and
 - (2) A file containing the progress photographs with relevant descriptions, in Microsoft Word format or its compatible.
- (d) The Contractor shall supply approved hard covered ring-file type albums with clear plastic sleeves to accommodate the prints and DVD-ROM. Photographs in excess of one set ordered by the Supervising Officer on any single month shall be defined as additional photographs which shall be deemed to include 2 coloured 5R size prints and digital images in JPEG format.
- (e) The Supervising Officer may select any of the above-mentioned photographs for the production of coloured blow-up prints of 8R size and each print shall be defined as 8R record photograph. The Supervising Officer may also order framed 8R prints from the digital images.
- (f) The professional photographer proposed by the Contractor shall be able to take aerial photographs of the Works throughout the whole period of Design and Works. The professional photographer shall either use drones or aircraft capable of accommodating two passengers in addition to the pilot and the photographer to take the aerial photographs.
- (g) All hard and digital copies of the photographs taken and submitted to the Supervising Officer shall be signed by both the Supervising Officer, and the authorised agent or representative of the Contractor.
- (h) The progress and record photographs and videos of the Works including without limitation the print/digital files, print/digital images, albums, folders, etc. shall become the property of the Employer.
- (i) The Contractor undertakes that it shall not duplicate or use (including without limitation doing any acts restricted by copyright under sections 22 to 29 of the Copyright Ordinance (Cap. 528)) any Photos and Videos without prior written permission from the Employer. All the Intellectual Property Rights in the Photos and Videos shall vest and remain vested in the Employer immediately upon their creation. If such Intellectual Property Rights for any reason do not vest in the Employer, the Contractor shall at its sole cost and expense forthwith, or shall ensure that the owner(s) of the Intellectual Property Rights shall forthwith, upon the demand of the Employer execute all necessary instruments or documents under which the Employer shall be assigned such Intellectual Property Rights. The Contractor shall take Photos and Videos strictly in accordance with this Clause 1.13.4 of the Employer's Requirements.

The following clauses are inserted after GS Clause 1.13.4: -

1.13.5 Monthly Report

- (a) The Contractor shall prepare Monthly Reports in a format agreed by the Employer from the commencement of the Design and the Works until the issue of the Handover Certificate. The report shall be submitted to the Employer and, where appropriate the Supervising Officer, within 14 days of the month following the month of the report in paper copy and DVD-ROM format and shall contain the following information, without limitation: -
- (b) The Monthly Report will be discussed at the next regular progress meeting but the receipt of the report by the Employer and, where appropriate the Supervising Officer, and/or the subsequent discussion of the report in no way signifies acceptance by the Employer and, where appropriate the Supervising Officer, of any of the details either contained therein or discussed at the progress meeting.

1.13.6 Attendance of Progress Meetings

- (a) The Employer or the Supervising Officer may call progress meetings from time to time as necessary and normally at intervals of not more than one month for the purpose of management of the Contract. The Contractor shall attend, and shall arrange the representatives of sub-contractors, Government departments, transport companies, utility undertakings, other contractors and other responsible persons to attend the meetings when required by the Employer or the Supervising Officer.
- (b) Apart from progress meeting, the Contractor shall also attend meetings arranged by the Employer or the Supervising Officer for matters relating to the Contract. The Contractor shall not claim any additional cost or time for such request.
- (c) The Contractor shall give the Employer or the Supervising Officer 48 hours notice, or such shorter period agreed by the Employer or the Supervising Officer, before meetings with Government departments, transport companies, utility undertakings, other contractors are to be held and shall give the Employer or the Supervising Officer the opportunity to attend such meetings.

1.23 Training

1.23.1 General

GS Clause 1.23.1(c) is deleted and replaced by the following: -

- (c) Detailed scope and the programme of the training shall be submitted to the Employer three months before the commencement of the training. The Contractor shall arrange training venue, facility and trainers for the training classes. All training shall be conducted in Cantonese and/or English unless otherwise specified in the Contract or requested by the Employer. The training programme shall suit the timetable of the Employer's staff which the Contractor will be informed of in advance. Training should normally be conducted in daytime.

1.24S Construction Site Safety and Environmental Management

GS Clause 1.24 is deleted and replaced by the following: -

1.24.1 General

- (a) The Contractor shall ensure as a priority in all activities connected with the Works, the safety and health of all persons on or adjacent to the Site.
- (b) The Contractor shall provide and employ on the Site only such personnel who have received adequate training including safety and health training relevant to their tasks and adopt safe working practices at all times and shall ensure his sub-contractors comply with this requirement.
- (c) The Contractor shall not allow any person to work on the Site who has repeatedly breached safety requirements. A notice of such sanction shall be displayed at a prominent place on the Site.

1.24.2 Legislation, Regulations and/or Codes of Practice

- (a) The Contractor shall comply with current version of the following legislation, regulations and/or codes of practice, guides and other documents and any additions or amendments thereto coming into effect before the completion of the whole of the Works shall be at Contractor's own expense :--

Legislation:

- the Factories and Industrial Undertakings Ordinance
- the Electricity Ordinance (Part VII)
- the Electricity (Wiring) Regulations
- the Builders' Lifts and Tower Working Platforms (Safety) Ordinance
- the Occupational Safety and Health Ordinance
- the Boilers and Pressure Vessels Ordinance
- the Electricity Supply Lines (Protection) Regulation

Codes of Practice, Guides and Others:

- "Code of Practice for Safe Use of Mobile Cranes", published by the Labour Department, where applicable
- "Code of Practice for Safe Use of Tower Cranes", published by the Labour Department, where applicable
- "Code of Practice for Safety and Health at Work for Industrial Diving", published by the Labour Department, where applicable
- "Code of Practice for Safety at Work (Lift and Escalator)", published by the Labour Department, where applicable
- "A Guide to the Factories and Industrial Undertakings Ordinance (Section 6A & 6B) - Know Your General Duties" published by the Labour Department
- "A Guide to the Construction Sites (Safety) Regulations" published by the Labour Department
- "A Guide to Construction Safety Management" published by the Labour Department
- "Guidance Notes for the Electrical Products (Safety) Regulation" published by the Electrical and Mechanical Services Department
- "Code of Practice on Working Near Electricity Supply Lines" published by the

- Electrical and Mechanical Services Department
- “Code of Practice for Bamboo Scaffolding Safety” published by the Labour Department
 - “Reference Manual for Inspection Reports on Construction Sites” published by the Labour Department
 - “Code of Practice for Metal Scaffolding Safety” published by the Labour Department
 - “Code of Practice on Safety and Health at Work in Confined Spaces” published by the Labour Department
 - “Code of Practice on Safety at Work for Gas Welding and Flame Cutting” published by the Labour Department
 - “A Brief Guide to the Requirements of the F&IU (Noise at Work) Regulation” published by the Labour Department
 - “Guidance Notes on the Selection, Use and Maintenance of Safety Helmets” published by the Labour Department
 - “Prevention of Gas Poisoning in Drainage Work” published by the Labour Department
 - “Simple Guide on the Prevention of Gas Poisoning in Drainage Work” published by the Labour Department
 - “Guideline for Prevention of Heat Stroke and other Heat-induced Accidents on Construction Site” published by the Labour Department
 - “Working Safely with Hand Tools” published by the Labour Department
 - “A Guide to Part VII of the Occupational Safety and Health Regulation (Manual Handling Operations)” published by the Labour Department
 - “Code of Practice for Safe Use of Excavators” published by the Labour Department
 - “Guide to Trench Excavations (Shoring Support and Drainage Measures)” published by Highways
 - “Safety Reminder on Mobile Plant” issued by Development Bureau in January 2013
 - “DSD Practice Notice No. 1/2002 – Safety of Operation of Excavators”
 - “DSD Practice Note No. 3/2012 – Safety Supervision of Work in Confined Space” published by Drainage Services Department
 - “DSD Safety Manual (August 2010)” published by Drainage Services Department
 - other safety and health related legislations, codes of practice and guides relevant to the execution of the Works.

1.24.3 Safety and Health Plan

(a) General

- (i) The Contractor shall in accordance with Clause 17 of the Conditions of Contracts to prepare and submit to the Supervising Officer the Safety and Health Plan signed by the Site Agent and the Safety Manager. It shall contain details of a safety management system with the elements listed below. The Contractor shall also refer to the Code of Practice on Safety Management and other relevant guidelines for preparing the Safety and Health Plan.
- (1) safety policy
 - (2) safety organisation
 - (3) safety and health training
 - (4) safety rules and regulations
 - (5) Not used

- (6) safety and health inspections
- (7) job hazard analysis
- (8) personal protective equipment
- (9) accident/incident investigation
- (10) emergency preparedness
- (11) safety promotion
- (12) health assurance programme
- (13) evaluation, selection and control of sub-contractors
- (14) process control programme

1.24.4 Safety Organisation

- (a) The Contractor shall provide to the Supervising Officer at monthly intervals an updated safety organisation chart containing a complete list of all sub-contractors, whether directly employed by the Contractor or not, on the Site and the Works and the name of the Safety Supervisor for each such sub-contractor, insofar as the employment of a Safety Supervisor is expressly set out in the Contract or in the absence of such requirement then by any enactment or statutory requirement. The list shall also include the names of the Safety Officer and Safety Supervisors. Telephone numbers of these safety staff shall also be shown on the chart.

1.24.5 Safety Officer

- (a) "Safety Officer" means a person registered as a safety officer in accordance with the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations (FIU(SO&SS)R) and employed by the Contractor to carry out the duties of a Safety Officer as specified in the Contract and duties specified in the FIU(SO&SS)R.
- (b) The Contractor shall employ at least one Safety Officer who shall be approved by the Supervising Officer. If the total number of workers employed on the Works or in connection with the Contractor whether in the employ of the Contractor or his sub-contractor is equal to or more than 100, the Safety Officer shall devote the whole of his time to this Contract in the discharge of his duties. If the total number of workers employed is less than 100, the Safety Officer may be engaged part time for this Contract but with sufficient presence on the Site to perform the duties of a Safety Officer. The time thus spent on site shall be not less than 12 hours per week excluding attendance of the progress meetings.
- (c) The Contractor shall not commence any construction work on the Site without the appointment of the required number of Safety Officer(s) unless expressly permitted by the Supervising Officer in writing.
- (d) The duties of the Safety Officer shall be solely directed towards safety and health matters. In addition to the duties stipulated in the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations, the Safety Officer shall: -
 - (i) Carry out safety inspections and prepare inspection reports;
 - (ii) Supervise and monitor implementation of the Safety and Health Plan;
 - (iii) Ensure that sub-contractors and all persons working on the Site are made aware of and comply with the Safety and Health Plan; and

- (iv) Carry out internal safety audits of the Safety and Health Plan at intervals of not less than once every six months, which format, scope and programme are to be proposed and agreed with the Supervising Officer. In this respect, the internal safety audits can be carried out by either the Safety Officer or Registered Safety Auditor (RSA).
- (e) The Safety Officer shall maintain a safety diary which shall record all matters related to safety and health, including Safety Supervisors' reports, details of safety inspections. The Safety Officer shall check to ensure that all unsafe situations are promptly rectified and the dates of their completion duly recorded in the safety diary. The safety diary shall be made available for inspection by the Supervising Officer upon request and copy thereof shall be submitted to the Supervising Officer upon request.
- (f) The Safety Officer shall order any person working on the Site to suspend any unsafe operation or to take urgent action to make safe the Site or the Works or to disallow any practice which may infringe the Safety and Health Plan or any statutory safety requirement.
- (g) The Safety Officer shall carry out comprehensive safety inspection on all activities on the Site at weekly intervals. The safety inspection shall identify any unsafe operation or potential hazards using a check-list agreed by the Supervising Officer. The Safety Officer shall give prior notice to the Supervising Officer of the date and time of the weekly inspection and shall allow the Supervising Officer to attend the inspection.
- (h) If the Safety Officer is unable to perform his duties for any reason, the Safety Officer shall be replaced as soon as practicable but in any case within 14 days. The Safety Officer shall not be replaced without consent by the Supervising Officer.
- (i) The Safety Officer shall be clearly identified on the Site by wearing an armband or a safety helmet appropriately marked in Chinese and English.

1.24.6 Safety Supervisors

- (a) "Safety Supervisor" means a person employed by the contractor or his sub-contractors on the Site to carry out the duties of a Safety supervisor as stipulated in the Factories and Industrial Undertakings (Safety Officers and Safety Supervisors) Regulations. The Safety Supervisor shall carry out safety inspections daily.
- (b) The Contractor shall employ at least one Safety Supervisor who shall be approved by the Supervising Officer. If the total number of workers employed on the Works is equal to or more than 20, the Safety Supervisor shall devote the whole of his time to this Contract in the discharge of his duties. Where the number of workers employed on the Works exceeds 50, the number of Safety Supervisors to be provided shall be increased by one for every additional 50 workers.
- (c) Notwithstanding the requirements stated in Clause 1.24.6(b) of the Employer's Requirements above, each sub-contractor of the first tier (directly employed by the Contractor) engaging 20 persons or more in the activities for which he is responsible shall provide at least one full-time Safety Supervisor to oversee the safety of his own activities.
- (d) Safety Supervisor shall have at least three years' experience on construction work and have completed an appropriate training course provided for safety supervisors.
- (e) Safety Supervisors shall be clearly identified on the Site by wearing an armband or a safety helmet appropriately marked in Chinese and English.

1.24.7 Not Used.

1.24.8 Safety Training

- (a) The Contractor shall regularly review the training needs of all persons employed on the Works and prepare a training programme. Each month the Contractor shall submit a proposed training programme to be provided in the next month for the Supervising Officer's approval. It shall contain the topics, dates, venues, the target participants of the proposed training and the names and qualification of the trainers.
- (b) All persons employed on the Works must have completed the mandatory basic safety training course for the construction industry under the Factories and Industrial Undertakings (Amendment) Ordinance 1999 and hold the relevant valid certificate which shall be referred to hereafter as the Labour Department Recognised Green Card (LDRGC).
- (c) Not used.
- (d) Not used.
- (e) Not used.
- (f) All persons employed on the Works or in connection with the Contract whether in the employ of the Contractor or his sub-contractors shall receive "site specific induction training". Site specific induction training and its refresher shall be conducted by the Safety Officer. An outline of the induction training shall be approved by the Supervising Officer. The talk shall be carried out within 2 working days of any such employee commencing work on the Site. Thereafter, he / she shall be given refresher talks at intervals of 6 months depending on the amount of changes to the site condition.
- (g)
 - (i) The Contractor shall provide tool box talks when necessary. The Contractor shall also ensure that the topic of every talk given to a worker is relevant to his trade and the work that he will perform under the Contract.
 - (ii) The Contractor shall propose the topics of the tool box talks and monthly training programme to the Supervising Officer for his approval. The Supervising Officer has the right to disapprove the training programme when the proposed topic is considered not relevant to the trade of the workers or the prevailing work activities. Moreover, the Supervising Officer can request the Contractor to review the topics to cater for special safety concern.
 - (iii) Not used.
 - (iv) The Contractor shall ensure that "tool box talks" are conducted by Safety Officers or Safety Supervisors.
 - (v) Not used.
- (h) The Contractor shall prepare attendance records on site specific induction training and tool box talks which shall include the topics and dates of the talks, the names of the trainers, names and trades of the persons receiving the talks and their signatures.
- (i) Not used.
- (j) The Contractor shall ensure that all site management and supervisory staff, who are employed on the Works whether employed by the Contractor or sub-contractor of all tiers, shall attend, if they have not done so, and complete the basic training commensurate with their duties, as follows: -

- (i) The term “site management staff” means persons engaged in the senior or managerial posts such as project managers, site agents, sub-agents, superintendents and site engineers. The basic training required to be attended by site management staff shall include: -
 - (1) Appropriate training course such as the Occupational Safety Management Course run by OSHC/CICTA or other approved training organizations. The course should cover amongst others: safety legislation in Hong Kong, safety management system, risk assessment, Safety and Health Plan and safety auditing; and
 - (2) Basic Accident Prevention Course run by OSHC/CICTA or other approved training organisations.
- (ii) The term “supervisory staff” means gangers and foremen. The basic training required to be attended by supervisory staff shall include: -
 - (1) Appropriate training course such as the Foreman Safety Training Course run by OSHC or the Site Foreman Safety Training Course run by CICTA or other approved training organizations. The course should cover amongst others: safety legislation, roles and duties of Site Foreman, hazards identification and safety control measures on construction sites. If the supervisory staff has completed the Construction Safety Supervisor Course run by OSHC/CICTA or other approved training organizations, it is deemed to have complied with the requirement of this sub clause.
- (k) The Contractor shall keep on Site records of all safety training received by his staff including those on refresher training and make them available for inspection by the Supervising Officer upon request.
- (l) If working in confined space is required, the Contractor shall comply with the Factories and Industrial Undertakings (Confined Spaces) Regulation, DSD Practice Note No. 3/2012 – Safety Supervision of Work in Confined Space and subsequent amendment or addition thereto and the Code of Practice for Safety and Health at Work in Confined Spaces. The Contractor shall also comply with other relevant legislation and guidelines when working in confined space.

1.24.9 Risk Assessment

- (a) The Contractor shall carry out, review and submit to the Supervising Officer risk assessments for works scheduled to start at least for the next two months. The works shall be broken down into jobs / tasks for hazard identification and evaluation of the level of risk by competent persons. The documentation shall contain the hazards identified, the likelihood and consequence of the hazard occurring, the level of risk thus evaluated, the proposed risk mitigation / control measures and the anticipated residual risks, and identify the respective risk controller. The results of such risk assessments and documentation shall be endorsed by the Safety Officer and the Site Agent. In addition, they shall be incorporated into the Safety and Health Plan or relevant safety working procedures or method statements. In addition, the Contractor shall also maintain an updated register of all risk assessments carried out, and update the relevant safety checklist based on the safety measures recommended in each new risk assessment.

1.24.10 Not used

1.24.11 Not used

1.24.12 Weekly Safety Walk

- (a) The Contractor should arrange a weekly safety walk to inspect the Site checking that safety and health conditions are being maintained on the Site.
- (b) The Contractor shall prepare and agree with the Supervising Officer a checklist for use during safety walk and site inspections. It shall contain a table listing out the deficiencies identified during the walk/inspection with the proposed rectification measures, the names of the persons responsible for taking any necessary rectification measures and the corresponding completion dates.
- (c) After the safety walk, the checklist shall be agreed and signed by the Safety Officer and the Supervising Officer and a copy shall be kept by the Supervising Officer and copied to the Employer. The Contractor shall take prompt action to rectify those deficiencies identified during the walk and shall report the status of actions taken at the forthcoming progress meeting.

1.24.13 Sub-contractors

- (a) The Contractor shall provide each sub-contractor with sets of site rules and regulations, safe working procedures and safety obligations to ensure compliance.
- (b) The Contractor shall, for contracts where more than two sub-contractors are working in close proximity, establish a safety co-ordination system to liaise amongst the sub-contractors and to maintain a safe working environment.

1.24.14 Reporting

- (a) In addition to the requirements of Clause 25.2 of the Conditions of Contract, the Contractor shall complete any other forms as the Commissioner for Labour may require including, but not limited to, forms requesting supplementary information used by the Labour Department for the purpose of accident analysis. Copies of such forms should be made available for inspection by the Supervising Officer upon request.
- (b) Further to Clause 1.24.14(a) of the Employer's Requirements above, the Contractor shall notify the Supervising Officer and the operator of Existing Facilities immediately of any accident occurring on the Site involving dangerous occurrence or death or serious personal injury or cases which may arouse public interest or attention. The initial notification shall be made verbally immediately after the occurrence of the accident. A written notification with details shall be made within 24 hours of the occurrence of the accident.
- (c) The Contractor shall report and record injuries and dangerous occurrences as stipulated in clause 9.1.1 to Development Bureau Construction Site Safety Manual.
- (d) The Contractor shall submit a monthly report for consideration at the progress meetings. It shall be prepared by the Safety Officer and duly endorsed by the Site Agent, to the Supervising Officer containing the information as stipulated in chapter 3 appendix III clause 13(4) to Development Bureau Construction Site Safety Manual.
- (e) The Contractor shall, upon the request of the Supervising Officer, submit a written report within 14 days upon the date of notification by the Supervising Officer on how to improve the safety performance of the Site to prevent accidents due to the high accident rate of the Contract in any three-month period.

1.24.15 Further Safety Measures

- (a) The Contractor's safety policy statement, emergency procedures and any rescue organisation shall be made known to all persons on the Site. Such information shall include an emergency telephone list including the names and contact telephone numbers of at least two key members of the Contractor's emergency organisation and the appropriate divisional police, fire and ambulance stations, utility undertakers and Labour Department's Operation Division. Copies of the above information and safety posters, in Chinese and English languages, shall be displayed at prominent places on the Site. Safety posters, up-to-date accident records and the names of the Safety Officer and the Site Agent shall be displayed near the site entrance.
- (b) The Contractor shall ensure that all tools, plant, equipment and temporary facilities and all other items used in carrying out the Works how-so-ever provided are in a safe, sound and good condition, are capable of performing the functions for which they are intended, and where required by the law or by the relevant codes of practice, are licensed and/or have been issued with the necessary permits for use.
- (c) All sides of working platforms, places, gangways, opening from which a person may be liable to fall for more than two metres shall be provided with at least two guard-rails of adequate strength and toe-boards securely fixed in position. The height of the top guard-rail shall be between 900 mm and 1150 mm. The intermediate guard-rail shall be positioned so that the unprotected gap in between does not exceed 470 mm. The toe-board shall be at least 200 mm high.
- (d) Not used
- (e) Not used
- (f) Alcoholic drinks and other substances which may impair judgement shall be prohibited from the Site. The Contractors shall remove any person under the influence of such substances from the Site immediately.
- (g) Not used.
- (h) Permit-to-work systems shall be implemented to control access to hazardous areas or the carrying out of any hazardous operations including, but not limited to, hot work, electrical work, work in confined space, maintenance of material hoist, area or operation liable to release of flammable or toxic liquid or gas, etc.
- (i) All lifting gear including slings, shackles and such like equipment shall be colour coded for identifying lifting gear which require re-inspection or disposal. Details of the colour coding system are given in Appendix 1.17 of Employer's Requirements.
- (j) All material hoists installed shall be fitted with fail-safe interlocking hoistway gates such that the driving mechanism is operable only when all gates are closed and latched; and hoists shall not be operated manually when one gate is opened. A single channel communication from the user to the operator of the hoist shall also be provided.
- (k) All persons engaged in works with risks of receiving foot injuries including but not limited to pneumatic drilling work and manual handling work shall be provided with safety boots when they are engaged in such works. The cost of provision of safety boots shall be deemed to have been allowed in the Contract Rates. Safety boots shall comply with BS EN 345 – Part 1, BS 345- Part 2 or equivalent standards.
- (l) Further to the requirements under the Factories and Industrial Undertakings (Noise at Work) Regulations, the Contractor shall provide approved ear protectors to all persons working on the Site who are exposed to noise level of 90 dB (A) or above.

- (m) The Contractor shall keep a register of all dangerous substances including those hazardous to health which are delivered to and stored for use on the Works. The register shall include information on: -
- (i) Review of the Safety and Health Plan and the EMP: -
 - (1) their physical and chemical properties;
 - (2) hazards;
 - (3) safe handling and storage;
 - (4) precautionary measures to be taken; and
 - (5) first aid measures.
- extracted from the manufacturers' material safety data sheets.
- (n) Receptacles with full containment on four sides to prevent the falling out of materials shall be used for the lifting and transportation of reinforcement links, stirrups, short pieces of splice or reinforcement U-bars, couplers and the like. The safe working load shall be marked on the receptacle after being tested by a competent examiner. The colour coding system for lifting gear shall also apply to these receptacles.
- (o) The lifting of reinforcement bars shall be by the use of wire slings. No cradles shall be used for the lifting of reinforcement bars unless they are properly designed and with their safe working load certified.
- (p) Not used.
- (q) Construction vehicles and plant used on Site shall be equipped with audible signals on reversing. Other form of warning signals and / or banksman shall be provided as necessary to guide such reversing movements if audible signals are causing nuisance to nearby residents particularly at night. For quarry operations, no person shall operate or drive any mechanical equipment at or near the edge of any face, side, tip or embankment in a quarry unless a banksman is in attendance.

1.24.16 Electrical Safety

- (a) A Registered Electrical Worker (REW) of the appropriate grade under the Electricity Ordinance (EO) shall be employed by the Contractor throughout the Contract to handle the entire temporary electrical systems and installations on the Site.
- (b) Upon completion of the temporary electrical system (TES) and after each alteration / repair to the existing TES, the Contractor shall arrange his REW / Registered Electrical Contractor (REC) under the EO to complete an individual Work Completion Certificate (WR1) as required by the Code of Practice for the Electricity (Wiring) Regulations (COP) issued by the Electrical and Mechanical Services Department. If a REC is not employed, the Contractor shall then assume the responsibilities of a REC and sign on the WR1 together with the REW employed by the Contractor as per Code No. 19B (d) of the COP. Each of such Certificates shall include a circuit diagram clearly indicating which portion(s) of the TES is / are covered, and, where appropriate, other necessary supporting documents.
- (c) Temporary electrical installations, such as lighting fittings, distribution boards, socket outlets, plugs and cable couplers in outdoor or damp environment shall be of splash-proof type to IP 54 or above.

- (d) The sheath of all electric portable cables shall be of heavy-duty type or otherwise adequately protected against mechanical damage if laid on ground. They shall be hung overhead as far as possible. Ordinary PVC cables, if employed, shall be enclosed in metallic conduits or trunkings and properly maintained.
- (e) The Contractor shall develop checklists for carrying out regular routine inspections and checking and monthly comprehensive checking of the TES. The checklists shall be developed by the Contractor and agreed by the Supervising Officer. Comprehensive checking shall include, but not be limited to, checking of temporary generators, functional test of earth leakage circuit breakers, integrity of cables and connections, measurement of earthing resistance and those items listed in Checklists Nos. 3 and 4 of the COP where appropriate. The checklist should be signed by the REW after each inspection and / or checking.
- (f) Adequate precautionary measures shall be adopted to ensure safety during inspection, repair and maintenance of the temporary electrical installations including the use of permit-to-work system and / or lock-off system. The Contractor shall establish and review regularly the maintenance programme and logging system for the TES.
- (g) The Contractor shall keep and maintain updated circuit diagrams, WR1 (complete with supporting documents) and records of inspection and checking of the TES by REW / REC in a dedicated file for inspection by the Supervising Officer's site supervisory staff upon request.
- (h) During weekly safety walks and when requested by the Supervising Officer or the Design Checker, the Contractor shall open the cover plates of temporary electricity distribution boards for inspection of the conditions of the internal wiring and / or carry out testing immediately. Updated schematic circuit diagram shall also be affixed inside the cover of the temporary distribution boards.
- (i) All temporary electrical distribution boards shall be kept locked and accessible only by authorized persons appointed by the Contractor, e.g. REW and / or general foreman. Legible warning notices (Danger – Electricity) in both Chinese and English, names and telephone numbers of such authorized persons shall be posted on the temporary distribution boards.
- (j) For work carried out in occupied buildings, unless prior approval has been obtained and proper and safe arrangement has been made, the Contractor shall not connect his fixed electric equipment directly to any existing permanent distribution boards. Such connection shall only be made through temporary distribution boards equipped with proper protective devices.
- (k) All arc welding machines and electrode holders shall comply with BS638 : Part 7, IEC 60974-1 (or BS EN60974-1) and BS EN60974-11 or equivalent standards. The welding machines should be fitted with no-load voltage reducing device for protection against electric shock at the output side. Welding machines shall be enclosed and the metal casing shall be effectively connected to earth. Cable terminals of the welding machines shall be effectively insulated.

- (l) All hand-held electrical tools and portable equipment shall be examined by the REW before they are used on Site. The examination shall include visual inspection and also tests for checking the functional, protective conductor continuity, polarity and insulation aspects. After passing the examination, all hand-held tools and equipment shall be registered and recorded. Identification labels showing the registration number, type of the tool, name of the owner and date of examination stamped with the Contractor's company chop shall be affixed to these tools and equipment. Re-examination of the registered hand-held tools shall be carried out at 3-month intervals or each time after repairs to damages.
- (m) Voltage in excess of 110V shall only be used for heavy equipment such as hoists, tower cranes, etc. with an earth leakage circuit breaker installed and in proper function. Portable and hand-held tools and temporary site lighting shall be operated at a voltage of 110V or less supplied from a step-down transformer with its output winding centre-tapped to earth and comply with BS3535 : Part 2 : 1990 or equivalent. All cables shall be terminated within the transformer enclosure of Class I and IP 55 and the outgoing circuit shall be provided with short circuit protector. In confined and damp environment, the voltage of temporary lighting and hand-held tools shall not exceed 25V.

1.24.17 Site Safety Cycle

The Contractor shall practise “Site Safety Cycle” (SSC) to improve and promote the safety and health of the Site. Site Safety Cycle shall begin when there are workers working on the Site, and shall cease by the date of substantial completion of the Works, or at a date proposed by the Contractor and approved by the Supervising Officer. The activities for Site Safety Cycle for one day, one week and one month are referred to as the “Daily Cycle”, “Weekly Cycle” and “Monthly Cycle” respectively. The Pre-work Exercise and Safety (PES) meeting, Hazard Identification Activity (HIA) meeting and Pre-work Safety Checks of the Daily Cycle are collectively referred to as the “Pre-work Activities”.

The Contractor is encouraged to arrange Pre-work Activities to be held daily. The Pre-work Activities shall be carried out prior to any work carried out by the persons attending the Pre-work Activities on that day.

- (a) Daily Cycle
 - (i) PES Meeting
 - (1) The Contractor shall arrange PES meetings for all the persons employed on the Works.
 - (2) The PES meeting shall be led by the Site Agent or a senior staff of site management of the Contractor.
 - (3) The PES meeting shall start with a physical exercise set by the Contractor. After that, the leader of the PES meeting shall address the attendees on the prevailing safety and health matters related to the Site, such as common hazards and control measures, general fire and safety precautions, specific safety concerns, general defects and irregularities observed in inspections, accidents or near misses etc.. Besides, the Contractor shall also make use of the PES meetings to announce common safety matters in execution and co-ordination of the Works on the Site among sub-contractors and workers, or presenting awards to workers and / or sub-contractors in recognition of their good safety performance.

- (4) The Contractor shall maintain a brief record of the run-down programme and a register of the persons attended for each PES meeting. The record and the register shall be kept in the Contractor's site office for ready inspection by the Supervising Officer or his / her staff upon request.
- (ii) HIA Meeting
 - (1) The Contractor shall arrange and hold HIA meeting after the PES meeting.
 - (2) The Contractor shall ensure that sufficient persons on the Site have received the training to lead the HIA meetings as soon as the Contract commences.
 - (3) The topics of HIA meeting may include hazards and control measures specific to the works or trades, special safety concerns, assurance of safety requirements and measures, reprimand of repeated irregularities and malpractice etc. The training materials prepared for and the discussion during the HIA meeting shall be recorded in a HIA table, a sample of which is shown in Appendix 1.19 of the Employer's Requirements. The HIA Table shall be kept in the Contractor's site office for ready inspection by the Supervising Officer upon request.
 - (4) Not used.
 - (5) Not used.
- (iii) Pre-work Safety Checks
 - (1) The Contractor shall arrange Pre-work Safety Checks for the attendees immediately after the HIA meeting. The Pre-work Safety Checks shall be carried out by foremen, gangers or Safety Supervisors of the attendees according to the trades, work teams or works areas set out by the Contractor for the Site. The Pre-work Safety Checks shall include the checking of personal protective equipment worn by attendees before they start working on that day such as safety helmet, reflective vest, ear protectors, eye protectors, safety harness, safety footwear etc.. The Supervising Officer or his / her staff shall attend the Pre-work Safety Checks regularly to ensure the proper checking by the Contractor for certifying payment.
 - (2) The Contractor shall assign persons who are competent with the relevant knowledge, experience and training to check and ascertain the safety conditions of facilities, machinery, plant and equipment and materials before commencing work on that day. The Contractor shall propose a list of facilities, machinery, plant and equipment to be checked and develop relevant checklists for such checking for the approval of the Supervising Officer. The assigned persons shall use the checklists for Pre-work Safety Checks, and the completed checklists shall be kept at the Contractor's site office for ready inspection by the Supervising Officer upon request.
- (iv) Safety Inspection by the Site Agent
 - (1) The Contractor shall arrange the Site Agent or his representative to carry out safety inspection of the Site. The Site Agent or his / her representative shall check and ensure that the safety instructions given in PES or HIA meetings have been carried out.

- (2) Any unsafe act or unsafe conditions observed during inspections shall be recorded in a diary maintained by the Site Agent, who shall promptly communicate the irregularity to the respective party concerned for follow-up actions. The Site Agent shall check and ensure that the unsafe acts or unsafe conditions are rectified promptly, and the date is duly recorded in the diary after completion. The safety diary shall be made available for inspection by the Supervising Officer and copying thereof upon request.
- (v) Guidance and Supervision during Work
- (1) The Contractor shall assign sufficient supervisory staff to be responsible for the safety and health of workers on the Site. The assigned supervisory staff shall provide guidance and supervision for the workers under his control, and rectify any irregularities, unsafe acts or unsafe conditions for the works on the Site. Guidance and supervision provided shall also include the implementation of safety instructions given in PES or HIA meetings.
- (vi) Safety Co-ordination Meeting
- (1) The Contractor shall arrange and hold safety co-ordination meeting when necessary to coordinate safety and health work to be carried out on the Site. The meeting shall be chaired by the Site Agent his representative, and attended by assigned supervisory staff pursuant to Clause 1.24.17(a)(v) of the Employer's Requirements above where necessary. The meeting shall be used to discuss the findings in safety inspections and the matters to be announced in the next PES or HIA meeting. It can also be used for discussion and co-ordination of site safety matters, such as sequence of works, usage times for shared machinery and equipment and works areas, phasing of works at various interfaces, delivery and storage of materials and equipment to the Site etc.
- (vii) Daily Cleaning and Tidying up of the Site
- (1) Detailed requirements are specified in Clause 1.28 of the Employer's Requirements.
- (viii) Checking of the Site after Each Day's Work
- The Contractor shall assign designated person to check the safety of the Site after each day's work. The designated person shall, after completion of checking, notify the Site Agent any unsafe conditions or imminent danger that require immediate follow-up actions. The designated person shall also draw the attention of the Site Agent about the minor irregularities to arrange rectification on the following day.
- (b) Weekly Cycle
- (i) Weekly Safety Walk
- (1) Detailed requirements are specified in Clause 1.24.12.
- (ii) Weekly Safety Co-ordination Meeting

- (1) The Contractor shall arrange the Site Agent or a senior staff of the site management of the Contractor together with the Safety Officer or Safety Supervisor and/or supervisory staff of sub-contractors to attend the weekly safety co-ordination meeting chaired by the Design Checker when necessary. The meeting shall discuss safety and health matters including, but is not limited to, safety performance, housekeeping and tidiness of the Site, together with the specific areas of concern, defects and deficiencies observed in Weekly Safety Walks, accidents and near misses occurred on the Site, etc. A brief notes of the meetings shall be prepared by the Contractor and made available for the inspection by the Supervising Officer when requested.
- (iii) Weekly Overall Cleaning and Tidying up of the Site
 - (1) Details requirements are specified in Clause 1.28 of the Employer's Requirements.

1.24.18 Not used

1.24.19 **Safety Measures of Trenches and Excavations**

- (a) Further to the requirements under the Construction Sites (Safety) Regulations, Guide to Trench Excavation (Shoring Support and Drainage Measures) and the Electricity Supply Lines (Protection) Regulation, the Contractor shall comply in particular with the following safety measures with regard to trench and other excavation works: -
 - (i) Before the commencement of any excavation work, sufficient information shall be obtained from the utility undertakings and by inspection pits or, if agreed by the Supervising Officer, by other means including referring to the investigation data obtained from the Supervising Officer in accordance with Clause 1.23 of General Specification for Civil Engineering Works 2020 Edition.
 - (ii) A competent person approved by the Electrical and Mechanical Services Department shall be appointed to locate the alignment and depth profile of all underground cables in the areas irrespective of the excavation depth.
 - (iii) Ensure that any underground cable alignment and depth profile as identified by the competent person in the area are clearly marked on the ground.
 - (iv) Excavation shall be carried out by trained and experienced workers who shall be fully instructed of the possible dangers and safety precautions, before work is commenced.
 - (v) Hand digging method shall always be employed as part of trench / open cut excavation where there are utilities adjacent to or within the trench / open cut excavation works. Portable mechanical tools may be used but shall be restricted to the breaking of the pavement surface. Due care shall be exercised to prevent damage to the underground installations. The Contractor shall adopt his own working method to overcome the obstruction by utilities if encountered in trench / open cut excavation, including but not limited to the excavation by hand digging. The Contractor shall adopt hand digging or other method in trench excavation instead of awaiting diversion of utilities unless the obstruction is substantial which covers more than half width of a trench and extends more than 10 metres.

- (vi) Exposed utility installations shall be adequately supported and protected from accidental damage. The requirement / recommendations by Joint Utilities Policy Group (JUPG) shall be followed. "Detailed Requirements on Support of Utility Services" published by JUPG shall be complied with and the document is attached as Appendix 1.20 of the Employer's Requirements. The Contractor shall be responsible for liaising with and seeking approval from the relevant utility undertakings in relation to utility diversion matters. The Contractor shall be entitled to no claim for extension of time or payment in any form for complying with such requirement.
 - (vii) Smoking and use of naked flames shall be prohibited if gas pipes are present.
 - (viii) Not used.
 - (ix) Not used.
 - (x) Not used.
 - (xi) Not used.
 - (xii) Not used.
 - (xiii) The Contractor shall ensure that all temporary covers/decking to the trenches and barriers at the edges of an excavation are safely and securely installed at all times, especially during adverse weather conditions, and shall be flush and continuous with the surrounding carriageway and pavement.
 - (xiv) Should there be any possibility of ponding of water, the Contractor shall place life saving rings at the edge of excavation for emergency use.
- (b) The Contractor shall note that trial/ inspection pits were excavated and backfilled by the Employer prior to commencement of the Contract. Should there be any underground obstructions, including but not limited to left-in sheet piles, that are likely to affect the execution of the Works, the Contractor shall remove the obstructions after obtaining approval from the Employer. The removal of such obstructions shall be at the Contractor's cost for complying with such requirement. The locations and design of the trial/ inspection pits are described in Appendix 1.27 of the Employer's Requirements.

1.24.20 Safety Operation of Excavators

- (a) The use of excavator for lifting on construction sites should be avoided as far as possible unless it was absolutely necessary when the use of other lifting means is impracticable. The following enhanced measures for safe use of excavators shall be implemented if it is necessary to use excavator for lifting on site.
 - (i) A method statement including a risk assessment for using excavators for lifting and/or transportation of materials shall be submitted for approval of the Supervising Officer before the execution of the Works on site;
 - (ii) An Automatic Safe Load Indicators (ASLI) shall be installed irrespective of the hoisting load whether it would be less than one tonne or not;
 - (iii) Completion of Forms 1, 3, 4 and 5 for the excavator for compliance with the Factory and Industrial Undertaking Regulation;
 - (iv) The lifting hook of the excavator shall be provided with certification from the manufacturer;

- (v) The excavator operator shall possess valid certificates for both excavator and lifting cranes; and
- (vi) A lifting supervisor shall be appointed to oversee the lifting operation by excavator on site.
- (b) In addition to the enhanced measures as stated in the above sub-clause (a), the Contractor shall follow the DSD Practice Notice No. 1/2002 - Safety of Operation of Excavators for the use of excavator for lifting operations on site.

1.24.21 Further Safety Requirements

- (a) Not used.
- (b) Not used.
- (c) The Contractor shall submit within 7 days from the date of acceptance of his tender the names and particulars of the Safety Officer and Safety Supervisors. For each proposed nomination of Safety Officer, the Contractor shall provide the Supervising Officer the following information: -
 - (i) a copy of the proposed Safety Officer's registration letter issued by Labour Department;
 - (ii) previous employment records of the proposed Safety Officer, including his engineering experience/background; and
 - (iii) present engagement of the proposed Safety Officer in other contracts including public works contracts, Housing Authority contracts and private sector contracts, and the capacity in which he is employed (part-time or full-time); the anticipated completion date of such contracts should also be provided.
- (d) Not used.
- (e) In the preparation of the Safety and Health Plan, the Contractor shall identify the risks to health and safety associated with the typical works for the Contract and prepare proposals for the satisfactory reduction and elimination of exposure to such risks. In this regard, the procedure for the execution of each works should be broken down into individual work processes and tied in with the Process Control Programme of the Safety and Health Plan. The typical works of the Safety and Health Plan shall include but not limited to the following: -
 - (i) construction of underground sewers and drains, and reinforced concrete channels;
 - (ii) inspection and clearance of sewers, drains, culverts, channels and watercourses;
 - (iii) repair of sewers and drains by in-situ internal lining; and channels and watercourses by sprayed concrete; and
 - (iv) construction and maintenance of metal fencing.
- (f) In the updating of the Safety and Health Plan, the Contractor shall ensure in particular that: -
 - (i) before the commencement of a works, the risk assessment and risk reduction/elimination proposals have been satisfactorily completed; and
 - (ii) the works issued in the past month have been included.

1.24.22 Environmental Management

- (a) Environmental Management Plan
- (i) The Contractor shall prepare an Environmental Management Plan (EMP) in accordance with Clause 18 of the Conditions of Contract for implementation on the Site. Irrespective of the measures proposed by the Contractor in the EMP, the Contractor shall not be absolved from his liability to satisfy in full all statutory requirements and requirements in the Employer's Requirements on Environmental Management.
 - (ii) The Environmental Management Plan shall include details categorised into four parts namely, general, nuisance abatement, waste management and records as stipulated in clause 6 of Appendix C to Development Bureau Technical Circular No. 19/2005.
- (b) Not used.
- (c) Performance Monitoring
- (i) Unless otherwise agreed by the Supervising Officer, the Contractor shall arrange weekly environmental walk to be attended by the Contractor's Agent and the Design Checker to inspect the Site, checking that the environmental performance of the Site is satisfactory and in compliance with the requirements under the Contract and EMP. The places to be inspected in the weekly environmental walk shall be determined by the Supervising Officer or his delegate.
 - (ii) The Contractor may arrange the weekly environmental walk to be carried out along with the weekly safety walk or other site inspections subject to the agreement of the Supervising Officer. The weekly environmental walks conducted under this clause are entirely without prejudice to and do not relieve any of the Contractor's responsibility to carry out regular inspections to upkeep the environmental performance of the Site as required by the statute or other clauses under this Contract.
 - (iii) The Contractor shall prepare and agree with the Supervising Officer a comprehensive checklist for use in weekly environmental walk. The checklist will form the basis for assessing the environmental performance of the Contractor on the Site. Any defects or deficiencies identified in the weekly environmental walk shall be duly recorded in a summary table, a proforma of which is attached at Appendix 1.22 of the Employer's Requirements. More than one table shall be used for recording the defects or deficiencies if the weekly environmental walk for the week is carried out by more than one inspection team.
 - (iv) After the weekly environmental walk, the summary table shall be agreed and signed by the Contractor's representative and the Supervising Officer attending the weekly environmental walk, and a copy should be kept by Employer and the Supervising Officer. The Contractor shall take prompt action to rectify the deficiencies identified and shall report the status of rectification actions in the forthcoming weekly environmental walk or the progress meeting whichever comes first.
 - (v) The following items should be included in the agenda for discussion at every progress meeting, or other established channels for performance monitoring as agreed by the Supervising Officer: -
 - (1) Review the sufficiency of the measures in the EMP and proposals for improvement;

- (2) Monitor the Contractor's environmental performance and achievement with reference to EMP;
 - (3) Assess the effectiveness of EMP taking into account the Contractor's environmental performance and achievement; and
 - (4) Monitor the follow-up action by the Contractor on the defects and deficiencies identified in weekly inspections.
- (d) Environmental Training
- (i) The Contractor shall ensure that all site management staff in his employment on the Works shall have attended and completed the "Environmental Management Course for Construction Managers" run by CICTA or similar training institutions as agreed by the Supervising Officer. For the purpose of this sub-clause, site management staff includes the Contractor's agent, project managers etc.. If anyone of the site management has not attended the course, the Contractor shall arrange such staff to attend the required environmental course within 14 days from the date of employment of such staff on the Site, and to complete the training within six months from the said date.
 - (ii) Not used.
 - (iii) Pursuant to Section 1.24 of the Employer's Requirements, the Contractor shall ensure that the site specific induction training cover environmental management in addition to safety for all staff and workers employed for the Works or in connection with the Contract, whether in the employment of the Contractor or his sub-contractors. The training content should cover subjects such as organisation structure, duties and responsibilities, measures, targets, in-house rules and regulations etc. The duration of the site specific induction training under Clause 1.24.8(f)(iii) of the Employer's Requirements shall cover the necessary subjects on environmental management.
 - (iv) Pursuant to Section 1.24 of the Employer's Requirements, the Contractor shall provide toolbox talks for workers on environmental nuisance abatement and waste management in addition to safety and health. The frequency of training and the contents of the toolbox training shall be subject to the approval of the Supervising Officer as in Section 1.24 of the Employer's Requirements.
- (e) Reporting
- (i) The Contractor shall submit a monthly report on environmental management for discussion in the progress meeting. The monthly report shall be duly endorsed by the Contractor's agent containing the following information: -
 - (1) complaints;
 - (2) abatement notices issued by EPD;
 - (3) offences spotted by EPD during inspections; and
 - (4) summonses of environmental offences.
 - (ii) A list of major forthcoming activities in the next two months which will likely have environmental impacts or cause nuisances to the surroundings, together with the proposed control or mitigation measures;
 - (iii) The training programme for the next month and records of training arranged/conducted in the previous month pursuant to sub-clause (d) above;

- (iv) The updated organisation chart on environmental management; and
- (v) A summary of defects and deficiencies identified during inspections and weekly environmental walks, together with the follow-up actions and remedies taken to prevent similar recurrences.

1.24.23 Air Pollution Abatement

- (a) The Contractor shall provide dust abatement measures to the satisfaction of the Supervising Officer. Such measures may include appropriate screens, tarpaulin or enclosures, water spraying system or the fitting of vacuum cleaning devices to pneumatic or power driven drilling, cutting and polishing machines.
- (b) Where the public will be affected by exhaust fumes or smoke emission from any Constructional Plant or construction activities (e.g. welding) in the Site, such Constructional Plant or construction activities shall be shielded by a screen. Such screen shall be at least 1.8m in height, incombustible and shall be approved by the Supervising Officer.
- (c) The Contractor , when considered necessary, should perform Daily Cleaning and Weekly Tidying of the Site including the Public Cleaning Areas as specified in Clause 1.28.1 (e). The Contractor shall provide efficient washing facilities/system according to Site condition to avoid any dirt or wastewater carrying away from the Site by the vehicles. The Contractor could provide a wheel washing system accordance with Appendix 1.23 of the Employer's Requirements in exits point of Site. Any washing facilities/system would be consented by Supervising Officer before provision to Site..
- (d) All dump trucks entering or leaving the Site shall be provided with mechanical covers in good service condition in accordance with the specification given in Appendix 1.24 of the Employer's Requirements.
- (e) For Constructional Plant driven by internal combustion engines, the Contractor shall ensure that the smoke emission from the plant shall not exceed Shade 1 on the Ringelmann Chart continuously for 30 seconds at any time.
- (f) Ultra-low-sulphur diesel (ULSD) (defined as diesel fuel containing not more than 0.005% by weight of sulphur) shall be used in all diesel-operated Constructional Plant on the Site pursuant to Clause 19 of the Conditions of Contract. The Contractor shall demonstrate his compliance by maintaining a summary record of ULSD pursuant to COC Clause 19 using the proforma of the summary record is in Appendix 25.1 of General Specification for Civil Engineering Works 2020 Edition.
- (g) Where there is practical difficulty in implementing any air pollution abatement measures specified above, the Contractor shall submit alternative proposals for the approval of the Supervising Officer before the work commences. The Supervising Officer or his Representative shall have the power to order the removal of any person who, or Constructional Plant or equipment which, fails to comply with the requirements under these Employer's Requirements off Site.

1.24.24 Dust Suppression Measure

- (a) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. The air pollution control system installed shall be operated whenever the plant is in operation.

- (b) The Contractor shall at his own cost, and to the satisfaction of the Supervising Officer, install effective dust suppression equipment and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver the concentration of air-borne dust shall not exceed 0.5 milligrams per cubic meter, at standard temperature (25°C) and pressure (1.0 bar) averaged over one hour, and 0.26 milligrams per cubic metre, at standard temperature (25°C) and pressure (1.0 bar) averaged over 24 hours.
- (c) Where dusty materials are being discharged to vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust should be provided for this enclosure and vented to a fabric filter system.
- (d) Stockpiles of sand and aggregate greater than 20m³ shall be enclosed on three sides, with walls extending above the pile and 2 metres beyond the front of the pile. In addition, water sprays shall be provided and used both to dampen stored materials and when receiving raw material.
- (e) Should the concentration of air-borne dust limits be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Supervising Officer that are necessary for compliance have been implemented. Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or any additional costs whatsoever.

1.24.25 Vehicles Carrying Dusty Material

- (a) Without prejudice to the generality of Clause 27 of the Conditions of Contract, any vehicle with an open load compartment used for transferring dusty materials off Site shall have properly fitted side and tail boards. Dusty materials shall not be loaded to a level higher than the side and tail boards, and shall be properly covered by a suitable cover to ensure in good condition before leaving the Site and maintained throughout the journey to the off-loading destination. The contractor's attention is also drawn to the requirements of power operated cover for trucks as stipulated in ETWB Technical Circular (Works) No. 19/2005.
- (b) For the purpose of this clause, "dusty materials" include cement, earth, pulverised fuel ash, aggregates, silt, stonfines, sand, debris, saw dust and wooden chips.

1.24.26 Asbestos Related Works

- (a) In complying with the Air Pollution Control Ordinance (Cap. 311), the Contractor shall either be a Registered Asbestos Contractor or employ a Registered Asbestos Contractor as sub-contractor under the Contractor to undertake any work which may give rise to asbestos dust. The Registered Asbestos Contractor shall pack, label transport and dispose of the asbestos waste in accordance with the latest code of practice.
- (b) The Contractor shall comply with the provisions of the Waste Disposal Ordinance, Chapter 354 relating to the disposal of asbestos waste. In particular, the Contractor shall register with the Environmental Protection Department as a registered waste producer under the Waste Disposal (Chemical Waste) (General) Regulation.
- (c) In accordance with Section 21 of the Waste Disposal (Chemical Waste) (General) Regulation, the Contractor shall engage the service of a licensed waste collector to collect the asbestos cement waste for disposal if the Contractor is not a licensed waste collector.

- (d) Notwithstanding the provisions in the above sub-clauses, the Contractor shall comply with all Ordinances and Safety Regulations in working with asbestos materials.

1.24.27 Noise Pollution Abatement

- (a) The Contractor shall adopt the following noise abatement practices: -
- (i) Use non-percussive pile driving methods such as hydraulic hammer, vibration or jacking method for installing or extracting sheet piles;
 - (ii) Use non-percussive equipment such as hydraulic crusher, sawing, coring machines etc. for demolition and concrete breaking work;
 - (iii) Close all hoods, cover panels and inspection hatches of powered mechanical plant such as generators etc. during operation;
 - (iv) Provide noise dampening materials inside and outside refuse chutes during building construction; and
 - (v) Fit mufflers or silencers, and dampening layer with steel collars to hand held pneumatic breakers.
- (b) Where percussive breakers are used, the Contractor shall enclose/wrap the breaker tip with sound insulating material to reduce the noise. This requirement is not applicable to works under emergency, or with prior agreement from the Supervising Officer that the provision of such is not necessary or not practicable under a given site condition.
- (c) Where the noise level measured at the noise sensitive receivers (NSR) exceeds 75 dB(A) (Leq 30 min) for hostels, and 70 dB(A) (Leq 30 min) for schools or 65 dB(A) during school examinations, the Contractor shall provide an acoustic screen or enclosure to shield the public or NSR from the noisy activity at source or adopt quiet process/plant including the use of 'quality powered mechanical equipment' pursuant to sub-clause (d) below. The acoustic screen or enclosure shall be made of incombustible, sound insulating material with performance such that the noise level measured at the NSR do not exceed the limits as mentioned in this sub-clause. The detailed information including the size and form of the screen or enclosure shall be proposed by the Contractor and submitted to the Supervising Officer for approval before the work commences. The acoustic screen or enclosure shall be securely fixed at the base to avoid overturning. Notwithstanding any approval given, the Contractor shall be fully liable for his design in all respects.
- (d) The Environmental Protection Department (EPD) has published a category of Quality Powered Mechanical Equipment (QPME) in the website: <http://www.epd.gov.hk/cgi-bin/npg/qpme/list.pl?lang=eng>.
- (e) Where a QPME is used, the plant should be registered with EPD, and the label issued by EPD from such registration shall be affixed on the plant at all times and kept legible. The Contractor shall also establish a register to record all QPME used on the Site.
- (f) The Supervising Officer shall have the power to inspect the QPME if he has doubt on its compliance with the QPME requirements. The Constructional Plant shall deem to be non-QPME for the purpose of this sub-clause if it does not have the registration label issued by EPD so affixed.

1.24.28 Noise Control

- (a) The sound level meter including the sound level calibrator supplied under the Contract shall be verified by the manufacturer every two years to ensure they perform the same level of accuracy as stated in the manufacturer's specifications, i.e., at the time of measurements, the equipment shall have been verified within the last two years.
- (b) Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.
- (c) No excavator mounted breaker shall be used within 125m from any nearby noise sensitive receivers. The Contractor shall use hydraulic concrete crusher whenever applicable.
- (d) The only equipment that shall be allowed on the Site for rock drilling works will be quiet drilling rigs with a sound power level not exceeding 110 dB(A). Conventional pneumatically driven drilling rigs are specifically prohibited.

1.24.29 Working in the Vicinity of Noise Sensitive Receiver

- (a) The Contractor shall liaise with the management of any noise sensitive receivers (NSR), including without limiting to schools, social welfare organisations, etc. to minimise disruption to the normal and special activities of these NSRs. Rock drilling and rock breaking works or similar noise generating operation may not be permitted during the NSRs' important activities. The Contractor shall programme his works to avoid disruption to the NSRs. Such allowance in programming shall be deemed to be included in the Schedule of Prices.

1.24.30 Wastewater Pollution Abatement

- (a) The Contractor shall minimise the generation of wastewater from the Site through the following means: -
 - (i) Prevent surface run-off from washing across the Site and spilling over to areas outside of the Site;
 - (ii) Minimise the exposure of soil on the Site after excavation and backfilling where applicable and prevent the washout of soil or similar materials from the Site;
 - (iii) Minimise water consumption;
- (b) The Contractor shall also provide on Site an effective drainage system for proper control of surface run-off, and cover all exposed surfaces of soil slopes to prevent soil erosion.
- (c) The Contractor shall identify the work activities on the Site with large water consumption, and provide an effective drainage system for the collection of wastewater generated.

1.24.31 Waste Management

- (a) All C&D materials arising from or in connection with the Works shall be sorted on the Site to recover reusable and/or recyclable materials. For the avoidance of doubt, C&D materials mean both inert and non-inert materials generated from construction and demolition activities. The inert portion of the C&D materials includes soil, building debris, broken rock, concrete, etc., and the non-inert portion comprises timber, paper, plastics, general refuse, etc.

- (b) Unless otherwise stated, all surplus C&D materials arising from or in connection with the Works shall become the property of the Contractor when it is removed from the Site.
- (c) On-site Sorting of C&D Materials
 - (i) The Contractor shall devise a system for on-site sorting of C&D materials. The system shall include the identification of the source of generation, estimated quantity, arrangement for on-site sorting and/or collection, temporary storage areas, frequency of collection by recycling contractors or frequency of removal off the Site, etc.
 - (ii) The Contractor shall sort the materials at source into: -
 - (1) hard rock and large broken concrete suitable for reuse on the Site or recycling at a designated location (see Clause 1.24.31(c)(iii) below);
 - (2) metals;
 - (3) paper and plastics;
 - (4) chemical waste; and
 - (5) materials suitable for disposal at public fill reception facilities, sorting facilities and landfills/outlying islands transfer facilities. Disposal at the sorting facilities should first be approved by the Supervising Officer.
 - (iii) The Contractor shall pay particular attention to hard rock and large broken concrete generated from demolition or road improvement works and deliver the materials to a Construction Waste Disposal Facilities agreed by the Supervising Officer.
 - (iv) Equipment and material packaging (i.e. paper and cardboard) shall be recovered, properly stockpiled in dry and covered condition to prevent cross contamination by other C&D materials. The Contractor shall pay particular attention to avoid cross contamination in the course of collecting paper for recycling.
 - (v) The Contractor shall ensure the materials disposed of at public fill reception facilities, sorting facilities, and landfills/outlying islands transfer facilities, comply with their respective requirements under Schedule 6 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N) and be fully liable for all non-compliance.
 - (vi) The Contractor shall identify and provide sufficient space for temporary storage of C&D materials to facilitate collection and/or sorting on the Site. The space provided shall commensurate with the estimated quantity for each type of C&D materials generated on the Site.
 - (vii) Except for those inert C&D materials to be reused on the Site, the Contractor shall remove all other C&D materials off the Site as soon as practicable in order to optimise the use of the on-site storage space.
 - (viii) The Contractor shall make arrangements with potential recycling contractors to facilitate that recyclable materials sorted from the Site are collected with reasonable care.
 - (ix) The Contractor shall establish a system for proper handling and storage of chemical waste generated from the Site, and arrange collection and disposal of such chemical waste by specialist contractors.

- (x) The Contractor shall carry out thorough sorting of C&D materials generated from demolition works for recovering of broken concrete, reinforcement bars, mechanical and electrical fittings, hardware as well as other fittings/materials that have established recycling outlets.

1.24.32 Baseline Odour Monitoring

- (a) Prior to the commencement of Works on the Site, the Contractor shall conduct a baseline odour monitoring attended by the Site Agent or his delegate and the Design Checker to measure the concentration of H₂S and NH₃ at the boundary of the Site. The baseline odour monitoring shall be able to establish the averaged baseline H₂S and NH₃ concentration conditions at the boundary of the Site. The proposed locations for monitoring are indicatively presented on Employer's Drawing No. 60434312/EP/1009.
- (b) The Contractor shall develop a baseline odour monitoring plan for the approval of the Supervising Officer before conducting the baseline odour monitoring. The plan shall include but not limited to the following information:-
- (i) Location of monitoring;
 - (ii) Detailed schedule of monitoring;
 - (iii) Specifications of the H₂S and NH₃ sensors;
 - (iv) Calibration method of the sensors; and
 - (v) Sampling methodology.
- (c) The baseline odour monitoring shall be conducted at least 2 days per week and 2 times per day for 12 months. The monitoring shall be conducted on Monday and Friday, at 10.00 am and 3.00 pm respectively. If the day of monitoring is a public holiday or under adverse weather (i.e. tropical cyclone warning signal No. 8 or above or Black Rainstorm), the monitoring shall be conducted on the next working day.
- (c) When conducting the baseline odour monitoring, the Contractor shall collect the meteorological information at the location of monitoring including but not limited to temperature, wind direction and wind speed.
- (e) The Contractor shall deliver a written report containing all measurement results and the maximum baseline H₂S and NH₃ concentration after completion of the baseline odour monitoring to the Design Checker and Supervising Officer for approval.

1.27 Contractor's Plans

1.27.1 Project Management and Technical Resources Plan

- (a) General
- (i) The Contractor shall be required to submit a draft Project Management and Technical Resources Plan in accordance for the certification by the Design Checker and consent by the Supervising Officer. The Project Management and Technical Resources Plan shall include without limitation the following:-
- (1) Statement of Project Aims, Objectives and Key Issues;
 - (2) Management Team;
 - (3) Programme;
 - (4) Monitoring progress;

- (5) Arrangements for the Design and construction of the Works;
 - (6) Arrangements for the Operation;
 - (7) Community impact assessment;
 - (8) Communication and public relations;
 - (9) Adequacy of personnel in the plan;
 - (10) Adequacy of Contractor's and Employer's staff training; and
 - (11) Sufficiency of manning schedule.
- (b) Statement of Project Aims, Objectives and Key Issues
- (i) Under "Statement of project aims, objectives and key issues", the following aspects shall be provided: -
 - (1) A statement demonstrating his understanding of the objectives, aims and key issues of the Works and the Operation;
 - (2) The means that he will adopt to ensure the efficient management and control of the Design, the Works and the Operation; and
 - (3) The key issue such as environmental performance, customer service, cost control, safety, quality systems and implementation plans for effective and efficient long term operation and maintenance of the Facility and the Existing Facilities as key issues.
- (c) Management Team
- (i) Under "Management team", the following aspects shall be provided: -
 - (1) Organisational structure of the key management and supervisory staff of the project team with details in Project Management and Technical Resources Plan and management for executing the Contract.
- (d) Programme
- (i) Under "Programme", the following aspects shall be provided: -
 - (1) The programme which the Contractor submitted to the Employer according to Clause 14 of the Conditions of Contract;
 - (2) Descriptions and supporting information to demonstrate understanding of the scopes, constraints and requirements of the Contract, lists of activities for the design and construction including statutory submissions and approvals, licenses and permits applications, approvals under the amended Environmental Permit conditions and associated time allowed and relationship of different activities; and
 - (3) Identification of critical paths and means to meet the key milestone dates of the programme and the Time for Completion.
- (e) Monitoring Progress
- (i) Under "Monitoring progress", the following aspects shall be provided: -
 - (1) The process for review and update of programme for the execution of the Design, construction of the Works and the Operation, including weekly, monthly and annual reporting arrangements;

- (f) Arrangements for the Design and Construction of the Works
- (i) Under "Arrangements for the Design and construction of the Works", the proposals shall include the following aspects: -
- (1) Overall approach to carry out the Design and construction of the Works taking into account timely commissioning of the Works, site constraints, maintenance requirements, reliability of performance, flexibility to cope with variability and durability of facilities;
 - (2) Organisational structure with job descriptions and field of expertise of different sub-teams of different work nature for the design and construction. Information shall be provided to demonstrate the efficiency and adequacy of the team structure in respect of reporting and interface management, including management of design works carried out in different geographical locations. Design Checker shall be included as one of the sub-teams and each sub-team shall comprise a leader and other team members;
 - (3) Organisation charts with duties and responsibility descriptions showing an effective and adequate organisation structure of staff to carry out the design and the design checking. The work location (city/country) and employer of each staff shall be clearly indicated; and
 - (4) Organisation charts with duties and responsibility descriptions showing an effective and adequate organisation structure of staff to manage and supervise the construction. The work location (city/country) and employer of each staff shall be clearly indicated.
- (g) Arrangements for the Operation
- (i) Under "Arrangements for the Operation", the proposals shall include the following aspects: -
- (1) Overall approach to carry out operation and maintenance of the Facility and the Existing Facilities taking into account compliance with the specified environmental and operational performance requirements;
 - (2) Organisational structure with job descriptions and field of expertise of the key staff of the project team for the Operation. Information shall be provided to demonstrate the efficiency and adequacy of the team structure in respect of reporting and interface management. Each sub-team shall comprise a leader and other team members; and
 - (3) Organisation charts with duties and responsibility descriptions showing an effective and adequate organisation structure of staff to manage and supervise the operation and maintenance of the Facility. The work location (city/country) and employer of each staff shall be clearly indicated.
- (h) Adequacy of Personnel in the Plan
- (i) The Contractor shall provide an organisation chart for the Design, Construction of the Works and the Operation at the date for commencement of the Design and the Works. The chart shall identify for each key position (i.e. all managers and supervisors): -
- (1) The title of the position; and

- (2) The name of the person proposed to fill that position and their employing company where that person is known.
- (ii) Under "Adequacy of personnel in the plan", the Contractor shall provide the curriculum vitae for the following positions: -
- (1) Project Manager;
 - (2) Site Agent;
 - (3) Operation Superintendents;
 - (4) Project Coordination Engineer;
 - (5) Safety Manager;
 - (6) Design Manager;
 - (7) Food Waste Treatment Technology Specialist;
 - (8) Equipment Installation Superintendents;
 - (9) Surveyors; and
 - (10) Laboratory technicians.
- and any other posts as identified in the organisation charts mentioned in Clause 1.27.1(h)(i) of the Employer's Requirements.
- (iii) For each staff member nominated in Clause 1.27.1(h)(ii) of the Employer's Requirements, provide descriptions of key attributes that the person brings to the role.
- (i) Adequacy of Contractor's and Employer's Staff Training
- (i) The Contractor shall provide an outline of the training proposed to be given to operators responsible for the operation and maintenance of the Facility and to the Employer's staff, and the likely timing of such training.
- (ii) Under "Adequacy of Contractor's and Employer's staff training", the proposals shall include the following aspects: -
- (1) Arrangement of training of operators, maintenance staff and supervisory staff of the Contractor and Employer's staff on the Operation of the Facility and responses to accidents and emergencies (including documentation and verification of proficiency of training);
 - (2) Content and coverage of the proposed training courses; and; and
 - (3) Arrangements to update the understanding of Contractor's and the Employer's staff with the most up-to-date technologies in respect of operation and maintenance of the Facility.
- (j) Sufficiency of Manning Schedule
- (i) The Contractor shall provide a Manning Schedule that shall contain information of all personnel based at or engaged on the Site, including employee numbers, job title and location (treatment system). The Manning Schedule shall include but not limited to the following headings: -
- (1) Job description (to be completed for all employees)
 - (2) Employee numbers
 - (3) Job title

- (4) Location
 - (5) Qualifications (university degree, technical diploma, trade certificate, specialised designation etc.)
 - (6) Hours of work
 - (7) Key tasks
- (ii) Under "Sufficiency of manning schedule", the proposals shall include the following aspects: -
- (1) Manning schedule showing the personnel based at or engaged on the Site to carry out day-to-day operation and maintenance activities; and
 - (2) Deployment of personnel on shifts outside of normal working hours and arrangements of backup staff.

1.27.2 Design and Works Plan

- (a) The Contractor shall submit a draft Design and Works Plan for the certification by the Design Checker and consent by the Supervising Officer. The purpose of the document is to show how the Contractor intends to proceed design and carry out the Works. The Contractor's Design and Works Plan shall cover without limitation the following: -
- (i) Identification of various design stages and packages;
 - (ii) Organisation charts of the Contractor's design team and the Design Checker with allocation of duties and responsibilities for each of the design packages and interfaces;
 - (iii) Document flow chart and approval plan, including statutory submissions;
 - (iv) Design changes management procedure;
 - (v) Design and submission programme, in line with the construction programme;
 - (vi) Proposed title block layout and document numbering system;
 - (vii) Proposed standard forms;
 - (viii) Design proposals;
 - (ix) Organisation charts of the Contractor's teams for carrying out the Works and for managing and supervising the Works, with allocation of duties and responsibilities for each of the teams;
 - (x) Proposed arrangement for executing the Construction Checking Procedures and proposed measures for construction quality control;
 - (xii) Proposed construction sequence;
 - (xiii) Proposed method statements and materials logistics arrangement for site formation;
 - (xiv) Proposed method statements and materials logistics arrangement for building blocks and installation of process, electrical and mechanical plant and equipment;
 - (xv) Proposed method statements and material logistics arrangement for berth facilities, roads and utilities;
 - (xvi) Proposed arrangement for skilled and unskilled labour for the Works;

- (xvii) Proposed arrangement for testing and commissioning;
 - (xviii) Proposed emergency procedures plan for the Works;
 - (xix) Proposed arrangements for health and safety during the Works; and
 - (xx) Proposed arrangements for quality assurance and environmental protection during the Works.
- (b) The Contractor shall at any time following approval of the Design and Works Plan review and re-submit the Design and Works Plan to the Supervising Officer and the Design Checker in the event that: -
- (i) the Employer and the Supervising Officer grants an extension of time in accordance with Clause 86 of the Conditions of Contract; or
 - (ii) the Employer and the Supervising Officer instructs a Change under Clause 42 of the Conditions of Contract; or
 - (iii) the Contractor considers for any reason that there is or may be a significant deviation between the actual or anticipated progress of the Design and Works Plan; or
 - (iv) the Employer and the Supervising Officer requests the Contractor in writing to reflect or incorporate any other matter in the Design and Works Plan.
- (c) Should it appear to the Supervising Officer at any time that there is or may be a significant deviation between the actual or anticipated progress of the Design and Works Plan, the Supervising Officer shall be entitled by written instruction to require the Contractor to produce a revised version showing such modifications to the Design and Works Plan as may be necessary to ensure or to be consistent with substantial completion of the Design and Works or Section of the Design and Works by the time or times for the completion of the Design and Works or Section thereof. The Contractor shall submit such revised Design and Works Plan within 14 days of the Supervising Officer's instruction or within such other time as the Supervising Officer shall allow in writing.
- (d) Unless and until an amended version is approved by the Supervising Officer in accordance with Clause 1.27.2(b) and 1.27.3(b) of Employer's Requirements, the Design and Works Plan previously approved by the Supervising Officer shall remain as the Design and Works Plan for all purposes of the Contract.
- (e) The submission of the Design and Works Plan shall not relieve the Contractor of any of his duties or responsibilities under the Contract nor bind or create any obligation or liability on the part of the Employer, the Supervising Officer and the Design Checker nor, in any event that a Programme indicates that a completion date has not or will not be met, constitutes any form of acknowledgement that the Contractor is or may be entitled to any extension of time in relation to such completion date.
- (f) The Contractor shall submit to the Supervising Officer by the end of each calendar month a monthly progress report which shall, amongst other things, highlight actual or potential departures from the Design and Works Plan and state the measures which the Contractor proposes to take in order to make good or reduce any delays.
- (g) Under "Design proposals", the following aspects shall be provided: -
- (i) Site Formation
 - (ii) Facility Layout and Overall Appearance

- (1) Descriptions with sufficient drawings to illustrate the layout of the Facility at the Site to satisfy functional needs with due considerations to the effectiveness of structural layout, functionality and footprint analysis of each of the proposed structures and buildings, adequacy of solutions to meet structural design requirements, adequacy of solutions to meet design constraints such as gross floor requirements, floor height, building height restriction, and ease of construction, with due considerations on vehicles and pedestrian circulation requirements.
 - (2) Descriptions with sufficient calculations, drawings and manufacturer's technical information to illustrate the air-conditioning and mechanical ventilation system for different buildings with due considerations to odour removal and fresh air intake, plumbing, drainage and the telecommunication and broadband services for different structures.
 - (3) Descriptions with sufficient drawings and details to demonstrate the considerations in design and planning of fire services installations and use of fire engineering approach to comply with Fire Services Department's requirements.
 - (4) Descriptions with sufficient 2D and/or 3D drawings to illustrate the concept of the architectural, landscaping and greening design, with due consideration to integrate and connect with the surrounding environments including appearance and the Existing Facilities.
- (iii) Food Waste Reception
- (1) Descriptions with sufficient drawings, process flow diagrams and design assumptions to illustrate the design of the process block(s) for receiving Food Waste from contractors for delivering Food Waste suiting different operation scenarios, approach for Food Waste reception, handling and storage strategies, arrangement for the traffic control of Food Waste collection vehicles, with due consideration on complying with the requirements for cycle time, design of storage facilities, arrangement for dealing with Non-Permitted Wastes, design of the weighing system and design of the vehicle washing approach.
- (iv) Pre-treatment
- (1) Descriptions with sufficient drawings, process flow diagrams and design assumptions to illustrate the design of the process block(s) for fulfilling the functional needs and odour control requirement, with details on the overall approach, measures incorporated in the design to cope with short term and long term variation of the quantity, composition and characteristics of the Food Waste but constant feed rate, assumptions and considerations on the Food Waste characteristics, technologies and equipment adopted.
 - (2) Descriptions with sufficient drawings, process flow diagrams and design assumptions to illustrate the design of Residues handling system, with details on the overall approach, proposed storage arrangements, and calculations.
 - (3) Descriptions with calculations to demonstrate the design of the Facility to achieve the Guaranteed Performance on the characteristics of the Pre-treated Food Waste as stipulated in the Employer's Requirements.

- (4) Descriptions with sufficient drawings to illustrate the design for real-time and automated processes equipment/ systems control, and overall operation management of the Facility, with details including but not limited to overall approach, interfacing arrangements, proposed system architecture, archiving and security strategies to the Supervisory Control and Data Acquisition System (SCADA).
 - (v) Pre-treated Food Waste Conveyance System
 - (1) Descriptions with sufficient drawings, process flow diagrams and design assumptions to illustrate the design of Pre-treated Food Waste Conveyance System, with details on the overall approach, proposed storage arrangements, and calculations.
 - (vi) Administration block
 - (1) Descriptions with sufficient drawings to illustrate the arrangements of administration block to fulfil the functional needs as stipulated in the Employer's Requirements.
- (h) Under "Proposed arrangement for executing the Construction Checking Procedures and proposed measures for construction quality control", the following aspects shall be provided: -
- (i) Descriptions with sufficient drawings to illustrate the Construction Checking Procedures for stage notification and inspection of Works. Inspection of Works shall include, but not limited to, inspection of materials and workmanship, before covering up works, the fabrication factory of structural steelwork, the proposed casting yard for the pre-casting of concrete elements and the inspection of mechanical and electrical equipment.
 - (ii) Descriptions with sufficient drawings to illustrate the quality control procedures for fabrication and installation, and major process equipment installation, including prefabrication and assembly of major prefabricated items to demonstrate the workmanship fulfilling the Contract requirements.
- (i) Under "Proposed method statements and materials logistics arrangement for site formation", the following aspects shall be provided: -
- (i) Descriptions with sufficient drawings to illustrate the arrangement for the construction activities.
 - (ii) Descriptions with sufficient drawings to illustrate the construction sequence for site formation, with due consideration given to, including without limitation, the project and site constraints, environmental performance and pollution control requirements and programming of the Facility.
 - (iii) Descriptions with sufficient drawings to illustrate the arrangement for the construction plant schedule, with details on the proposed quantities and types of construction plant to be mobilised and employed for the site formation including those for delivery and handling and the proposed delivery and mobilisation schedules of different types of construction plant.
 - (iv) Descriptions with sufficient drawings and other relevant documentation to illustrate the arrangement for the fill materials, with details on the sources of different types of fill materials, including Construction & Demolition (C&D) materials, sand fill and rock fill, plans and procedures to obtain different types of fill materials, and delivery schedules of different types of fill materials to the Site.

- (j) Under "Proposed method statements and materials logistics arrangement for building blocks/building blocks and installation of process, electrical and mechanical plant and equipment", the following aspects shall be provided: -
 - (i) Descriptions with sufficient drawings to illustrate the arrangement for the construction of the building blocks and structures, roads, drainage, and underground utilities, plant and equipment installation and interfaces for civil and E&M works with due consideration given to construction constraints, resources deployment, Temporary Works, health and safety, environmental management as well as interfaces among other construction activities at the Site.
 - (ii) Descriptions with sufficient drawings to illustrate the construction sequence for construction of the Facility, with due consideration given to, including without limitation, the project and site constraints, environmental performance and pollution control requirements and programming for construction of the Facility, and interface with the operators of the Existing Facilities on connecting the Facility to the switch room at the Existing Facilities.
 - (iii) Descriptions with sufficient drawings to illustrate the arrangement for the major equipment delivery schedule and storage arrangements.
- (k) Under "Proposed method statements and material logistics arrangement for roads and utilities", the following aspects shall be provided: -
 - (i) Descriptions with sufficient drawings to illustrate the arrangement for the construction of roads and utilities, with due consideration given to the interfaces among other construction activities and traffic flow.
- (l) Under "Proposed arrangement for skilled and unskilled labour for the Works", the following aspects shall be provided: -
 - (i) Descriptions with sufficient details to illustrate the arrangement for securing adequate supply of and providing sufficient trainings to skilled and unskilled labour, including but not limited to qualified welders, welding examiner and electrical workers, for carrying out different types of the Works to meet the construction schedule, and to meet the testing, commissioning and operation requirements.
- (m) Under "Proposed arrangement for testing", the following aspects shall be provided: -
 - (i) Descriptions with sufficient drawings to illustrate the sequence and arrangement for testing of the Facility, including coordination arrangement with contractors for delivering Food Waste, Food Waste Reception System, Pre-treatment, Pre-treated Food Waste Conveyance System, including coordination arrangement with operators of the Existing Facilities, Residues storage, handling and disposal systems, including demonstration of a reliable logistics flow for Residues disposal and coordination plans with the Designated Landfill and the Designated Organic Waste Treatment Facilities during the testing period, control and monitoring systems, such as SCADA etc., with due considerations to the prerequisites for each activity, methodologies, duration of each activity, Temporary Works, measures to mitigate environmental impacts, health and safety precautions, emergency arrangement, project constraints, interfacing requirements with other parties and procedures to be taken in case of failure of testing.

- (ii) Descriptions with sufficient drawings to illustrate the arrangement for carrying out the testing including but not limited to the proposed arrangement and procedures to test normal shutdown and emergency shutdown of the Facility, proposed arrangement and procedures to test the reliability of the Facility, and proposed arrangement and procedures to demonstrate a stable operation of the Facility in automatic control.
- (n) Under "Proposed Emergency Procedures Plan for the Works", the following aspects shall be provided: -
 - (i) Descriptions with sufficient drawings to illustrate the emergency procedures and arrangements in different emergency situations during construction of the Facility.

1.27.3 Operation Plan

- (a) The Contractor shall submit a draft Operation Plan in accordance with Clause 59 of the Conditions of Contract for the certification by the Design Checker and consent by the Supervising Officer. The Plan shall outline the policies and procedures for the systematic management approach to Occupational Health and Safety, rehabilitation, environmental protections, operations and maintenance activities associated with the Operation of the Facility. The Contractor's Operation Plan shall cover without limitation to the following:
 - (i) Introduction – Project / Operation Management System Structure covering safety & operations management, management system, O&M Manuals and asset management.
 - (ii) Objectives and Targets – Identifying the objectives and targets related to safety, quality and environment, together with the performance measurement indicators and responsible person.
 - (iii) Staffing and responsibility – Manning level, responsibility and line of accountability of staff.
 - (iv) Hazard and Risk Identification – Identify all potential health, safety and environmental hazards and risks associated with the works, assess the risks involved and develop controls to eliminate or minimise the risk.
 - (v) Staff Training – Skills matrix and assessment, safety and refresher training.
 - (vi) Data Management System (Data integrity) – Reporting format (covering Reporting of monitoring data stipulated in Part 6 of the Employer's Requirements, KPI compliance analysis, license exceedances, exception reports, non-conformances, customer complaints), data review and validation, back up and archived.
 - (vii) Operation Procedures – Arrangements, operational strategies and approaches for different items and conditions in order to ensure all requirements as stipulated in the Contract are complied with during Proving and Post-commissioning stage.
 - (viii) Sampling and testing requirements – Method of sampling, testing and testing standards, online equipment calibration and validation frequency and procedures.
 - (ix) Incident Management – Hazard report, assessment, corrective action, including accident and major incident reporting, complaint handling and response.

- (x) Emergency procedures plan for Operation during Post-commissioning stage – Emergency response protocol and training to handle emergency matters stipulated in Part 6 of the Employer's Requirements. Diagram showing the escape routes to a safe place, means of providing a rapid and direct warning to personnel on site in the event of emergency in the Facility communication channel with the operation personnel and Fire Services Department (FSD), and training and periodic drills to site personnel on the emergency procedures shall also be included.
 - (xi) Emergency Food Waste handling procedures – Reporting, emergency procedures to limit the duration of emergency Food Waste handling, remedial actions and environmental monitoring procedures.
 - (xii) Operation and Maintenance Schedule – Spares inventory, planning of inspection, operation and maintenance, part replacement and asset replacement plans for the Project specified in Section 6 of the Employer's Requirement.
 - (xiii) Management Review and Improvement Plan – Frequency and nature of reviews to achieve continuous improvement on the Operation.
 - (xiv) Plant commission test arrangements during the Proving Stage.
- (b) In “Operation Procedures”, the following items shall be covered: -
- (i) Arrangement for operation and maintenance
 - (1) Descriptions with sufficient drawings to illustrate the operational control mechanism and special maintenance strategies to optimise the treatment process, including but not limited to: (A) Food Waste Reception System, including coordination arrangement with the contractors for delivering Food Waste; (B) Food Waste Conveyance System; (C) Pre-treatment; (D) Pre-treated Food Waste Conveyance System; (E) Residues storage, handling and disposal, including all delivery and transportation arrangements for Residues; (F) storage and handling of chemicals, dangerous goods and hazardous materials; (J) arrangements to engage expertise for carrying out maintenance, overhaul, emergency repair or examination of the major equipment;
 - (ii) Operational strategies to achieve the Guaranteed Performance
 - (1) Descriptions with sufficient drawings to illustrate the operational and special maintenance strategies to achieve the Guaranteed Performance provided by the Contractor in the tables set out in the Schedule of Guaranteed Performance in Appendix Q2 to the Condition of Tender, with due consideration given to: (A) proposal for periodic verification and validation of compliance with the Guaranteed Performance; and (B) proposal for periodic calibration and validation of the Pre-treated Food Waste characteristics assessment/calculation methodology. The proposal shall include validation by Pre-treated Food Waste sampling including sampling frequency, procedures, standards and testing methods.
 - (iii) Operational strategies to cater for variations and fluctuations in Food Waste quality

- (1) Descriptions with sufficient drawings to illustrate the operational and special maintenance strategies to achieve the annual availability of the Facility, with due consideration given to the compliance of the Operational Performance Requirements, for operation plans to cater for variation (both short term and long term changes) in quantity and quality of Food Waste.
- (iv) Operational strategies to maximise the energy efficiency of the Facility
 - (1) Descriptions with sufficient drawings to illustrate the operational and special maintenance strategies to maximise the energy efficiency of the Facility apart from the Contractor's Guaranteed Performance, with due consideration given to: (A) strategies for monitoring and target-setting energy use in the Facility; (B) proposals to maximise the appropriate use of natural lighting; (C) proposals to maximise the appropriate use of natural ventilation and adequate cross flow of air to reduce the need for air conditioning and active cooling; (D) plans for adequate maintenance of all equipment to ensure efficiency and effectiveness; (E) proposals to adopt new, energy and carbon efficient equipment/measures during the Operation Period; and (F) demonstration of the proposed design comply with Code of Practice for Energy Efficiency of Building Services Installation.

1.28 Site Cleanliness

1.28.1 General

- (a) The Contractor shall observe all relevant requirements related to site cleanliness as stated in Clause 1.32 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender).
- (b) Rubbish, debris, cement bags, disused formwork and the like shall be disposed of at least once a day and the works areas cleaned by flushing with water as necessary so that the Site is kept constantly clean and tidy.
- (c) Notwithstanding the above, the Contractor shall also be required to place rubbish bins at the appropriate locations agreed by the Supervising Officer and be required to collect the rubbish in the bins at a frequency agreed by the Supervising Officer.
- (d) The Contractor shall ensure that no earth, debris, rock or Food Waste is deposited on public or private rights of way as a result of the Works, including any deposits arising from the movement of construction plant and vehicles.
- (e) The Contractor shall perform Daily Cleaning and Weekly Tidying of the Site including the Public Cleaning Areas. The extent of the Public Cleaning Areas required for cleaning are deemed to be the carriageway within the Existing Facilities where the vehicles associated with the Project pass by and within 1.2 metres on the periphery outside the site boundary unless otherwise specified by the Supervising Officer. Where necessary, the Supervising Officer shall determine the Public Cleaning Areas on site and may amend their extent on each day based on the requirements in the Employer's Requirements, and taking into account the actual site condition before work commences.

- (f) The Contractor shall draw up, in the Design and Works Plan where appropriate, a system on waste management, and maintenance of cleanliness and tidiness of the Site including, but is not limited to, the methods and provisions including the proposed areas for on-site sorting, separation, storage and disposal of waste materials, and the proposal of how to maintain the Site in clean and tidy condition. The Contractor shall provide the necessary facilities, receptacles and transport for the temporary storage, disposal and removal of different types of wastes.

1.28.2 Daily Cleaning

- (a) "Daily Cleaning" shall include cleaning and tidying up after work of tools, equipment, unused materials, storage areas and common areas such as passageways, daily removal of waste materials from works areas, removal of any rubbish and debris dumped into the Site by the public and, without derogating from the generality of the foregoing, shall include, but is not limited, to all the items subject to checking as listed in Clause 1.28.2(b) of the Employer's Requirements.
- (b) The Contractor shall develop inspection checklist for Daily Cleaning after each Cleaning Day's work for the approval of the Supervising Officer. The inspection checklist shall be reviewed and updated whenever there is a change in work nature or work location and re-submitted for approval by the Supervising Officer. The inspection checklist shall include an assessment on cleanliness and tidiness of all work locations plus the Public Cleaning Areas. Items to be checked against shall include, but are not limited to, the following: -
- (i) Maintenance of passageways, common accesses and public areas free of obstruction;
 - (ii) Proper storage and stacking of materials;
 - (iii) Proper placement and storage of tools and equipment after work;
 - (iv) Proper sorting, storage and/ or disposal of waste materials in accordance with the waste management plan of the Works Plan;
 - (v) Proper securing of barriers, guarding, lighting, and signing of works;
 - (vi) Prevention and removal of water ponds and flooding;
 - (vii) Clearing of stockpiling and wastes arising from such Works;
 - (viii) Conditions of cleanliness and tidiness of the Site including Public Cleaning Areas in the perspective of the general public;
 - (ix) Other cleaning requirements as instructed by the Supervising Officer;
 - (x) Measures listed below for improvement of site cleanliness and to control mosquito breeding on construction sites. The list is not meant to be exhaustive: -
 - (1) Removal of litters and debris on the Site and Public Cleaning Areas including those dumped from outside by the public;
 - (2) Removal of debris and rubbish not within the Site and Public Cleaning Areas if the debris and rubbish are in connection with the Works or disposal of by the persons working on the Site;
 - (3) Removal of excavation materials or covering of stockpiled materials with tarpaulins for all excavation works particularly for roadwork sites;
 - (4) Keeping traffic cones clean and in an orderly manner;

- (5) Refurbishing, repainting and/or repairing of hoardings and/or steel barriers half yearly;
 - (6) Keeping passageways clear and free of greasy dirt, wastes and timbers;
 - (7) Proper covering of all water storage tanks, removal of unnecessary stagnant water and disused containers, or applying larvicidal spray to prevent mosquito breeding as the last resort; and
 - (8) Cutting the bamboo piles for bamboo scaffolding as near to the point before the nodes of the poles as possible.
- (c) The Contractor shall assign person(s) to inspect the Site after each Cleaning Day's work. The assigned person shall check and ensure the cleanliness and tidiness of the Site, complete the inspection checklist, record the areas requiring improvements, and take photographs of areas where cleaning and tidying up works have been done and where improvement actions are required. The Contractor shall also assign a designated person for the overall co-ordination, monitoring and overseeing of the performance of the site on cleanliness and control of mosquito breeding. The assigned person can be the Contractor's Agent or Sub-agent or any other person whom the Contractor considers capable of undertaking the duties. The Contractor shall notify the Supervising Officer the name and contact telephone number of the assigned person and any subsequent change thereafter.
- (d) The Contractor shall notify the Supervising Officer the time schedule for Daily Cleaning on every Cleaning Day and the name of the assigned person as referred to in Clause 1.28.2(c) of the Employer's Requirements above responsible for the inspection and checking after each Cleaning Day.
- (e) The Contractor shall submit, in the morning of the day (which is not a General Holiday) following a Cleaning Day, the inspection checklist, records and photographs prepared pursuant to Clause 1.28.2(c) of the Employer's Requirements above to the Supervising Officer for checking and recording.
- (f) The Supervising Officer may carry out inspections and surprise checks to verify the Contractor's performance on cleanliness and tidiness of any Site before the noon of the day (which is not a General Holiday) following a Cleaning Day. The Contractor shall not be entitled to any payment for the item for "Daily Cleaning" for a Cleaning Day if the performance of the Contractor on cleanliness and tidiness for any part of the Site for that Cleaning Day is not carried out to the satisfaction of the Supervising Officer. The Supervising Officer shall notify the Contractor and record in the Site Diary for any non-payment of the item for "Daily Cleaning" on a Cleaning Day and the areas of dissatisfaction for improvement by the Contractor.
- (g) The Contractor shall in the morning of every Cleaning Day before work commences inspect and remove any rubbish and debris that may be littered by the public over the night within any area which cleanliness and tidiness the Contractor is required to maintain under this Contract before the inspection by the Supervising Officer.

- (h) If a tropical cyclone warning signal (No. 8 or above), a Black Rainstorm warning or other special circumstances renders Daily Cleaning not possible or practical on a Cleaning Day (or if more than one Cleaning Day, Cleaning Days), the Contractor shall submit the detailed particulars of the circumstances for the consideration of the Supervising Officer. The Supervising Officer may, at his discretion, waive the Contractor's duties and obligations in respect of Daily Cleaning on that Cleaning Day (or if more than one Cleaning Day, those particular Cleaning Days) and in such event, the Contractor shall not be entitled to any payment in respect of Daily Cleaning on that particular Cleaning Day (or if more than one Cleaning Day, those particular Cleaning Days).

1.28.3 Weekly Tidying

- (a) "Weekly Tidying" shall include the cleansing and tidying up of the common areas and accesses, cleansing and/or re-conditioning of barriers, guarding, lighting, signage and/or traffic cones, cleansing of external covers for plant and equipment, removal of waste and debris etc. so as to ensure that the plant and equipment, as well as such Site as a whole, to be clean and tidy in the perspective of the general public and, without derogating from the generality of the foregoing, shall include, but is not limited to, all the items subject to checking as listed in Clause 1.28.3(b) of the Employer's Requirements.
- (b) The Contractor shall develop inspection checklist for Weekly Tidying after each Cleaning Week Day's work for the approval of the Supervising Officer. The inspection checklist shall be reviewed and updated whenever there is a change in work nature or work location and re-submitted for approval by the Supervising Officer. The inspection checklist shall include an assessment on the cleanliness and tidiness of the Site conditions including the Public Cleaning Areas. Items to be checked shall include, but are not limited to, the following: -
- (i) Thorough cleansing of passageways, common accesses and public areas;
 - (ii) Re-organising of storage materials for better utilisation of storage spaces and safe stacking if appropriate;
 - (iii) Maintenance and re-conditioning of tools and equipment;
 - (iv) Cleansing of external covers for plant and equipment;
 - (v) Collection and removal of disposed waste materials off site;
 - (vi) Cleansing, re-conditioning and/or replacement of barriers, guarding, lighting, and signage of works to good working condition;
 - (vii) Clearing of drains and channels to prevent flooding; and
 - (viii) Other cleansing requirements as instructed by the Supervising Officer from the perspective of the general public.
- (c) The Contractor shall assign person(s) to inspect the Site after each Cleaning Week Day's work. The assigned person shall check and ensure the overall cleanliness and tidiness of the Site, complete the inspection checklist, record the areas requiring improvements, and take photographs of areas where overall site cleaning and tidying up actions have been done and where improvement actions are required.
- (d) The Contractor shall notify the Supervising Officer the time schedule for Weekly Tidying on every Cleaning Week Day, and the name of the assigned person as referred to in Clause 1.28.2(d) of the Employer's Requirements above responsible for the inspection and checking after each Cleaning Week Day.

- (e) The Contractor shall submit, in the morning of the day (which is not a General Holiday) following the Cleaning Week Day, the inspection checklist, records and photographs prepared pursuant to Clause 1.28.2(d) of the Employer's Requirements above to the Supervising Officer for checking and recording.
- (f) The Supervising Officer shall, together with the Site Agent, check and inspect the overall cleanliness and tidiness of the Sites on the day (which is not a General Holiday) following the Cleaning Week Day. The Supervising Officer shall advise the Contractor whether his performance is to his/her satisfaction, or if not, where improvement actions are required.
- (g) The Contractor shall promptly rectify the defects identified by the assigned person as referred to in Clause 1.28.3(c) of the Employer's Requirements above, and/or the Supervising Officer. The Contractor shall not be entitled to any payment for the item for "Weekly Tidying" for a Cleaning Week Day if the Contractor fails to rectify the identified defects pursuant to Clause 1.28.3(c) and 1.28.3(d) of the Employer's Requirements above to the satisfaction of the Supervising Officer before the end of the day (which is not a General Holiday) following the Cleaning Week Day.
- (h) The Contractor shall in the morning of every Cleaning Week Day before work commences inspect and remove any rubbish and debris that may be littered by the public over the night within any area which cleanliness and tidiness the Contractor is required to maintain under this Contract before the inspection by the Supervising Officer.
- (i) If a tropical cyclone warning signal (No. 8 or above), a Black Rainstorm warning or other special circumstances renders Weekly Tidying not possible or practical on a Cleaning Week Day, the Contractor shall submit the detailed particulars of the circumstances for the consideration of the Supervising Officer. The Supervising Officer may, at his discretion, waive the Contractor's duties and obligations in respect of Weekly Tidying on that particular Cleaning Week Day and in such event, the Contractor shall not be entitled to any payment in respect of Weekly Tidying on that particular Cleaning Week Day.

1.28.4 Red Imported Fire Ants

- (a) The Contractor shall inspect the plants for Red Imported Fire Ants before they are planted on the Site and inspect the planted area regularly.
- (b) The Contractor shall maintain and protect all planting from invasion of Red Imported Fire Ants. Whenever such maintenance or protection is not possible, the Contractor shall report to the Supervising Officer with alternative proposal and resume the original conditions at his own cost.

1.28.5 Prevention of Dust

- (a) The Contractor shall observe all relevant requirements related to dust prevention as stated in Clause 1.34 of the General Specification for Civil Engineering Works 2020 Edition (including the addenda thereto up to and including the day before the closing date of tender).
- (d) The Contractor shall suitably pave the whole of the area around the wheel washing facilities and, where appropriate, any length of access road between the wheel washing facilities and the public road or Public Cleaning Areas, to facilitate cleaning and shall be kept free of mud.

- (e) The result of washing shall be to the satisfaction of the Supervising Officer or his Representative. The Contractor shall submit the design of the wheel washing facilities to the Supervising Officer for consent prior to setting up and installation on the, and shall maintain the facilities to satisfy the requirements in the Contract.
- (f) The installation of wheel washing facilities shall be provided before any works commence on the Site. The Contractor shall be responsible for the operation, maintenance and any necessary replacement of such facilities throughout the Works.
- (g) The Contractor shall be responsible for the removal of the wheel washing facilities and the subsequent reinstatement upon completion of the Works or as requested by the Supervising Officer.
- (h) Mechanical Dump Truck Covers
 - (i) All dump trucks (i.e. goods vehicles of gross vehicle weight equal to or more than 16 tonnes, fitted with a dump bed) leaving the Site carrying dusty materials shall be fitted with a mechanical cover in good service condition which covers the dump bed. Such dump truck covers shall comply with the following.
 - (1) The cover shall be constructed of durable materials and suitable components in good condition. The covering materials shall be effective in preventing dust emissions. The cover shall be power-operated with manual backup. Except in the manual backup mode, the cover shall only be operable inside the driving cabin, if applicable.
 - (2) The cover system shall incorporate controls to ensure safety in operation. The cover shall be inoperable unless the vehicle has come to a standstill, and after the hand brake is on. A warning system, consisting of flashing amber lights and audible alarm, shall be activated automatically when the cover is being operated inside the driving cabin. The warning system shall be visible and audible from both inside (by an indicator light or the like if necessary) and outside the driving cabin. A locking system shall be in place to prevent accidental opening of the cover, if applicable.
 - (3) The cover shall be able to withstand strong winds under normal circumstances. After the cover to the dump bed is closed, any gap left on the system of enclosure shall be less than 25 mm wide measured in a direction across the gap as far as practicable. Any remaining gap shall be sealed up tightly with suitable materials of sufficient length to bridge across the gap as far as practicable. In addition, the cover shall not accumulate any significant amount of dust or debris which may obstruct its operation. The gross vehicle weight and maximum dimensions of the truck after fitted with the cover and associated accessories shall comply with the relevant legislation.
 - (ii) The Contractor shall be responsible for selecting the design of mechanical cover satisfying the above requirements.
 - (iii) The Supervising Officer shall have the power to:
 - (1) refuse entry into the Site any dump truck that fails to meet this specification; and
 - (2) require any loaded dump truck to unload its contents before leaving the Site if its dump bed and cover is found not to comply with the above requirements after loading.

Provided always that approval for leaving the Site of a loaded dump truck by the Supervising Officer shall not relieve the Contractor of his obligation to comply with the relevant legislation, and the Employer shall not be liable for any loss or damage sustained by the Contractor or the truck drivers or truck owners arising from or in connection with any offence committed by the Contractor or the truck drivers or truck owners in relation to transportation of the C&D materials from the Site.

- (iv) Vehicles other than ‘dump trucks’ carrying dusty materials away from the Site may use means other than mechanical covers to cover their dusty materials, provided that the vehicle shall have properly fitted side boards and tailboards, with the dusty material loaded to a height not exceeding the height of side boards and tailboards, and covered by a tarpaulin or suitably impervious covering materials (as approved by the Supervising Officer) in good condition. The covering shall be properly secured and extended at least 300 mm over the side boards and tailboards before leaving the Site.

1.29 Miscellaneous

1.29.1 Trade or Proprietary Names

- (a) Where trade names or proprietary products are shown in the Contract documents, these are shown only as a means of describing the requirements of the article, equipment or fitting. Products having equivalent functions or performance may be submitted for the approval of the Supervising Officer.
- (b) The phrase “equal or equivalent” for alternative materials of particular patent or trademark as specified in the Contract shall mean alternative products and materials having equivalent functions or performance.
- (c) If the Contractor intends to use the Intellectual Property Rights of another person in performing his obligations under the Contract, appropriate licenses shall be obtained from the relevant Intellectual Property Rights owner.
- (d) Before placing any order for material, manufactured articles or machinery, the Contractor shall submit for the approval of the Supervising Officer a list showing such items, the names of the manufacturers and the manufacturer publications giving details of the specifications and recommended methods of use etc.

1.29.2 Security System for the Site

- (a) The Contractor shall be responsible for setting up, operating and maintaining a security system for controlling all access points to and from the Site and at specific locations within the Site throughout the Contract Period.
- (b) The control of traffic shall include all land transport travelling to and from the Site associated with the Contract. The Contractor shall be responsible for providing all necessary arrangements to support the security system which shall be capable of dealing with inadvertent and deliberate attempts by the members of the public and other unauthorised persons and land transport to access the Site. The Contractor shall develop a comprehensive security system proposal and arrangements for the Supervising Officer’s approval.
- (c) The Contractor shall establish a security system that will enable all persons and land transport to be rapidly screened to determine whether the access to the Site is authorised.

- (d) The security system shall be installed and effected by a specialist security sub-contractor who is on the Employer's List of Approved Suppliers of Materials and Specialist Contractors for Public Works under the category of Burglar Alarm and Security Installation and approved by the Supervising Officer. The Contractor shall patrol the Site at regular intervals and remove any unauthorised persons and land transport from the Site immediately.
- (e) The Contractor shall submit a proposal for the security system to the Supervising Officer for approval within 2 months from the commencement of the Contract. The Contractor shall complete setting up and start to operate the approved security system before commencement of the Works. The Contractor shall update and adjust the security system from time to time to suit the actual site conditions and the progress of the Works. No updating and adjustments are to be made without the prior approval of the Supervising Officer.

1.29.3 Control of Dogs on the Site

- (a) No dog shall be kept by the Contractor or his employees, his agents or sub-contractors or their employees, on the Site unless the dog is acceptable for licencing by the Agriculture, Fisheries and Conservation Department (AFCD), and is licensed under the Rabies Ordinance (Cap 421), implanted with a microchip and vaccinated against rabies. In addition, the keeper of the dog under the license shall either be: -
 - (i) An employee of the Contractor who shall be of a rank not lower than deputy site agent or equivalent as agreed by the Supervising Officer; or
 - (ii) A security firm in its own name or an employee of the firm who shall not be of a rank lower than assistant manager level, where the security firm is engaged by the Contractor solely for the purpose of Site security.

1.29.4 Weather Protection Scheme

- (a) The Contractor shall submit to the Supervising Officer at least 1 month before the commencement of the Works for consent a Design Checker-certified weather protection scheme against all kinds of weather for the elements of the Works including but not limited to the following: -
 - (i) earthworks and excavation and foundation works;
 - (ii) concreting;
 - (iii) structural steelworks;
 - (iv) drainage and sewerage and utilities works;
 - (v) plant and equipment installation;
 - (vi) temporary stockpiling area.
- (b) The Contractor shall implement and comply with the weather protection scheme consented by the Supervising Officer in carrying out the Works and fulfilling his obligations and responsibilities under the Contract. The submission to and the consent given by the Supervising Officer to the weather protection scheme shall not relieve the Contractor of any of his obligations and responsibilities under the Contract.

- (c) The Contractor shall identify the extent of the works susceptible to the effect of all kinds of weather and shall describe methods of protection for each works elements, materials, plant and equipment for erection and dismantling of each weather protection system, and the estimated time required for erection and dismantling of each weather protection system in his submission of the weather protection scheme.
- (d) Within 2 months after the date of commencement of the Works, the Contractor shall deliver to the Site samples of each weather protection system and conduct site trial to demonstrate the adequacy of the proposed materials, plant, equipment, erection and dismantling methods.
- (e) If the Contractor considers that the weather conditions are not suitable for carrying out the Works, he shall erect the weather protection systems to protect the Works.
- (f) All activities of the Works shall be carried out in the dry, unless otherwise consented by the Employer or the Supervising Officer. The Contractor shall arrange for rapid removal of water which enters the construction works in the Site from any source and when practicable discharge the water into permanent drainage system. The Contractor shall provide adequate means for trapping silt before discharging any water into permanent drainage systems.
- (g) The Contractor shall provide, where necessary, temporary water courses, ditches, drains, pumping or other means of maintaining the construction works in the free of water.
- (h) The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm-water drain, channel, stream-course or sea any effluent or foul or contaminated water or cooling or hot water without the prior consent of the Supervising Officer who may require the Contractor to provide, operate and maintain at the Contractor's own expense, within the Site or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water. The Design Checker-certified design of such treatment works shall be submitted to the Supervising Officer for consent not less than one month prior to the commencement of construction or as agreed by the Supervising Officer.

1.29.5 Emergency Unit

- (a) The Contractor shall be responsible for provision of an emergency unit for patrolling the Site and implementing the weather protection schemes as stipulated in the Employer's Requirements and other necessary temporary relief works during inclement weather which includes but not limited to hoisting of red/ black rainstorm warning, and hoisting of tropical cyclone warning signal No. 8 or above.
- (b) The emergency unit for the Works shall consist of the following: -
 - (i) the Project Manager;
 - (ii) a foreman; and
 - (iii) a labourer.
- (c) The Contractor shall provide for exclusive use of the emergency unit for the Works adequate supporting machinery and equipment. The Contractor shall maintain the machinery and equipment in good working condition.
- (d) The Contractor shall submit to the Supervising Officer for approval the particulars of the emergency unit for the works and the supporting machinery and equipment at least 1 month before the commencement of the Works.

- (e) When inclement weather conditions are encountered, the emergency unit shall station on the Site and conduct regular patrol of the Site. In the event that the weather conditions will affect the stability of the Works or part of the Facility or others, the emergency unit shall report the situation to the Supervising Officer and carry out necessary works to restore the stability of the Works or the part of the Facility and to minimise the effects on the progress of the Works.
- (f) The emergency unit shall be mobilised within two hours of an instruction being given at any time of the day and night. Mobilisation will have been deemed to have been completed when all members, machinery and equipment are gathered in the Contractor's temporary accommodation and a state of standby has been achieved.
- (g) The Contractor shall monitor the weather forecasts from the Hong Kong Observatory at all times and shall ensure that he is aware of poor visibility, rainstorm warnings, flood warnings, landslip warnings, and the hoisting of tropical cyclone warning signals. Whenever any such warnings are announced, he shall maintain 24-hour appropriate precautions and all necessary arrangements for immediate action if required.
- (h) In the event of emergency incidents such as flooding, slope failure, traffic collision and any disasters happened in the vicinity of the Site (whether outside the normal working hours or not), the Supervising Officer or his representative may request the Contractor to provide assistance to the Employer to deal with the emergency situations. The Contractor shall attend to such emergency incidents forthwith by providing all necessary labours, plants and resources. The Contractor shall be reimbursed for the cost of the emergency work, together with overheads and profit to be assessed by the Supervising Officer.

1.29.6 Use of Hardwood for Temporary Works

- (a) Hardwood shall not be used for the following items of temporary works: -
 - (i) Falsework, which is defined as a temporary structure used to support formwork and a permanent structure until the permanent structure is self-supporting.
 - (ii) Trench support, which is defined as the shoring, strutting and propping used to support temporary openings below surface ground level.
 - (iii) Formwork, which is defined as the mould against which concrete is cast and which gives the shape and finish to the concrete surface and which may be permanent or temporary.
- (b) The Contractor shall propose alternatives to hardwood for approval of the Supervising Officer. The Contractor shall use metallic alternatives to timber in all components of site signboards.

1.29.7 Payment of Wages of the Site Personnel

- (a) The Contractor shall ensure prompt payment of full wages to all the Site Personnel employed by him and shall use all reasonable endeavours to have his sub-contractors of all tiers to effect prompt payment of wages to all the Site Personnel employed by them for the execution of the Works in accordance with the Employment Ordinance.
- (b) The Contractor shall include provisions in the contracts with his sub-contractors requiring the implementation of the system of payment of wages to the Site Personnel under the provisions of Clause 1.29.10 of the Employer's Requirements.

1.29.8 **Qualified Tradesmen / Qualified Skilled Workers and Intermediate Tradesmen / Qualified Semi-skilled Workers**

- (a) The minimum number of Qualified Tradesmen / Qualified Skilled Workers and Intermediate Tradesmen / Qualified Semi-skilled Workers to be employed by the Contractor in accordance with Clause 34 of the Conditions of Contract shall be calculated in accordance with the following stated percentages of the total local workforce on the Site (i.e. excluding those labour who are imported with the approval of the Director of Immigration) at any time in each of the following specified trades and rounded up to the nearest whole number : -
 - (b) Job descriptions of the specified trades shall be as shown in the Final Report for the Review of Trade Classification in the Construction Industry published by the Works Bureau.
 - (c) Trade test certificates, certificates of completion of apprenticeship and intermediate trade test certificates are relevant if they are in trades or types of work specified in the following tables: -
 - (d) For the purpose of complying with the requirements set out in sub-clause (1)(b) above, Qualified Tradesmen / Qualified Skilled Workers of the other related E&M trades can also be counted as Intermediate Tradesmen / Qualified Semi-skilled Workers for specific trade as set out below: -
 - (e) The Contractor shall keep daily records of the names and trades of the Qualified Tradesmen / Qualified Skilled Workers and Intermediate Tradesmen / Qualified Semi-skilled Workers working at the Site and shall make such records available for inspection by the Supervising Officer as required.
 - (f) The Day of Checking is defined as the 15th of each month or the subsequent working day if the 15th is a General Holiday. The Contractor shall submit to the Supervising Officer, within 3 days (General Holiday not to be counted) from and including the Day of Checking, a name list of the Qualified Tradesmen / Qualified Skilled Workers and Intermediate Tradesmen / Qualified Semi-skilled Workers working at the Site in the morning of the Day of Checking. The List shall be submitted in the forms shown in Appendix C of WBTC 13/2002. The Contractor shall also direct the workers to sign against their names on the forms in Appendix C of WBTC 13/2002. In addition, the Contractor shall send pages C2/7 and C4/7 (in Excel format) of the completed forms direct to the CICTA by e-mail (E-mail address: VERIFY@icta.edu.hk) on the same day of the submission to the Supervising Officer. Likewise completed forms should be sent to VTC by e-mail (E-mail address: aputtr@vtc.edu.hk) and to EMSD (E-mail address: contract@emsd.gov.hk), if applicable. The submission of this information in electronic format is to facilitate CICTA /VTC /EMSD in processing the submitted forms. Checking for compliance with the contractual requirements is based on the hard copies of the submitted forms. Submission of the forms in Appendix C of WBTC 13/2002 will not be required after the issue of the Certificate of Completion.
 - (g) Random site checks will be carried out by the Supervising Officer's site supervisory staff on the workers working on Site. The Contractor shall ensure that all Qualified Tradesmen / Qualified Skilled Workers and Intermediate Tradesmen / Qualified Semi-skilled Workers will be able to produce their trade test certificates, intermediate trade test certificates, trade test certification cards, intermediate trade test certification cards, certificates of completion of apprenticeship or registration certificates under the Electricity Ordinance (Cap. 406) upon request.

1.29.9 Management of Sub-contractors

- (a) General
 - (i) The Contractor shall ensure the submission and quarterly updating of the sub-contractor Management Plan (SMP) in the form and contents as prescribed in the Contract.
 - (ii) The Contractor shall monitor and ensure the implementation of and the compliance with the SMP.
- (b) Sub-contractor Management Plan (SMP)
 - (i) The Contractor shall, in accordance with Clause 6.8 of the Conditions of Contract, prepare and submit to the Supervising Officer 2 copies of the Sub-contractor Management Plan signed by the Project Manager. The SMP shall contain detailed information as required by the Guideline on Scope and Contents of the Sub-contractor Management Plan at Appendix F to the Conditions of Contract.
- (c) Quarterly updated SMP
 - (i) The Contractor shall, in accordance with Clause 6.9 of the Conditions of Contract, prepare and submit to the Supervising Officer 2 copies of the quarterly updated Sub-contractor Management Plan signed by the Project Manager. The quarterly updated SMP shall contain detailed information as required by the Guideline on Scope and Contents of the Sub-contractor Management Plan at Appendix F to the Conditions of Contract.
 - (ii) If there is no change to the previous SMP, the Contractor shall, in accordance with Clause 6.9 of the Conditions of Contract, declare such status in writing instead of submitted the same SMP again. The declaration shall be signed by the Project Manager and for the purpose of Clause 1.29.9 of the Employer's Requirements, the declaration shall be considered as a quarterly updating of the SMP.

1.29.10 Mandatory Provident Fund (MPF) and Site Personnel Wages

- (a) General
 - (i) The Contractor shall, in accordance with Clause 6.9 of the Conditions of Contract, prepare and submit to the Supervising Officer 2 copies of the quarterly updated Sub-contractor Management Plan signed by the Project Manager. The quarterly updated SMP shall contain detailed information as required by the Guideline on Scope and Contents of the Sub-contractor Management Plan at Appendix F to the Conditions of Contract.
 - (ii) The Contractor shall include provisions in the contracts with his sub-contractors requiring the implementation of the system of payment of wages to the Site Personnel under the provisions of Clause 1.29.10 of the Employer's Requirements.
 - (iii) For the purposes of Clause 1.29.10 of the Employer's Requirements, "bank" shall be an authorised institution within the meaning of Section 2 of the Banking Ordinance (Cap 155).

- (b) Written employment agreements
 - (i) Unless written employment contracts are already in place, the Contractor and his sub-contractors of all tiers shall enter into written employment contracts with all the Site Personnel under their respective employments. The terms of the employment contract shall not be less favourable to the terms provided in the specimen employment contract given in Appendix Q to the Conditions of Contract. The Contractor shall provide copies of the executed employment contracts to the Supervising Officer for records. The Contractor shall not allow any Site Personnel without a properly executed written employment contract to work on the Site.
 - (ii) A certified true copy of the written employment contract of each Site Personnel shall be kept on the Site and shall be made available to the Supervising Officer for inspection if so requested by the Supervising Officer.
 - (iii) Any Site Personnel without a proper written employment contract with either the Contractor or his sub-contractor shall not be permitted or caused to be permitted to enter to or remain in the Site.
 - (iv) The Contractor shall advise and ensure his sub-contractors of all tiers to advise all the Site Personnel under their respective employments that a copy of their respective written employment contracts would be made available to the Supervising Officer for inspection if so requested by the Supervising Officer and that the personal data provided by means of the respective employment contracts will be used for the purposes and may be transferred to the transferees as listed out in the "Notes about Personal Data" to the specimen employment contract given in Appendix Q to the Conditions of Contract.
- (c) Personal accident insurances of self-employed workers
 - (i) In accordance with Clause 35B.2 of the Conditions of Contract, the Contractor shall ensure that self-employed workers working on the Site shall each be covered by a personal accident insurance at a minimum coverage of HK\$1,000,000. The Contractor shall not allow any self-employed worker without a valid personal accident insurance to work on the Site.
 - (ii) The Contractor shall keep a certified true copy of the personal accident insurance of each self-employed worker on Site and shall be made available to the Supervising Officer for inspection if so requested by the Supervising Officer.
 - (iii) Any self-employed workers without a proper personal accident insurance shall not be permitted or caused to be permitted to enter to or remain in the Site.
- (d) Lorry drivers
 - (i) Lorry drivers shall either be a Site Personnel of the Contractor or his sub-contractors or a self-employed person with a personal accident insurance cover of not less than HK\$1,000,000 for the execution of the Works.
- (e) Payment of wages by designated bank accounts or personal cheques
 - (i) Subject to sub-clause (c) of this Clause, the Contractor shall within 14 days from the commencement of the Contract submit to the Supervising Officer the name of the designated bank and all related arrangement details for payment of wages to all the Site Personnel.
 - (ii) The Contractor shall require all the Site Personnel to open a wage payment account in the designated bank or in any other bank of their choice.

- (iii) Subject to evidence produced to the satisfaction of the Supervising Officer, Site Personnel not able to open a personal bank account with any bank in Hong Kong shall have their wages paid by personal cash cheques with the subject Site Personnel specified as payee and the cheques shall be immediately due on presentation. Payment of mandatory provident fund ("MPF") contributions for the subject Site Personnel shall be made by bank transfers in accordance with Clauses 1.29.10(g) and 1.29.10(h) of the Employer's Requirements. Copies of the following documents shall be submitted to the Supervising Officer for records: -
- (1) signed acknowledgement of receipt of payment from the subject Site Personnel;
 - (2) the cheque; and
 - (3) the certified true copy of the bank statement showing the cash withdrawal.
- (iv) The above copies of the documents shall be submitted as soon as they are available and in any event no later than 7 days from the date when payment is due for the subject Site Personnel.
- (f) Smart-card system
- (i) The Contractor shall provide and operate an attendance recording system comprising smart-card cum biometric authentication (hereinafter refer to as "the system") to record and verify the information of all the Site Personnel entering and leaving the Site. The system shall be in operation within 1 month from the commencement of the Contract. Prior to the operation of the system, the Contractor shall use log books to record the time of entry and departure of all Site Personnel and self-employed workers in and out of the Site. Temporary cards for identification shall be used by all Site Personnel prior to the availability of the system. All temporary cards shall contain the information set out in sub-clause (d) of this Clause. Once the system is in operation, no persons are allowed to work on the Site without a smart-card. All visitors shall be issued a visitor card for identification.
- (ii) The Contractor shall engage a specialist provider to design, provide and train his personnel to operate the system. The Contractor shall within 7 days of commencement of the Contract, submit to the Supervising Officer the details of the system and the name and details of the specialist provider for the Supervising Officer's approval.
- (iii) The system shall adopt a non-contact type card (the "smart-card") complying with ISO 14443 with sufficient memory to store data as required in this Clause. The chip inside the smart-card shall comply with ISO 14443A. The biometric authentication shall utilize field-proven hand geometry technology that maps and verifies the size and shape of a person's hand in less than one second or other biometric authentication technology with equivalent performances. The smart-card shall be compatible with the registration cards issued by the Registrar of Construction Workers appointed under the Construction Workers Registration Ordinance (Cap. 583) to registered construction workers. The system's card readers shall be compatible with the smart-card and shall be complete with a security access module (SAM) for cryptographic security slot. The SAM will be provided by the Construction Workers Registration Authority.
- (iv) The smart-card shall have the following information of the Site Personnel printed in durable print on its face: -

- (4) Name of worker in Chinese and English;
 - (5) Name of employer in Chinese and English;
 - (6) Trade;
 - (7) Photograph of worker;
 - (8) Contract No. and Contract Title;
 - (9) Expiry date; and
 - (10) Other information agreed by the Supervising Officer.
- (v) The smart-card shall contain sufficient encrypted information for identification of the card holder and access to the master data bank of the system.
 - (vi) The Contractor is responsible for the issue of the smart-cards to each Site Personnel and self employed worker and for registering their details to the system.
 - (vii) If a Site Personnel or self employed worker is issued a registration card by the Registrar of the Construction Workers pursuant to the Construction Workers Registration Ordinance (Cap. 583) the card so issued is permitted to be used in lieu of the smart-card required under the Employer's Requirements.
 - (viii) The Contractor shall install sufficient number of the system's card readers at convenient locations with shelters within the Site to facilitate day-to-day recording. The exact locations shall be submitted for agreement by the Supervising Officer. The readers shall be connected to a secured computer so that the Site Personnel can record their signing in and out of the Site. Separate smart card readers with clear labels indicating "IN" and "OUT" shall be provided for the purpose. Alternatively the system may assign the time of recording as "IN" and "OUT" automatically. The secured computer shall be loaded with appropriate software for recording the data retrieved from the system and the time of signing in and out of each worker. The Contractor shall provide 2 numbers of portable pocket personal computer, which can be synchronized with the master system data bank and is capable of recording, verifying and updating the information of the Site Personnel and self employed workers for the use of the Supervising Officer. The Contractor's portable pocket personal computer shall be approved by the Supervising Officer and the equipment shall be securely kept by a designated staff. The Contractor shall provide a full time staff to man the operation of the system's readers at each of the locations.
 - (ix) The system's card readers, once commissioned, shall be in operation at all times and shall be replaced in the first instance in the event of breakdowns, repairs or regular maintenance. The Contractor may, subject to the approval of the Supervising Officer, dismantle and remove all system card readers installed on Site two months following the issue of the last Certificate of Completion under Clause 72B of the Conditions of Contract. The system card readers once dismantled under this sub-clause shall be removed off Site and shall become the Contractor's property.

- (g) Schedule of wages and MPF contributions
- (i) The Contractor shall compile daily records of the Site Personnel working on the Site based on the data collected by the smart-card system. The Contractor shall verify the data of all the Site Personnel employed or engaged by him. The Contractor shall prepare separate daily records for each sub-contractor and distribute to these sub-contractors the records of the Site Personnel employed or engaged by them for verification. A copy of all the verified data and records shall be submitted to the Supervising Officer on a daily basis.
 - (ii) The Contractor shall prepare a schedule of wages of all the Site Personnel employed or engaged by him and the corresponding mandatory provident fund ("MPF") contributions based on the verified data from the smart-card system. A copy of such schedule shall be submitted to the Supervising Officer for each payment cycle.
 - (iii) The Contractor shall require his sub-contractors, of all tiers, to prepare the respective schedules of wages of the Site Personnel employed or engaged by them and the corresponding MPF contributions based on the verified data from the smart-card system. A copy of these schedules shall be made available to the Supervising Officer for each payment cycle.
- (h) Payment of wages and MPF contribution
- (i) In accordance with the scheduled payment date stated in the employment contract, the Contractor shall ensure that sufficient funds have been reserved in the designated bank account for the payment of all wages and MPF contributions as given on the verified schedules for the subject payment cycle and shall promptly instruct the designated bank to effect the payment to the respective wage payment accounts and the respective MPF contribution accounts of all his Site Personnel. The Contractor shall forward a certified true copy of the instruction records to the Supervising Officer.
 - (ii) The Contractor shall ensure that his sub-contractors, of all tiers, has sufficient funds available in the designated bank account for the payment of the wages and MPF contributions to their respective Site Personnel as given on the verified schedule on the scheduled payment date stated in the employment contracts for the subject payment cycle and to ensure that his sub-contractors shall promptly instruct the designated bank to effect the payment to the wage payment accounts and the MPF contribution accounts of their respective Site Personnel. The Contractor shall ensure that certified true copies of instruction records are made available to the Supervising Officer.
 - (iii) A flow chart illustrating the payment arrangements is in Appendix 1.13 to the Employer's Requirements.
- (i) Not used
- (j) Labour Relations Officer
- (i) The Contractor shall provide a suitably qualified staff approved by the Supervising Officer to be responsible for the monitoring of the payment of wages and MPF contributions of all the Site Personnel and handling of complaints on wages arrears raised by the Site Personnel. This staff will be referred to as the "Labour Relations Officer".

- (ii) The Contractor shall afford all necessary assistance to the Labour Relations Officer in connection with the discharge of his duties which shall include but not necessarily limited to the following:
- (1) to act as a one-point contact for the Site Personnel on Site on any enquiries in relation to employment matters;
 - (2) to conduct briefing sessions to inform and to educate the Site Personnel the benefits of the wage payment control measures being implemented under the Contract, in particular the workers' obligations to report wage arrears;
 - (3) to conduct regular site visits to promote the monitoring system and to establish contacts with Site Personnel to obtain feedback;
 - (4) to monitor payment of wages and MPF contributions to assess whether they are made timely by the Contractors and all subcontractors;
 - (5) to oversee the setting up and maintenance of a record system on employment contracts, workers attendance, re-deployment, and wage payments;
 - (6) to undertake regular physical checks to verify the accuracy and reliability of the records and to identify irregularities, if any, for early intervention;
 - (7) to establish a simple and user-friendly complaint system, including the operation of a telephone hotline to receive enquiries from Site Personnel on employment matters and to receive reports on wage defaults;
 - (8) to alert the Supervising Officer of anomalies and to refer the same to the Contractor for investigation and appropriate follow-up actions;
 - (9) to report to the Supervising Officer and the Labour Department complaints on wage arrears as soon as they are received and to provide necessary assistance to Labour Department to facilitate investigation and/or dispute resolution where appropriate; and
 - (10) to carry out random attendance checks, and to record and report the findings to the Supervising Officer.
- (k) Providing access and assistance to visitors
- (i) Notwithstanding any other provisions under the contract, from time to time representatives from established local labour unions and contractors associations may visit the Site to make propaganda for the wage payment arrangement and monitoring process for wage payment under this Contract to the Site Personnel. These representatives may interview the Labour Relations Officer to ascertain whether there are any difficulties with the monitoring process and offer their assistance where necessary.
 - (ii) Upon notification from the Supervising Officer, the Contractor shall provide access and all necessary assistance to these representatives visiting the Site for the said purposes.
 - (iii) The Contractor shall ensure that his Contractor's All Risk and Third Party Liability insurance policies are extended to cover these visitors.

(l) Casual Workers

- (i) "Casual Workers" are those Site Personnel who are expected to work on Site no more than an aggregated total of 7 working days throughout the duration of the Contract period. The provisions under Clauses 1.29.10(b), 1.29.10 (e), 1.29.10 (g) and 1.29.10 (h) of the Employer's Requirements shall not apply to Casual Workers. Casual Workers are required to be issued a temporary smart-card and follow the attendance recording system in accordance with Clause 1.29.10(f) of the Employer's Requirements. Casual Workers will be subject to the full provisions of Clauses 1.29.10(a) to 1.29.10(h) of the Employer's Requirements if they are required to work on site in excess of an aggregated total of 7 working days throughout the duration of the Contract period.
- (ii) Wages for the Casual Workers are to be paid daily by personal cash cheques with the subject Casual Worker specified as payee and the cheques shall be immediately due on presentation. The subject Casual Worker shall be required to sign a receipt of acknowledgement of each payment.
- (iii) Copies of the following documents shall be submitted to the Supervising Officer for records: -
 - (1) signed acknowledgement of receipt of payment from the subject Casual Worker;
 - (2) the cheque; and
 - (3) the certified true copy of the bank statement showing the cash withdrawal.
- (iv) Copies of (i) and (ii) above shall be submitted the day immediately following the subject payday referred to in sub-clause (b) of this Clause. Copies of (iii) above shall be submitted as soon as they are available and in any event no later than 7 days from the subject payday referred to in sub-clause (b) of this Clause.
- (v) The 7-day restriction under sub-clause (a) of this Clause may be extended subject to prior approval in writing from the Supervising Officer if the Supervising Officer is satisfied that there are reasonable grounds for not complying with the full requirements under Clauses 1.29.10(a) to 1.29.10(h) of the Employer's Requirement for the subject Casual Worker.

1.29.11 Returns of Labour and Constructional Plant

- (a) The Contractor shall submit to the Supervising Officer, the names, age, nationality of each of the labour employed on the Works or the Operation, including a copy of their Hong Kong Identity Card or their passport with valid work visa, for record.
- (b) The Contractor shall enter daily, on a form provided by the Supervising Officer, information in respect of labour employed on the Works or the Operation. Three copies of the form shall be prepared and two completed forms shall be submitted to the Supervising Officer. The Contractor shall retain the remaining copy.
- (c) The average, high and low wage rates for workers of each trade employed on the Site shall be entered on monthly wage return forms (referred to as the labour return form) provided by the Supervising Officer, and the completed forms returned to the Supervising Officer within 4 days of the start of the succeeding month. For the purpose of completing the labour return form, the individual trades shown in the left hand column below shall be considered as being equivalent to those appearing on the corresponding lines in the right hand column: -

Actual Trade	Equivalent
Office Attendant	Labourer (unskilled)
Watchman	Labourer (unskilled)
Working Ganger	Ordinary worker in the trade in which he is employed, or if the trade is not listed, Lorry Driver
Survey Labourer	Concretor's Labourer
Turf-layer	Concretor's Labourer
Bituminous Concrete Layer	Concretor's Labourer
Shot-firer	Plasterer
Lorry Checker	Labourer (unskilled)
Motor Driver (car/van)	Truck Driver
Survey Leveller	Plumber
Welder	Painter

- (d) With reference to Clause 28 of the Conditions of Contract, the Contractor shall complete the labour return form and submit the original and one copy to the Supervising Officer. The Contractor shall retain a further copy.
- (e) The Contractor shall provide the Supervising Officer with certified true copies of the licences, permits (including noise permits) and the like for the Constructional Plant used on the Site.
- (f) The Contractor shall also provide the Supervising Officer with a weekly return of Constructional Plant on the Site, including details of Constructional Plant that is idle or under repair.

1.29.12 Site Uniform

- (a) The Contractor shall ensure that all workers involved in site works, except workers who are engaged for the execution of the Works and the Operation on the Site for an aggregated period of 7 days or shorter, wear a set of site uniform when they are on the Site in accordance with the provisions of this clause. The site uniform, in the form of polo shirt (short-sleeve or long-sleeve to suit the weather conditions) and trousers, shall adopt the design of the anti-heat stress uniform of the Hong Kong Polytechnic University or a similar design submitted to and not disapproved by the Supervising Officer within 5 working days after the date of delivery of the design to the Supervising Officer. The Contractor may show the Contractor's logo or a sub-contractor's logo on the site uniform.

1.29.13 Trip Ticket System

Disposal of Construction and Demolition Materials

- (a) The Contractor shall implement a trip ticket system (TTS) for tracking the removal of construction and demolition (C&D) materials from the Site to the disposal grounds. The inert portion of the C&D materials comprising soil, broken rock and concrete, etc., shall

be disposed of at the public fill reception facilities as advised by the Public Fill Committee or other disposal grounds as directed by the Supervising Officer. The non-inert portion of the C&D materials that are not recyclable shall be disposed of at the landfills or Shatin Transfer Station as advised by EPD.

- (ai) The Contractor shall note that inert construction waste for disposal at the disposal ground as mentioned in sub-clause (1) of this shall not be in liquid form such that it can be contained and delivery by dump trunk instead of tanker trunk. Inert construction waste such as bentonite in liquid form shall be solidified before delivering to the public fill reception facilities.
- (b) The Contractor shall inform the Supervising Officer the account number of the billing account for disposal of construction waste under the Waste Disposal (Designated Waste Disposal Facility) Regulation (Cap Clause. 354L) at least 4 weeks prior to the commencement of the disposal of construction waste from the site. This is to enable the Supervising Officer to check the disposal records posted at the Environmental Protection Department's website. The Supervising Officer will provide the account number to the Civil Engineering and Development Department for overall monitoring of the trip ticket system, detecting and taking action to deal with malpractice such as overloading of dump trucks and improper covering of load, and compiling statistics as well as counting eligible trips for mechanical dump truck covers under the pay for safety and environment scheme.

Alternative Disposal Grounds Proposed by Contractor

- (c) In order to make use of C&D materials generated by the Site, the Contractor shall use his best endeavours to identify recycling facilities or other construction sites where such materials can be used. The Contractor should not propose as an alternative disposal ground a private construction site which is not administered by an authorized person as defined under the Buildings Ordinance (Cap. 123) ("Authorized Person"). Where the Contractor has identified such a recycling facility or a construction sites which can be used as an alternative disposal ground, he shall obtain the written approval of the Supervising Officer, who will process the Contractor's request expeditiously. In support of the request for such approval the Contractor shall provide relevant information including:
 - (i) a detailed description of the alternative disposal ground, including location, lot number (where appropriate), location plan and photographs of the proposed alternative disposal grounds showing the surrounding environment and land use;
 - (ii) where the alternative disposal ground is a private construction site, a letter from each of the relevant authorities, such as Agriculture, Fisheries and Conservation Department, Lands Department and Planning Department, to comment on suitability of the site under their respective purview, and a letter from the Authorized Person of the development to confirm:
 - (1) the C&D materials for use in the development is acceptable;
 - (2) the land/pond filling in the proposed alternative disposal ground and the use of land so formed by the C&D materials are in conformity with the statutory town plan/lease conditions; and

- (3) the Supervising Officer's staff are allowed to enter the alternative ground to conduct inspections where necessary;
 - (iii) where the alternative disposal is a private recycling facility, it is on the recyclers' list for C&D materials recognized by EPD, as well as a letter from the operator to confirm the Supervising Officer's staff are allowed to enter the recycling facility to conduct inspections where necessary;
 - (iv) where the alternative disposal ground is a construction site of Government (other than a government contract quarry), Hong Kong Housing Authority or Mass Transit Railway Corporation, a written consent from the project office of the alternative disposal ground to use the C&D materials generated from the Site;
 - (v) where the alternative disposal ground is a government contract quarry, a written consent from the Mines Division of Civil Engineering and Development Department to import the C&D materials generated from the Site;
 - (vi) the estimated quantity and type of C&D materials to be used/processed in the alternative disposal ground and the approximate delivery programme, together with the name, post and specimen signature of the competent person to sign the Disposal Delivery Form (DDF); and
 - (vii) a system for transmitting disposal records from the alternative disposal ground to the Supervising Officer.
- (d) For illegal dumping of C&D materials; or disposal of C&D materials at a disposal ground other than that designated in the Contract or directed or approved by the Supervising Officer and where the disposal ground is within any private land constitutes a major improper disposal (as defined in sub-clause (p) below) for the purposes of assessing the performance of the Contractor, the Contractor may be subject to relevant regulating and enforcement/prosecution action.
 - (e) The Contractor's attention is drawn to Conditions of Contract Clause 57C on Disposal Grounds.

Site Management Plan for Trip Ticket Implementation

- (f) The Contractor shall prepare a site management plan for implementation of the TTS for the whole Contract. The Contractor shall submit within 45 days of the date of the Employer's letter of acceptance of the Tender the site management plan to the Supervising Officer for approval. If the Supervising Officer is of the opinion that the site management plan does not meet the requirements of this Specification, he shall request the Contractor to revise the plan by notice in writing. The Contractor shall then revise the plan and resubmit it within 7 days of the date of the notice. The Contractor shall review the site management plan on a monthly basis. The updated section of the plan (if any) shall be submitted to the Supervising Officer for approval. The plan shall include the following details:

(i) Site organization and staff duties

A site organizational chart showing the manpower resources and duties of each staff for implementation of the TTS. The Contractor:

- (1) shall appoint a senior staff member (with at least two years experience in site management) fully responsible for implementing and overseeing the operation of the TTS;
- (2) shall appoint designated person(s) to fill in and sign Part 1 of the Daily Record Summary (DRS) properly before departure of the truck. A sample of the DRS is given at Appendix 1.14 of the Employer's Requirements; and
- (4) shall appoint experienced person(s) to man each exit from the Site for the purpose of ensuring that every truck carrying C&D materials leaving the Site bears a duly completed CHIT/ DDF. The CHIT shall be used for disposal of C&D materials at a prescribed facility as defined under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N) (hereinafter referred to as "prescribed facility"). A sample of the CHIT is given in Appendix 1.15 of the Employer's Requirements. The DDF shall be used for disposal of C&D materials at other disposal grounds as designated in the Contract or as directed by the Supervising Officer or recycling facilities/construction sites proposed by the Contractor and approved by the Engineer. A sample of the DDF is given in Appendix 1.16 of the Employer's Requirements. The person(s) who man the exit(s) shall record the CHIT/DDF no., the vehicle registration mark and the departure time of every truck carrying C&D materials leaving the Site.

(ii) Disposal Programme

The Contractor shall prepare a monthly programme or bi-weekly programme as determined by the Supervising Officer for disposal of C&D materials off the Site, and indicate the estimated quantities, types of the C&D materials and corresponding disposal grounds. The Contractor shall update the programme on a monthly basis and submit it to the Supervising Officer for information by 15th day of each month or the next working day if it is a public holiday, Sunday or Saturday, or a later date as agreed by the Supervising Officer.

(iii) Site procedures

The Contractor shall establish site procedures to ensure that each truckload of C&D materials leaving the Site will bear a duly completed CHIT/DDF and that Part 1 of the DRS has been filled in and signed properly before departure of the truck. The Contractor shall also establish a mechanism to ensure timely retrieval of the CHIT/DDF and/or receipt from the disposal grounds where irregularities are observed.

(iv) Surveillance

The Contractor shall establish a surveillance system within the Site and at any alternative disposal grounds to check that the disposal activities comply with the requirements as set out in the Specifications.

(v) Recording system

The Contractor shall maintain a comprehensive register of the CHIT/ DDF issued, and make it available for inspection by Supervising Officer upon request.

(vi) Control Measures to track internal movement of materials

Where trucks need to exit and re-enter the Site for delivery of C&D materials generated by the Site, the Contractor shall devise control measures to ensure that the C&D materials are not disposed of outside the Site in breach of the Contract.

(vii) Video Recording System

The Contractor shall:

- (1) provide, operate and maintain, including all necessary cables, wirings, lightings and other accessories, a video recording system at each vehicular exit/entrance with gate(s) installed with the following essential features to record all trucks leaving the Site: The video cameras used in the system shall be of high resolution, lowlight and colour type; power backup shall be provided to cater for accidental breakdown of the power supply to the system; videos captured by the system shall be recorded continuously without break except with the agreement of the Supervising Officer or in the month during which there is no disposal of C&D materials off the Site for the entire month; videos shall be captured in a format acceptable to the Supervising Officer; the registration mark of each vehicle leaving the site shall be recorded; and the loading conditions of dump trucks including empty trucks shall be captured;
- (2) securely protect the video cameras from being damaged or blocked;
- (3) design and construct all necessary temporary works, including any supporting frames and protections, for mounting the video cameras and their accessories;
- (4) provide the software and hardware for capturing the vehicle registration mark, and the time and date for the Supervising Officer's immediate taking and viewing of photograph of every truck leaving the Site and viewing the recorded videos;
- (5) keep the videos record for at least 60 days and the photographs until such time as instructed by the Supervising Officer;
- (6) post sufficient notices at conspicuous positions to notify the workers, drivers and staff about the purpose of the video recording system in accordance with data protection principles set out in the Personal Data (Privacy) Ordinance; and
- (7) if a video camera system cannot be installed at the exit, propose alternative methods of control to the Supervising Officer, who may accept such proposals if he is satisfied that the proposals are equally effective.

- (g) Recyclable materials such as metal, paper, plastics and milled bituminous materials etc., which have been sorted on the Site for the purposes of recycling, shall not be considered as C&D materials for the purposes of the Contract. For such sorted recyclable materials, the Contractor shall devise appropriate control measures to ensure that the materials are

delivered to a proper recycling outlet for processing. The Contractor shall highlight such control measures in the pursuant to ETWB TCW No. 19/2005 if applicable.

- (gi) The Contractor shall propose recycling and / or reuse option for felled trees and cleared vegetation, for the approval of the Supervising Officer, to minimise the amount of C&D materials to landfills.
- (h) The Contractor shall obtain the approval of the Supervising Officer for the site management plan before disposing any C&D materials from the Site.

Informing Truck Drivers

- (i) The Contractor shall write to all truck drivers engaged for removal of C&D materials from the Sites and draw their attention to the following particular points:
 - (i) Each truck carrying C&D materials leaving the Site for a disposal ground must bear a duly completed CHIT/DDF, irrespective of the location and nature of the disposal ground; and
 - (ii) The C&D materials must be disposed of at the disposal grounds stipulated in the Contract or directed by the Supervising Officer or alternative disposal grounds approved by the Supervising Officer.

General Procedures of the TTS and Record Keeping

- (j) The procedures for implementation of the TTS are as follows:
 - (i) For each truckload of C&D materials leaving the Sites, the Contractor's truck driver must bear a duly completed CHIT/DDF.
 - (ii) The Contractor shall maintain a daily record of disposal of C&D materials from the Site including CHIT/DDF numbers, vehicle registration marks, drivers' particulars, approximate volume, C&D materials type, designated disposal ground, departure time from the Site, actual disposal ground and arrival time at disposal ground. The Contractor shall complete Part 1 of the DRS in duplicate and inform the Supervising Officer's staff before departure of the vehicle, The Supervising Officer's staff shall sign Part I of the DRS before departure of the trucks, or to suit site operations at other time to be agreed between the Supervising Officer and the Contractor.
 - (iii) The truck shall proceed to the disposal ground as stipulated in the Contract or directed by the Supervising Officer or alternative disposal ground approved by the Supervising Officer. The Contractor's truck driver shall present the CHIT/DDF to the operator of the disposal ground. For a prescribed facility if the C&D materials accord with the acceptance criteria, disposal of the materials will be permitted and the facility operator will give the Contractor's truck driver a Transaction Record Slip and stamp the CHIT.
 - (iv) For disposal at a prescribed facility, the Contractor shall check the information recorded in the DRS against available information including his own records and data from EPD's website [<http://www.epd.gov.hk/epd/misc/cdm/scheme.htm#j>] The Contractor shall complete Part 2 of the DRS form for submission to the

Supervising Officer within 1 working day after the records are posted at the EPD web-site.

- (v) For disposal ground other than prescribed facilities, the Contractor shall ensure that the DDF is signed off by a competent person as agreed by the Supervising Officer at the disposal ground to confirm completion of each trip. The Contractor shall also maintain a daily record with details of each disposal trip from the Site to the disposal ground. The Contractor shall complete Part 2 of the DRS form for submission to the Supervising Officer within 3 working day after the date of disposal.
- (vi) Where an irregularity is observed or where requested by the Supervising Officer under special circumstances (e.g. a CHIT/DDF has been issued but there is no disposal record at the disposal ground), the Contractor shall submit to the Supervising Officer within 5 working days after the recorded date of disposal the supporting evidence such as duly stamped CHIT/DDF and/or the Transaction Record Slip (where relevant) to confirm proper completion of the delivery trips in question, or within 2 working days after the Supervising Officer has requested for such evidence, whichever is later. A fax copy of the CHIT/DDF or Transaction Record Slip is acceptable, unless otherwise directed by the Supervising Officer.

Performance monitoring

- (k) The following items shall be included in the agenda for discussion at every progress meeting, or other established channels for performance monitoring as agreed by the Supervising Officer:
 - (i) review the site management plan and implementation of the TTS, and identify areas for improvement;
 - (ii) audit the quantity of C&D materials removed from the Site (based on the DRS and survey records) against the quantities of C&D materials delivered to the disposal ground designated in the Contract (e.g. based on EPD website) and directed or approved by the Supervising Officer;
 - (iii) review incidents of non-compliance and discuss the necessary follow-up actions; and
 - (iv) monitor the follow-up action on defects and deficiencies identified

Removal of C&D Materials from Unauthorized Disposal Grounds

- (l) Where C&D materials from the Site have been dumped at a place other than that designated in the Contract or directed or approved by the Supervising Officer, the Contractor shall at his own cost undertake the following remedial action:
 - (a) remove the dumped C&D materials from the unauthorized disposal ground to a disposal ground designated in the Contract or directed or approved by the Supervising Officer to his satisfaction; and
 - (b) reinstate the unauthorized disposal ground to the condition before dumping of the

C&D materials, or a condition considered satisfactory by the Authority as required under the relevant legislation where appropriate.

- (m) Where the unauthorized disposal ground is a private property, the Contractor shall be responsible for obtaining the landowner's consent before removal of the dumped C&D materials.
- (n) Should the Contractor fail to remove the C&D materials from the unauthorized disposal ground or fail to reinstate the unauthorized disposal ground as set out in sub-clause (l) above, the Employer may in accordance with Clause 53 of Conditions of Contract instruct another contractor to perform the work and the Employer shall be entitled to recover such costs from the Contractor, and may but shall not be bound to deduct such costs either in whole or in part, in accordance with the provisions of Clause 55 of Conditions of Contract.

Improper disposal and major improper disposal

- (o) The following shall constitute an "improper disposal":
 - (i) A Contractor's truck loaded with C&D materials having left the Site without a CHIT/DDF or the daily record summary not completed in accordance with this Specification;
 - (ii) Disposal of C&D materials at a disposal ground other than that designated in the Contract or directed or approved by the Supervising Officer; or
 - (iii) The Contractor fails or is unable to produce the stamped CHIT/DDF or the Transaction Record Slip (where relevant) in accordance with sub-clause (j)(vi) of this Employer's Requirement.
- (p) The following shall constitute a "major improper disposal":
 - (i) Illegal dumping of C&D materials; or
 - (ii) Disposal of C&D materials at a disposal ground other than that designated in the Contract or directed or approved by the Supervising Officer, and where the disposal ground is within any private land. For the purpose of this Clause, "private land" has the same meaning as it has in the Mining Ordinance (Cap. 285).
- (q) The Contractor shall also note that the Employer takes a very serious view of any non-compliance with the TTS requirements. Without prejudice to other regulating action which may be taken against the Contractor, the Contractor's performance in implementing the TTS will be fully reflected in the Report on the Contractor's Performance.

Compliance with the Personal Data (Privacy) Ordinance (Cap.486)

- (r) The Contractor shall comply with the provisions of the Personal Data (Privacy) Ordinance (Cap. 486) in relation to personal data collected under the TTS.

1.30 Non-compliance

1.30.1 General

- (a) Notwithstanding Clause 1.30 of the Employer's Requirements, the Employer shall have the right to set out new requirements and the corresponding non-compliance point(s) with at least two weeks prior notice.

1.30.2 Action in the event of a Non-Compliance

(a) Adjustments of the Capital Value and Operation Fees

- (i) The Contractor shall recognize that a percentage of the Capital Value, as set out in the Form of Tender, will be allotted to compliance with the Safety and Environmental Performance Requirements during the Works. This part of the Capital Value shall be payable in full only if all of the safety and environmental requirements listed in Tables 1.01 in the Employer's Requirements are complied with.
- (ii) The Contractor shall recognize that a percentage of the Operation Fees, as set out in the Form of Tender, will be allotted to compliance with the Safety and Environmental Performance Requirements during the Operation. This part of the Operation Fees shall be payable in full only if all of the safety and environmental requirements listed in Tables 1.02 in the Employer's Requirements are complied with.
- (iii) The Contractor shall also recognize that a percentage of the Operation Fees, as set out in the Form of Tender, will be allotted to compliance with the Operational Performance Requirements during the Operation. This part of the Operation Fees shall be payable in full only if the Contractor has operated the Facility in compliance with the Contract.
- (iv) If any of the Environmental and Safety Performance Requirements is not complied with during the Works, there will be a non-entitlement of the allocation of payments for the Capital Value for the Works calculated in accordance with Clause 1.30.3 of the Employer's Requirements.
- (v) If any of the Environmental and Safety Performance Requirements, Operational Performance Requirements and the Contract requirements is not complied with during the Operation, there will be a non-entitlement of the allocation of the particular monthly payment for the Operation Fees calculated in accordance with Clause 1.30.3 of the Employer's Requirements.

1.30.3 Calculation of Payment

- (a) In the event of one or more non-compliances with the Environmental and Safety Performance Requirements or Operational Performance Requirements being detected in any month, the number of points attributable to each non-compliance shall be determined from Tables 1.01 and 1.02 in the Employer's Requirements and these points shall be summed up for that month. In the event of one or more non-compliances with the Contract requirements being detected in any month during the Operation, the number of days in which the Contractor fails to operate the Facility shall be summed up for that month.

- (b) In the event of any non-compliance being detected in respect of the Works or the Operation in the reporting month, the amount of decrease in payments for the Capital Value or the payments for the Operation Fees in the same reporting month shall be in accordance with the relevant formula in the Conditions of Contract, which are detailed in Clause 92 of the Conditions of Contract in respect of the Works, and Clause 71 of the Conditions of Contract in respect of the Operation.

1.30.4 Failure to carry out the Environmental Monitoring

- (a) In the event that the Supervising Officer or, as the case may be, the Employer certifies under Clause 50.3 of the Conditions of Contract that the Contractor has not complied with his obligations under Clause 50.1 of the Conditions of Contract to carry out the environmental monitoring as set out in the Employer's Requirements, such non-compliance shall be deemed to carry the total maximum number of points in a month for the Safety and Environmental Performance Requirements.

1.30.5 Failure to carry out the Safety Measures

- (a) In the event that the Supervising Officer or, as the case may be, the Employer certifies under Clause 50.3 of the Conditions of Contract that the Contractor has not complied with his obligations under Clause 50.3 of the Conditions of Contract to carry out the safety measures as set out in the Employer's Requirements, such non-compliance shall be deemed to carry the total maximum number of points in a month for the Safety and Environmental Performance Requirements.

Table 1.01 – Safety and Environmental Performance Requirements during the Works: Allocation of Non-compliance Points and Monitoring Frequencies

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
1. Construction Dust							10
a)	Construction Dust	Environmental	24-hour average level of TSP at the site boundary shall not exceed 260 µg/m ³	1 point	Weekly	1 point	-
2. Construction Noise							10
a)	Construction Noise	Environmental	Exceedance of the construction noise limit level of 75 dB(A)	1 point	Daily	1 point	-
3. Water Quality							10
a)	Wastewater discharge	Environmental	Discharge of any wastewater to locations not consented by the Employer.	5 points	Continuous	5 points	-
b)	Fresh water supply	Environmental	Failure to provide fresh water or the quality of water supply cannot comply with the requirements in Hong Kong.	5 points	Continuous	5 points	-
4. Waste management							5
a)	Chemical storage	Environmental	Failure to comply with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	1 point / incident	Weekly	3 points	-
5. Safety							50
a)	Safety and health	Safety	Failure to comply with any safety regulations or follow safety guidelines and procedures in the Safety and Health Plan.	1 point / item	Daily	5 points	-
b)	Traffic flow	Safety	Failure to prevent any blockage of traffic road at the Existing Facilities	5 points / incident	Daily	5 points	-

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
c)	Accident (Non-fatal)	Safety	Accident reportable to the Labour Department with related injuries causing incapacity of 3 man-days or more	5 point / incident	Daily	15 points	-
d)	Accident (Fatal)	Safety	Fatal Accident	50 points / incident	Daily	50 points	-
Total maximum no. of points per reporting month							85

Table 1.02 – Operational, Safety and Environmental Performance Requirements during the Operation: Allocation of Non-compliance Points and Monitoring Frequencies

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
1. General						5	
a)	Licences, permits, certificates and insurance policies	Operational	Failure to obtain or renew or update any licence or permit or certificate or insurance policy required for the Operation on time	1 point / incident	Continuous	-	-
2. Odour						5	
a)	Odour	Environmental	Two or more documented complaints are received within a week, or failure of the deodorisation system to achieve the minimum requirements as specified in Clause 2.17S.1 of the Employer's Requirements.	5 points	Monthly	5 points	-
3. Water quality						10	
a)	Wastewater discharge	Environmental	Discharge of any wastewater to locations not consented by the Employer.	5 points	Continuous	5 points	-
b)	Fresh water supply	Environmental	Failure to provide fresh water or the quality of water supply cannot comply with the requirements in Hong Kong.	5 points	Continuous	5 points	-
4. Waste management						10	
a)	Disposal of Food Waste / Pre-treated Food Waste / Residues	Environmental	Disposal of Food Waste/ Pre-treated Food Waste / Residues at locations not consented by the Employer and without instruction from the Employer.	10 points	Continuous	10 points	-
5. Safety						50	
a)	Safety and health	Safety	Failure to comply with any safety regulations or follow safety guidelines and procedures in the Safety and Health Plan.	1 point / item	Daily	5 points	-

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
b)	Traffic flow	Safety	Failure to prevent any blockage of traffic road at the Existing Facilities.	5 points / incident	Daily	5 points	-
c)	Accident (Non-fatal)	Safety	Accident reportable to the Labour Department with related injuries causing incapacity of 3 man-days or more.	5 point / incident	Daily	15 points	-
d)	Accident (Fatal)	Safety	Fatal Accident.	50 points / incident	Daily	50 points	-
6. Site cleanliness and housekeeping							60
a)	Cleanliness and housekeeping	Operational	Failure to upkeep any part of the Facility in a clean and tidy condition, or failure to repair or replace any malfunctioned building services equipment.	1 point / incident	Continuous	3 points	-
b)	Spillage/ Leakage	Operational	Failure to prevent, repair and clean up within the time agreed with the Employer or the time set by the Employer.	1 point / incident	Continuous	3 points	-
c)	All pipeworks	Operational	Failure to clear any blockage or obstructed pipeworks within the time agreed with the Employer or the time set by the Employer.	1 point / incident	Continuous	1 point	-
7. Legislations, Ordinances and Regulations							30
a)	Conviction (Safety)	Safety	Convictions under the Factories and Industrial Undertakings Ordinance (Cap. 59) or the Occupational Safety and Health Ordinance (Cap. 509).	5 points / conviction	Continuous	5 points	-
b)	Conviction (Others)	Safety	Conviction under ordinances other than Factories and Industrial Undertakings Ordinance (Cap. 59) or the Occupational Safety and Health Ordinance (Cap. 509).	2 points / conviction	Continuous	2 points	-

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
c)	First aid, life saving and safety equipment	Safety	Failure to provide and maintain functional conditions or renew any associated testing certificate.	5 points	Continuous	5 points	-
d)	Fire services installations / equipment	Safety	Failure to maintain the functional conditions or renew any associated testing certificates.	5 points	Continuous	5 points	-
8. Food Waste Reception							40
a)	Reception of Food Waste	Operational	Failure to unload and receive Food Waste delivered to the Facility between 8.00am to 6.00pm.	10 points / day	Continuous	10 points	-
9. Guaranteed Performance							100
a)	Annual Availability	Operational	Failure to attain the Guaranteed Performance of Annual Availability.	5 points / day	Daily	5 points	-
b)	Pre-treated Food Waste quality	Operational	Failure to achieve the Guaranteed Performance of Pre-treated Food Waste quality.	5 points / day	Weekly	5 points	-
10. Reporting							5
a)	Review of Contractor's Plan	Operational	Failure to update on time or declare no change as per the Employer's Requirements.	1 point / incident	Continuous	1 point	-
b)	Report Submission	Operational	Failure to submit daily, monthly or annual reports on time.	1 point / incident	Continuous	1 point	-
11. Maintenance management							40
a)	Preventive maintenance	Operational	Backlog of outstanding work order for 14 days or more without any reason acceptable to the Employer.	1 point / order	Continuous	1 point	-

Item	Performance requirement	Category	Compliance limit	Allocation of Points for each non-compliance	Monitoring frequency	Max no. of Points per day	Max no. of Points per reporting month
b)	Corrective maintenance	Operational	Backlog of outstanding work order for 7 days or more without any reason acceptable to the Employer.	2 points / order	Continuous	2 points	-
c)	Inventory control and records	Operational	Incomplete, inconsistent, out-dated or ambiguous records.	1 point	Continuous	1 point	-
Total maximum no. of points per reporting month							320

APPENDIX 1.01 LIST OF EMPLOYER'S DRAWINGS

Sheet Number	Sheet Title
60634312/EP/1001	The Site
60634312/EP/1002	Connection Points for Stormwater, Sewage and Potable Water Supply
60634312/EP/1003	Schematic Arrangement for Power Cable
60634312/EP/1004	Schematic Arrangement for Pre-treated Food Waste Transfer Pipe
60634312/EP/1005	Existing Tree Location Plan
60634312/EP/1006	Proposed Tree Compensation Plan
60634312/EP/1007	(Not Used)
60634312/EP/1008	(Not Used)
60634312/EP/1009	Proposed Odour Monitoring Location Plan
60634312/EP/1010	Schematic Arrangement for Utilities for Fire Services Installations

APPENDIX 1.02 STANDARDS AND CODES OF PRACTICES FOR DESIGN, CONSTRUCTION AND TESTING OF THE PROCESS, ELECTRICAL AND MECHANICAL WORKS

Authority / Code	Title
HKSAR Government	General Specification for Civil Engineering Works, 2020 Edition
Drainage Services Department	General Specification for E&M Sewerage Facility Installations, 2016 Edition
Architectural Services Department	General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Air-conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Broadcast Reception Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Catering Equipment Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition together with Explanatory Notes
Architectural Services Department	General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Lift, Escalator and Passenger Conveyor Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition together with Explanatory Notes
Architectural Services Department	General Specification for Liquefied Petroleum Gas Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Mechanical Installations in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	General Specification for Plumbing and Drainage Installation in Government Buildings of the Hong Kong Special Administration Region, 2017 Edition

Authority / Code	Title
Architectural Services Department	General Specification for Swimming Pool Water Treatment Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Electrical and Mechanical Services Department	General Specification for Public Address Systems, Specification No. ESG 11 (Issue No. 5), 2016 Edition
Electrical and Mechanical Services Department	General Technical Specification for Closed Circuit Television System, Specification No. ESG 14 (Issue No. 7), 2021 Edition
Electrical and Mechanical Services Department	General Technical Specification for Uninterruptible Power Supply (UPS), Specification No. ESG15 (Issue No. 7), 2016 Edition
Electrical and Mechanical Services Department	General Requirements for Electronic Contract, Specification No. ESG01 (Issue No. 11), 2016 Edition
Architectural Services Department	Testing and Commissioning Procedure for Air-conditioning, Refrigeration, Ventilation and Central Monitoring & Control System Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Broadcast Reception Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Burglar Alarm and Security Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Emergency Generator Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Architectural Services Department	Testing and Commissioning Procedure for Lift, Escalator and Passenger Conveyor Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition
Buildings Department	Code of Practice for Building Works for Lifts and Escalators (2020 Edition)
Buildings Department	Code of Practice for Dead and Imposed Loads (2011)

Authority / Code	Title
Buildings Department	Code of Practice for Demolition of Buildings (2004)
Buildings Department	Code of Practice for Fire Resisting Construction (1996)
Buildings Department	Code of Practice for Fire Safety in Buildings (2015)
Buildings Department	Code of Practice for Foundations (2017)
Buildings Department	Code of Practice for Oil Storage Installations (1992)
Buildings Department	Code of Practice for Precast Concrete Construction (2016)
Buildings Department	Code of Practice for Site Supervision (2021)
Buildings Department	Code of Practice for the Provision of Means of Access for Firefighting and Rescue Purposes (2004)
Buildings Department	Code of Practice for the Provision of Means of Escape in Case of Fire (1996)
Buildings Department	Code of Practice for Structural Use of Concrete (2020)
Buildings Department	Code of Practice for the Structural Use of Steel (2021)
Buildings Department	Code of Practice on Wind Effects in Hong Kong (2019)
Buildings Department	Design Manual – Barrier Free Access (2008)
Buildings Department	Explanatory Materials to Code of Practice for the Structural Use of Steel (2011)
Buildings Department	Explanatory Note to the Code of Practice on Wind Effects in Hong Kong (2019)
Buildings Department	Guidelines on the Design and Construction of Bamboo Scaffolds
Buildings Department	Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers
Buildings Department	Technical Memorandum for Supervision Plans (2009)
Civil Engineering and Development Department	Geotechnical Engineering Office – GEO Publication No. 1/93, Review of Granular and Geotextile Filters (1993)
Civil Engineering and Development Department	Geotechnical Engineering Office – GEO Publication No. 1/2006, Foundation Design and Construction (2006)
Civil Engineering and Development Department	Geotechnical Engineering Office – GEO Publication No. 1/2007, Engineering Geological Practice in Hong Kong (2007)
Civil Engineering and Development Department	Geotechnical Engineering Office – GEO Publication No. 1/2011, Technical Guidelines on Landscape Treatment for Slopes (2011)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 1: Guide to Retaining Wall Design, Second Edition (2020)

Authority / Code	Title
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 2: Guide to Site Investigation (2017)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 3: Guide to Rock and Soil Descriptions (2017)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 4: Guide to Cavern Engineering, Second Edition (2018)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 5: Guide to Slope Maintenance, Third Edition (2018)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 6: Guide to Reinforced Fill Structure and Slope Design (2017)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geoguide 7: Guide to Soil Nail Design and Construction (2017)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geospec 1: Model Specification for Prestressed Ground Anchors, 2nd Edition (1997)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geospec 3: Model Specification for Soil Testing (2017)
Civil Engineering and Development Department	Geotechnical Engineering Office – Geotechnical Manual for Slopes (Second Edition, 2011)
Civil Engineering and Development Department	Geotechnical Engineering Office – Guide to Trench Excavations (Shoring Support and Drainage Measures) (2003)
Civil Engineering and Development Department	Highway Slope Manual (2017)
Civil Engineering and Development Department	Other Technical Publications of the Geotechnical Engineering Office
Civil Engineering and Development Department	Port Works Design Manual and all relevant corrigenda to it
CLP Power Hong Kong Limited	Code of Practice 101 for Distribution Substation Design (Version 15.0) (2020)
CLP Power Hong Kong Limited	Guide to Supply and Metering Arrangement on Customer's Internal Distribution System (2018)
CLP Power Hong Kong Limited	Supply Rules (2001)
Development Bureau	Construction Site Safety Manual (2018)
Development Bureau	Technical Circular (Works) No. 02/2015, Environment Bureau Circular Memorandum No. 3/2015 – Green Government Buildings

Authority / Code	Title
Drainage Services Department	Safety Manual (2018)
Drainage Services Department	Sewerage Manual (Part 1 and Part 2) (2013)
Drainage Services Department	Stormwater Drainage Manual, Fifth Edition (2018)
Electrical and Mechanical Services Department	Code of Practice for Energy Efficiency of Building Services Installation, 2018 Edition
Electrical and Mechanical Services Department	Code of Practice for the Electricity (Wiring) Regulations, 2020 Edition
Electrical and Mechanical Services Department	General Requirements for Electronic Contracts, Specification No. ESG01 (2016)
Electrical and Mechanical Services Department	Other Codes of Practices, Guidance Notes and Guidelines
Electrical and Mechanical Services Department	Performance-based Building Energy Code, 2007 Edition
Environmental Protection Department	A Guide to the Water Pollution Control Ordinance
Environmental Protection Department	Application of Screening Structure to abate Noise from Surface Transportation
Environmental Protection Department	Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance
Environment, Transport and Works Bureau	Code of Practice on Monitoring and Maintenance of Water-carrying Services Affecting Slopes (2006)
Environmental Protection Department	Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste
Environmental Protection Department	Code of Practice on the Handling, Transportation and Disposal of Polychlorinated Biphenyl (PCB) Waste (1992)
Environmental Protection Department	Code of Practice for the Management of Clinical Waste – Major Clinical Waste Producers and Waste Collectors
Environmental Protection Department	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992)
Environmental Protection Department	EIAO Guidance Notes
Environmental Protection Department	General Requirements of Continuous Emission Monitoring (CEM) System (2009)

Authority / Code	Title
Environmental Protection Department	Guidance Note for Contaminated Land Assessment and Remediation (2007)
Environmental Protection Department	Landfill Gas Hazard Assessment Guidance Note (1997)
Environmental Protection Department	Practice Note for Professional Persons (ProPECC Notes)
Environmental Protection Department	Practice Note for Professional Persons Environmental Consultative Committee (ProPECC) PN 2/93 - Noise from Construction Activities - Non Statutory
Environmental Protection Department	Quality Assurance /Quality Control (QA/QC) Manual, Air Services Laboratory (2005)
Environment, Transport and Works Bureau	Technical Circular (Works) No.13/2003 – Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals
Environment, Transport and Works Bureau	Technical Circular (Works) No. 24/2004 – Specification Facilitating the Use of Concrete Paving Units Made of Recycled Aggregates
Environment, Transport and Works Bureau	Technical Circular (Works) No. 36/2004 – The Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS)
Environment, Transport and Works Bureau	Technical Circular (Works) No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
Environment, Transport and Works Bureau	Technical Circular (Works) No. 7/2015 – Tree Preservation
Environment, Transport and Works Bureau	Technical Circular (Works) No. 08/2005 – Aesthetic Design of Ancillary Buildings in Engineering Projects
Environmental Protection Department	Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters
Environmental Protection Department	Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites
Environmental Protection Department	Technical Memorandum on Environmental Impact Assessment Process
Environmental Protection Department	Technical Memorandum on Noise from Construction Work in Designated Areas
Environmental Protection Department	Technical Memorandum on Noise from Construction Work other than Percussive Piling
Environmental Protection Department	Technical Memorandum on Noise from Percussive Piling
Fire Services Department	Codes of Practice and Circular Letters

Authority / Code	Title
Fire Services Department	Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment, 2012 Edition
Highways Department	Code of Practice for the Lighting, Signing and Guarding of Road Works (2017)
Highways Department	Guidance Notes on Application of Materials for Road Markings (2016)
Highways Department	Guidance Notes on Design and Construction of Pavements with Paving Units (2020)
Highways Department	Guidelines on Design of Noise Barriers
Highways Department	Guidance Notes on Pavement Design for Carriageway Construction (2013)
Highways Department	Guidance Notes on Road Pavement Drainage Design (2020)
Highways Department	Public Lighting Design Manual (2017)
Highways Department	Road Inspection Manual (RIM)
Highways Department	Structures Design Manual for Highways and Railways (2013)
HKSAR Government	General Information, charts, reports, meteorological data and services
HKSAR Government	How to Apply for a Construction Noise Permit
HKSAR Government	Recommendations and Requirements of the Hong Kong Gas Standard Office
Hong Kong Observatory	Climatological Notes
Hong Kong Observatory	Forecasters Notes
Hong Kong Observatory	Technical Memoirs
Hong Kong Observatory	Technical Notes
Hong Kong Observatory	The Probable Maximum Rainfall in Hong Kong
Labour Department	A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment (1998)
Labour Department	Code of Practice for Owners of Boilers and Pressure Vessels (2016)
Planning Department	Hong Kong Planning Standards and Guidelines (2021)

Authority / Code	Title
Telecommunications Authority	Performance Specification For Angle - Modulated Radio Transmitters and Receivers for use as Base, Repeater, Mobile and Portable Equipment in the Land Mobile Radio Service, (HKTA 1002) (2008)
Transport Department	Code of Practice for Private Roads (1994)
Transport Department	Transport Planning & Design Manual (2016)
Water Supplies Department	Handbook on Plumbing Installation for Buildings (2018)
Water Supplies Department	Manual of Mainlaying Practice (2012 Edition)
Water Supplies Department	Manual for Structural Design of Waterworks Design (2020)
Water Supplies Department	Particular Guidelines and Examples of Recommended Applications of Water-Saving/Water-efficient Devices to be used in Government Projects
Water Supplies Department	Technical Specifications on Grey Water Reuse and Rainwater Harvesting
Office of the Privacy Commissioner for Personal Data	Guidance on CCTV Surveillance and Use of Drones
2014/68/EU	Pressure Equipment Directive
AS/NZS 1768	Lightning protection
ANSI/ASHRAE -2007	Ventilation for Acceptable Indoor Air Quality
BS 381C	Specification for colours for identification, coding and special purposes
BS 558	Specification for Nickel Anodes, Anode Nickel and Nickel Salts for Electroplating
BS 7531	Rubber bonded fibre jointing for industrial and aerospace purposes. Specification.
BS 822-6	Terminal markings for electrical machinery and apparatus. Lead colours for rotating electrical machinery
BS 1600	Specification for dimensions of steel pipe for the petroleum industry
BS 1710	Specification for identification of pipelines and services
BS 1759	Specification for knurling wheels.
BS 3974	Specification for pipe supports.
BS 4533-102.1:1990	Luminaires. Particular requirements. Specification for fixed general purpose luminaires

Authority / Code	Title
BS 476-22	Fire tests on building materials and structures. Method for determination of the fire resistance of non-loadbearing elements of construction
BS 4800	Schedule of paint colours for building purposes
BS 4999-140	General requirements for rotating electrical machines. Specification for voltage regulation and parallel operation of a.c. synchronous generators
BS 5000-3	Rotating electrical machines of particular types or for particular applications. Generators to be driven by reciprocating internal combustion engines. Requirements for resistance to vibration
BS 5499-4	Safety signs. Code of practice for escape route signing
BS 5499-10	Guidance for the selection and use of safety signs and fire safety notices
BS 5975:2008+A1:2011	Code of practice for temporary works procedures and the permissible stress design of falsework
BS 61869-2	Instrument transformers. Additional requirements for current transformers
BS 61869-3	Instrument transformers. Additional requirements for inductive voltage transformers
BS 6206	Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings.
BS 6290	Lead-acid stationary cells and batteries.
BS 7121-2-1	Code of practice for the safe use of cranes. Inspection, maintenance and thorough examination. General
BS 7121-3	Code of practice for safe use of cranes. Mobile cranes
BS 7121-4	Code of practice for safe use of cranes. Lorry loaders
BS 7121-5	Code of practice for safe use of cranes. Tower cranes
BS 7121-13	Code of practice for safe use of cranes. Hydraulic gantry lifting system
BS 7121-14	Code of practice for safe use of cranes. Side boom pipelayers
BS 7668	Weldable structural steels. Hot finished structural hollow sections in weather resistant steels. Specification
BS 7671	Requirements for electrical installations. IEE wiring regulations
BS 8313	Code of practice for accommodation of building services in ducts.

Authority / Code	Title
BS 9990	Non automatic fire-fighting systems in buildings. Code of practice.
BS EN 287-1	Qualification test of welders
BS EN 349	Safety of machinery. Minimum gaps to avoid crushing of parts of the human body
BS EN 485-2	Aluminium and aluminium alloys. Sheet, strip and plate. Mechanical properties
BS EN 1011-1	Welding. Recommendations for welding of metallic materials. General guidance for arc welding
BS EN 1011-2	Welding. Recommendations for welding of metallic materials. Arc welding of ferritic steels
BS EN 1011-3	Welding. Recommendations for welding of metallic materials. Arc welding of stainless steels
BS EN 1011-4	Welding. Recommendations for welding of metallic materials. Arc welding of aluminium and aluminium alloys
BS EN 1011-5	Welding. Recommendations for welding of metallic materials. Welding of clad steel
BS EN 1011-6	Welding. Recommendations for welding of metallic materials. Laser beam welding
BS EN 1011-7	Welding. Recommendations for welding of metallic materials. Electron beam welding
BS EN 1011-8	Welding. Recommendations for welding of metallic materials. Welding of cast irons
BS EN 10204	Metallic products. Types of inspection documents
BS EN 1092	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, PN designated
BS EN 12368	Traffic control equipment. Signal heads.
BS EN 1387	Machine readable cards. Health care applications. Cards. General characteristics
BS EN 1992-3	Eurocode 2. Design of concrete structures. Liquid retaining and containing structures
BS EN 1993	Eurocode 3: Design of steel structures
BS EN 1561	Founding Grey cast irons
BS EN 1562	Founding Malleable cast irons
BS EN 1563	Founding Spheroidal graphite cast iron

Authority / Code	Title
BS EN 1759-1	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, class-designated. Steel flanges, NPS 1/2 to 24
BS EN 1759-3	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, class designated. Copper alloy flanges
BS EN 1759-4	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, class designated. Aluminium alloy flanges
BS EN 4504	Circular flanges for pipes, valves and fittings (PN designated)
BS EN 10022	Steel forgings for pressure purposes
BS EN 10025	Hot rolled products of structural steels
BS EN 10025-1	Hot rolled products of structural steels. General technical delivery conditions
BS EN 10029	Hot-rolled steel plates 3 mm thick or above. Tolerances on dimensions and shape.
BS EN 10088	Stainless steels
BS EN 10143	Continuously hot-dip coated steel sheet and strip. Tolerances on dimensions and shape
BS EN 10210	Hot finished structural hollow sections of non-alloy and fine grain steels
BS EN 10204	Metallic products - Types of inspection documents
BS EN 10213	Steel castings for pressure purposes
BS EN 10216-5	Seamless steel tubes for pressure purposes. Technical delivery conditions. Stainless steel tubes
BS EN 10217	Welded steel tubes for pressure purposes. Technical delivery conditions.
BS EN 10217-7	Welded steel tubes for pressure purposes. Technical delivery conditions. Stainless steel tubes
BS EN 10222	Steel forgings for pressure purposes.
BS EN 10226-1	Pipe threads where pressure tight joints are made on the threads. Taper external threads and parallel internal threads. Dimensions, tolerances and designation
BS EN 10226-2	Pipe threads where pressure tight joints are made on the threads. Taper external threads and taper internal threads. Dimensions, tolerances and designation
BS EN 10226-3	Pipes threads where pressure-tight joints are made on the threads. Verification by means of limit gauges

Authority / Code	Title
BS EN 10250-4	Open steel die forgings for general engineering purposes. Stainless steels
BS EN 10254	Steel closed die forgings. General technical delivery conditions
BS EN 10255	Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions
BS EN 10305	Steel tubes for precision applications. Technical delivery conditions.
BS EN 10305-1	Steel tubes for precision applications. Technical delivery conditions. Seamless cold drawn tubes
BS EN 10305-2	Steel tubes for precision applications. Technical delivery conditions. Welded cold drawn tubes
BS EN 10305-3	Steel tubes for precision applications. Technical delivery conditions. Welded cold sized tubes
BS EN 10283	Corrosion resistant steel castings
BS EN 10293	Steel castings for general engineering uses
BS EN 10296	Welded circular steel tubes for mechanical and general engineering purposes
BS EN 12077-2	Crane safety – requirements for the health and safety. Limiting and indicating devices
BS EN 12241	Thermal insulation for building equipment and industrial installations. Calculation rules
BS EN 12285-1	Workshop fabricated steel tanks. Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and non-flammable water polluting liquids
BS EN 12285-2	Workshop fabricated steel tanks. Horizontal cylindrical single skin and double skin tanks for the aboveground storage of flammable and non-flammable water polluting liquids
BS EN 12451	Copper and copper alloys - seamless, round tubes for heat exchangers
BS EN 12680-2	Founding - Ultrasonic examination, Part 2: Steel castings for highly stressed components
BS EN 13000	Cranes. Mobile cranes
BS EN 13001	Crane safety
BS EN 13001-3-1	Cranes. General Design. Limit States and proof competence of steel structure

Authority / Code	Title
BS EN 13121-3	GRP tanks and vessels for use above ground. Design and workmanship
BS EN 13157	Cranes. Safety. Hand powered lifting equipment
BS EN 13162	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
BS EN 13284-1	Stationary source emissions. Determination of low range mass concentration of dust. Manual gravimetric method
BS EN 13480	Metallic industrial piping
BS EN 13501	Fire classification of construction products and building elements
BS EN 13601	Copper and copper alloys. Copper rod, bar and wire for general electrical purposes.
BS EN 13835	Founding. Austenitic cast irons
BS EN 13923	Filament-wound FRP pressure vessels. Materials, design, manufacturing and testing
BS EN 13956	Flexible sheets for waterproofing - Plastic and rubber sheets for roof waterproofing - Definitions and characteristics
BS EN 14122	Safety of machinery - Permanent means of access to machinery
BS EN 15442	Solid recovered fuels. Methods for sampling
BS EN 24624	Paints and varnishes. Pull-off test for adhesion
BS EN 45510	Guide for the procurement of power station equipment
BS EN 50110-1	Operation of electrical installations. General requirements
BS EN 50172	Emergency escape lighting systems
BS EN 50272-2	Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries
BS EN 50288-7	Multi-element metallic cables used in analogue and digital communication and control. Sectional specification for instrumentation and control cables
BS EN 50310	Application of equipotential bonding and earthing in buildings with information technology equipment; Engineering Recommendation P2/6 Security of supply
BS EN 50347	General purpose three-phase induction motors having standard dimensions and outputs
BS EN 55014-1	Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Emission

Authority / Code	Title
BS EN 55014-2	Electromagnetic compatibility. Requirements for household appliances, electric tools and similar apparatus. Immunity. Product family standard
BS EN 60034	Rotating electrical machines
BS EN 60034-2	Rotating electrical machines, Part 2: Standard methods for determining losses and efficiency from tests
BS EN 60034-6	Rotating electrical machines. Methods of cooling (IC Code)
BS EN 60034-14	Rotating electrical machines. Mechanical vibration of certain machines with shaft heights 56 mm and higher. Measurement, evaluation and limits of vibration severity
BS EN 60038	CENELEC standard voltages
BS EN 60044	Instrument transformers
BS EN 60079	Explosive atmospheres.
BS EN 60079-0	Explosive atmospheres. Equipment. General requirements
BS EN 60079-1	Explosive atmospheres. Equipment protection by flameproof enclosures "d"
BS EN 60079-2	Explosive atmospheres. Equipment protection by pressurized enclosure "p"
BS EN 60079-5	Explosive atmospheres. Equipment protection by powder filling "q"
BS EN 60079-6	Explosive atmospheres. Equipment protection by liquid immersion "o"
BS EN 60079-7	Explosive atmospheres. Equipment protection by increased safety "e"
BS EN 60079-10-1	Explosive atmospheres. Classification of areas. Explosive gas atmospheres
BS EN 60079-10-2	Explosive atmospheres. Classification of areas. Explosive dust atmospheres
BS EN 60079-11	Explosive atmospheres. Equipment protection by intrinsic safety "i"
BS EN 60079-14	Explosive atmospheres. Electrical installations design, selection and erection
BS EN 60079-15	Electrical apparatus for explosive gas atmospheres. Type of protection "n"
BS EN 60079-17	Explosive atmospheres. Electrical installations inspection and maintenance

Authority / Code	Title
BS EN 60079-18	Explosive atmospheres. Equipment protection by encapsulation "m"
BS EN 60079-25	Explosive atmospheres. Intrinsically safe electrical systems
BS EN 60079-26	Explosive atmospheres. Equipment with Equipment Protection Level (EPL) Ga
BS EN 60079-27	Explosive atmospheres. Fieldbus intrinsically safe concept (FISCO)
BS EN 60079-28	Explosive atmospheres. Protection of equipment and transmission systems using optical radiation
BS EN 60079-29-1	Explosive atmospheres. Gas detectors. Performance requirements of detectors for flammable gases
BS EN 60079-29-3	Explosive atmospheres. Gas detectors. Guidance on functional safety of fixed gas detection systems
BS EN 60079-29-4	Explosive atmospheres. Gas detectors. Performance requirements of open path detectors for flammable gases
BS EN 60079-30-1	Explosive atmospheres. Electrical resistance trace heating. General and testing requirements
BS EN 60079-31	Explosive atmospheres. Equipment dust ignition protection by enclosure "t"
BS EN 60079-32	Explosive atmospheres. Electrostatics hazards. Tests
BS EN 60085	Electrical insulation – thermal evaluation and designation
BS EN 60099	Surge arresters
BS EN 60196	IEC standard frequencies
BS EN 60204-32	Safety of machinery – Electrical equipment of machines – Part 32: Requirements for hoisting machines
BS EN 60255	Electrical relays
BS EN 60376	Specification of technical grade sulphur hexafluoride (SF6) for use in electrical equipment
BS EN 60480	Guidelines for the checking and treatment of sulphur hexafluoride (SF6) taken from electrical equipment and specification for its reuse
BS EN 60529	Degrees of protection provided by enclosures (IP code)
BS EN 60702-1	Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V. Cables
BS EN 60865	Short circuit currents – Calculation of effects

Authority / Code	Title
BS EN 60896-11	Stationary lead-acid batteries – Part 11: Vented types; General requirements and methods of test
BS EN 60947	Low-voltage switchgear and controlgear
BS EN 61000	Electromagnetic compatibility (EMC)
BS EN 61439-1	Low voltage switchgear and controlgear assemblies General rules
BS EN 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems
BS EN 61508-5	Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 5: Examples of methods for the determination of safety integrity levels
BS EN 61511	Functional safety – Safety instrumented systems for the process industry sector
BS EN 61537	Cable management – Cable tray systems and cable ladder systems
BS EN 61951-1	Secondary cells and batteries containing alkaline or other non-acid electrolytes. Portable sealed rechargeable single cells. Nickel-cadmium
BS EN 62040	Uninterruptible power systems (UPS)
BS EN 62040-3	Uninterruptible power systems (UPS). Method of specifying the performance and test requirements
BS EN 62424	Representation of process control engineering – Request in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools
BS EN 82079-1	Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements
BS EN ISO 14119	Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
BS EN ISO 14120	Safety of machinery. Guards. General requirements for the design and construction of fixed and movable guards
BS EN ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods
BS EN ISO 20344	Personal protective equipment. Test methods for footwear
BS EN ISO 2360	Non-conductive coatings on non-magnetic electrically conductive basis materials – Measurement of coating thickness – Amplitude-sensitive eddy current method
BS EN ISO 2409	Paints and varnishes – Cross-cut test

Authority / Code	Title
BS EN ISO 2560	Welding consumables. Covered electrodes for manual metal arc welding of non-alloy and fine grain steels. Classification
BS EN ISO 2808	Paints and varnishes – Determination of film thickness
BS EN ISO 3581	Welding consumables. Covered electrodes for manual metal arc welding of stainless and heat-resisting steels. Classification
BS EN ISO 3834	Quality requirements for fusion welding of metallic materials.
BS EN ISO 4126	Safety devices for protection against excessive pressure
BS EN ISO 4126-1	Safety devices for protection against excessive pressure. Safety valves
BS EN ISO 4126-2	Safety devices for protection against excessive pressure. Bursting disc safety devices
BS EN ISO 4126-3	Safety devices for protection against excessive pressure. Safety valves and bursting disc safety devices in combination
BS EN ISO 4126-4	Safety devices for protection against excessive pressure. Pilot-operated safety valves
BS EN ISO 4126-5	Safety devices for protection against excessive pressure. Controlled safety pressure relief systems (CSPRS)
BS EN ISO 4126-6	Safety devices for protection against excessive pressure. Application, selection
BS EN ISO 4624	Paints and varnishes – Pull-off test for adhesion
BS EN ISO 5167-1	Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full, Part 1: General principles and requirements
BS EN ISO 5167-2	Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full, Part 2: Orifice plates
BS EN ISO 5199	Technical specifications for centrifugal pumps. Class II
BS EN ISO 5817	Welding. Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded). Quality levels for imperfections
BS EN ISO 7010	Graphical symbols. Safety colours and safety signs. Registered safety signs
BS EN ISO 7519	Technical drawings. Construction drawings. General principles of presentation for general arrangement and assembly drawings
BS EN ISO 8501	Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness

Authority / Code	Title
BS EN ISO 8502	Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness
BS EN ISO 8503	Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates
BS EN ISO 8503-2	Preparation of steel substrates before application of paints and related products. Surface roughness characteristics of blast-cleaned steel substrates. Method for the grading of surface profile of abrasive blast-cleaned steel. Comparator procedure
BS EN ISO 8503-4	Preparation of steel substrates before application of paints and related products. Surface roughness characteristics of blast-cleaned steel substrates. Method for the calibration of ISO surface profile comparators and for the determination of surface profile. Stylus instrument procedure
BS EN ISO 9905	Technical specifications for centrifugal pumps. Class I
BS EN ISO 9906	Rotodynamic pumps. Hydraulic performance acceptance tests. Grades 1, 2 and 3
BS EN ISO 9908	Technical specifications for centrifugal pumps. Class III
BS EN ISO 11124-1	Preparation of steel substrates before application of paints and related products. Specifications for metallic blast-cleaning abrasives. General introduction and classification
BS EN ISO 12944	Paints and varnishes – Corrosion protection of steel structures by protective paint systems
BS EN ISO 13857	Safety of machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs
BS EN ISO 14119	Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
BS EN ISO 14120	Safety of machinery. Guards. General requirements for the design and construction of fixed and movable guards
BS EN ISO 14713	Protecting iron and steel structures against corrosion using zinc and aluminium coatings, guidelines
BS EN ISO 14731	Welding coordination – Tasks and responsibilities
BS EN ISO 14847	Rotary positive displacement pumps. Technical requirements
BS EN ISO 15607	Specification and qualification of welding procedures for metallic materials
BS EN ISO 15609-1	Specification and qualification of welding procedures for metallic materials – Welding procedure specification – Part 1: Arc welding

Authority / Code	Title
BS ISO 128-23	Technical drawings. General principles of presentation. Lines on Construction drawings
BS ISO 1219	Fluid power systems and components. Graphical symbols and circuit diagrams.
BS ISO 3864-4	Graphical symbols. Safety colours and safety signs. Colorimetric and photometric properties of safety sign materials
BS ISO 5210	Industrial valves. Multi-turn valve actuator attachments.
BS ISO 20816	Mechanical vibration – Evaluation of machine vibration by measurements on non-rotating parts.
BS ISO 11124	Preparation of steel substrates before application of paints and related products. Specifications for metallic blast-cleaning abrasives. High-carbon cast-steel shot and grit
BS ISO 11126-5	Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Nickel refinery slag
BS ISO 11126-10	Preparation of steel substrates before application of paints and related products. Specifications for non-metallic blast-cleaning abrasives. Almandite garnet
EN ISO 14122-3	Safety of machinery. Permanent means of access to machinery. Stairs, stepladders and guard-rails
BS ISO/IEC 10026	Information technology. Open systems interconnection. Distributed transaction processing. OSI TP model
DIN 28124-1	Manhole closures – Part 1: For unpressurized vessels
DIN 28124-2	Manhole closures – Part 2: For pressure vessels, from steel
DIN 28124-3	Manhole closures – Part 3: For pressure, covered
DIN 28124-4	Manhole closures – Part 4: Swivel devices
DIN EN 55011	Radio-frequency disturbance characteristics – Limits and methods of measurement
DW/142 & 144	Specification for Sheet metal ductwork
EN 10025-2	Technical delivery conditions for non-alloy structural steels
EN 13121	GRP tanks and vessels for use above ground.
EN 13923	Filament-wound FRP pressure vessels. Materials, design, manufacturing and testing

Authority / Code	Title
EN 1514-1	Flanges and their joints. Dimensions of gaskets for PN-designated flanges. Non-metallic flat gaskets with or without inserts
EN 1514-2	Flanges and their joints. Gaskets for PN-designated flanges. Spiral wound gaskets for use with steel flanges
EN 1514-6	Flanges and their joints. Dimensions of gaskets for PN-designated flanges. Covered serrated metal gaskets for use with steel flanges
EN 50064	Wrought aluminium and aluminium alloy enclosures for gas-filled high-voltage switchgear and control gear
EN 50068	Wrought steel enclosures for gas-filled high-voltage switchgear and control gear
EN 50069	Welded composite enclosures of cast and wrought aluminium alloys for gas-filled high-voltage switchgear and control gear
EN 50089	Cast resin partitions for metal enclosed gas-filled high-voltage switchgear and control gear
EN ISO/IEC 17024	Conformity Assessment – General Requirements for Bodies Operating Certification of Persons
FEM 1.001	Rules for the Design of Hoisting Appliances
IEC 60034-1	Rotating electrical machines – Part 1: Rating and performance
IEC 60034-5	Rotating electrical machines. Degrees of protection provided by the integral design of rotating electrical machines (IP code). Classification
IEC 60034-6	Rotating electrical machines - Part 6: Methods of cooling (IC Code)
IEC 60034-9	Rotating electrical machines - Part 9: Noise limits
IEC 60034-14	Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity
IEC 60038	IEC standard voltages
IEC 60085	Electrical insulation - Thermal evaluation and designation
IEC 60099-4	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems
IEC 60214	Tap-changers
IEC 60228	Conductors of insulated cables
IEC 60255	Electrical Relays
IEC 60269-1:	Low-voltage fuses - Part 1: General requirements

Authority / Code	Title
IEC 60269-2	Low-voltage fuses - Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) - Examples of standardized systems of fuses A to K
IEC 60269-3	CSV Consolidated version Low-voltage fuses - Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household or similar applications) - Examples of standardized systems of fuses A to F
IEC 60269-4	CSV Low-voltage fuses - Part 4: Supplementary requirements for fuse-links for the protection of semiconductor devices
IEC 60376	Specification of technical grade sulphur hexafluoride (SF6) for use in electrical equipment
IEC 60480	Guidelines for the checking and treatment of sulphur hexafluoride (SF6) taken from electrical equipment and specification for its re-use
IEC 60502	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV)
IEC 60502-1	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3,6 kV)
IEC 60751	Industrial platinum resistance thermometers and platinum temperature sensors
IEC 61000	Series of Standards for Electromagnetic compatibility
IEC 61000-4-11	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests
IEC 61000-4-34	Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase
IEC 61158	Industrial communication networks. Fieldbus specifications. Overview and guidance for the IEC 61158 and IEC 61784 series
IEC 61439-1	Low-voltage switchgear and controlgear assemblies - Part 1: General rules
IEC 61508	Commented version Functional safety of electrical/electronic/programmable electronic safety-related systems – All Parts together with a Commented version
IEC 61511-1	Redline version Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements

Authority / Code	Title
IEC 61511-2	Functional safety - Safety instrumented systems for the process industry sector - Part 2: Guidelines for the application of IEC 61511-1
IEC 61511-3	Functional safety - Safety instrumented systems for the process industry sector - Part 3: Guidance for the determination of the required safety integrity levels
IEC 61850	Communication networks and systems for power utility automation
IEC 61869-1	Instrument transformers Part 1: General requirements
IEC 61869-2	Instrument transformers - Part 2: Additional requirements for current transformers
IEC 62305	Protection against lightning
IEC 62305-1	Protection against lightning - Part 1: General principles
IEC 62305-2	Protection against lightning - Part 2: Risk management
IEC 62305-3	Protection against lightning - Part 3: Physical damage to structures and life hazard
IEC 62305-4	Protection against lightning - Part 4: Electrical and electronic systems within structures
IEC/BS EN 60076	Power transformers.
IEC/BS EN 62305	Protection against lightning
IEEE 242	IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book)
IEEE 802.3	Ethernet
IEEE 802.5	Token Ring Access Method and Physical Layer Specifications
IEEE 519	Recommended Practice and Requirements for Harmonic Control in Electric Power Systems
IEEE P1547	Series of standards for interconnection
IIB Machinery directive	Machinery directive – Appendix
ISO 668	Series 1 freight containers – Classification, dimensions and ratings
ISO 1940	Mechanical vibration -- Balance quality requirements for rotors in a constant (rigid) state
ISO 1460	Metallic coatings -- Hot dip galvanized coatings on ferrous materials -- Gravimetric determination of the mass per unit area

Authority / Code	Title
ISO 1461	Hot dip galvanized coatings on fabricated iron and steel articles -- Specifications and test methods
ISO 9001	Quality management systems. Requirements
ISO 14694	Industrial fans -- Specifications for balance quality and vibration levels
NFC 17-102	Protection Against Lightning - Early Streamer Emission Lightning Protection Systems
NFPA 780	Standard for the Installation of Lightning Protection Systems
SEMI F47	Specification for Semiconductor Processing Equipment Voltage Sag Immunity
VDI 2060	Standards of Evaluation for the State of Balance of Rotating Rigid Bodies.
VGB-R 170 A1 e	Measures for the avoidance and handling of instrumentation and control equipment failures
VGB-R 170 (B0-B6) e	Design standards for instrumentation and control equipment
VGB-R 170 C e	Function-related documentation of power plant instrumentation and control in line with operating requirements
VGB-R 505 e	Guideline for the use of high-temperature bolting
VGB-R 510 Le	Pipe supports

APPENDIX 1.03 NOT USED

APPENDIX 1.04 SAMPLE OF SWAC / PMAC

Serial No. _____

**Site Work (SWAC)/Plant Modification (PMAC)
Authorization Certification**

This certificate permits the following modification/work to be carried out: -

Contract No. _____ Contractor _____

Name of Contractor's On-site Supervisor _____ Contact Tel. No. _____

Sub-Contractor (a) _____ Your fax No. _____

(b) _____

Location of Site/Plant _____

Modification Work _____

Start Date and Time _____ Finish Date and Time _____

Conditions of Work:

1. Application for SWAC/PMAC shall be submitted for approval one week in advance of the site work/plant modification.
2. All safety instructions given by the Works Manager or his representative shall be followed.
3. The contractor's staff must not trespass into areas not authorized.
4. Smoking, Alcohol is restricted in all plant working areas.
5. The contractor must contact the shift-in-charge at the plant (Tel. No. 26841060) in case of emergency.
6. This certificate does **NOT** authorise the contractor to use, adjust, switch off or on, or modify any plant other than that authorized in this certificate.
7. If the site/modification work approved by this certificate is unlikely to be finished within the agreed time, a new certificate must be obtained.
8. The contractor shall inform the shift-in-charge at the plant when he arrives on site to start work and when he leaves the site.
9. The contractor shall be responsible for rectification/repair of all damages due to the captioned work; and keeping the works area clean and removes all waste materials from the site daily.
10. If entry to confined space for modification/site work is required; all safety procedures should be followed. Risk Assessment Permit-to-Work in Confined Space issued by contractor's Competent Person **must** copy to Works Manager for inspection and comment prior to each commencement of the works.
11. The form of undertaking shall be submitted to Works Manager before the work is commenced.
12. Method statement of modification/site work is required before the work is commenced.
13. _____

IN THE EVENT THAT UNFORESEEN CIRCUMSTANCES REQUIRE A STOPPAGE OF ANY ACTIVITY, INSTRUCTIONS FROM SENIOR WORKS STAFF MUST BE FOLLOWED.

Requested by: Name _____ Signature: _____ Date: _____
(Contractor's Supervisor)

Endorsed by: Name _____ Signature: _____ Date: _____
(Project Supervisor)

Approved by: Name _____ Signature: _____ Date: _____
(Works Manager)

APPENDIX 1.05 NOT USED

APPENDIX 1.06 NOT USED

APPENDIX 1.07 SCHEDULE OF CONTRACT COMPUTER FACILITIES FOR THE SITE ACCOMMODATIONS

(Clause 1.2.1F of the Employer's Requirements refers)

1 ELECTRONIC DOCUMENT MANAGEMENT SYSTEM

- (a) The Contractor shall provide and arrange to maintain the following Electronic Document Management System from and including the date for commencement of the Works to the date of issue of the Certificate of Completion of the Works. The maintenance of the EDMS shall be carried out by an independent service provider.

1.1 System Development

- (a) The Contractor has to choose the most cost-effective solution for implementation of the EDMS for the approval of the Supervising Officer.
- (b) The EDMS shall be implemented to centralise the information on site documents on a core database to facilitate the input, collection, storage, retrieval, display and reuse of the documents scanned from paper and generated from other electronic sources in an efficient and effective manner. The documents stored in EDMS shall be retrieved instantaneously through the networked computers at designated locations within and outside the temporary accommodation with sufficient security measures to protect the information flow. The users of the Employer's staff located within the Environmental Protection Department premises shall also be able to retrieve the electronic documents via Virtual Private Network (VPN). It shall enable users to share documents with colleagues. The proposed system shall allow different types of user (exact classification to be agreed by the Supervising Officer during system development) to handle different functions of EDMS.
- (c) The EDMS shall be operated under a computerized environment and make use of the computer network infrastructure of the temporary accommodation. All documents being handled by the system shall be scanned into softcopy. It shall provide an easy way to retrieve documents from Environmental Protection Department. The proposed system shall be designed, implemented and maintained without the need of proprietary software, in view of cost effectiveness, unless otherwise agreed by the Supervising Officer.
- (d) The EDMS shall be installed on the network system in the temporary accommodation. The Employer's head office shall be connected to the EDMS system from other locations via Virtual Private Network (VPN) as configuration did through Environmental Protection Department and the temporary accommodation.
- (e) The EDMS shall support access to the system from any PC connected to the local area network of the temporary accommodation and PC in Employer's head office running on Windows platforms.
- (f) The EDMS shall provide an interface that can manipulate the data of site diary and other site records as specified in the Project Administration Handbook, which are currently in use in Government Projects.

4.2 Manipulation and registration of documents

- (a) In the EDMS, the electronic document is the scanned image of hardcopy or other type used for document purpose, such as Microsoft Word, TIFF, JPEG, BMP, and e-mail correspondence, etc. The scanned image shall be stored as Tiff format. It shall invoke the application associated or native application of the file with the file kept in the EDMS for preview purpose.
- (b) The EDMS shall be operated with a web browser, an Acrobat Reader and a text editor for manipulating different electronic document formats essentially Word (.doc) and Acrobat (.pdf).
- (c) The EDMS shall provide a tool to view and print the physical file or searched file without editing the file.
- (d) The EDMS shall provide a freezing function for document such that there is no unauthorized modification.
- (e) The EDMS shall enable users to: -
 - (i) Support registration of all incoming and outgoing files and to assign a unique number to each document.
 - (ii) Support centrally storing files in its native format or a converted scanned document in .tiff format.
 - (iii) Support grouping of related files under a folder or for forming a new folder.
 - (iv) Establish and amend relationship (such as attachment relationship, master/slaves relationship and link (Reply to/by) relationship) between folders.
 - (v) Support user profile in the folder level.
- (f) The EDMS shall validate the essential data entered in the user profiles.
- (g) All files in the EDMS shall be time-stamped.
- (h) The EDMS shall support full-text search (content of files), and form search with user-defined searching criteria on the user profile in the system. The searching results shall be hyperlinks pointing to such files that meet the searching criteria. The table of search result shall be able to be printed.
- (i) The EDMS shall be able to search through and identify those files documents that have been recorded but not yet scanned and/or linked with the records.
- (j) The EDMS shall provide a function to receive incoming documents from external recipients through emails.
- (k) The EDMS shall produce both on-screen tabular format and hard copy reports (i.e. printing). The format of any displayed table shall be able to be customized by individual user. For any on-screen report, individual user shall be able to sort column, re-arrange column order, select the displayed columns and export the report to database format in format of csv file. The file can be accessed and edited by common spreadsheet or database

software available in the market (e.g. Excel, Access, Word, etc.).

- (l) The EDMS should provide a clear structured tree diagram for users to navigate the project hierarchy and retrieve the project document in form of Contract Number, File Number, File Division, File Extension, then document record and attachment. Each level of tree diagram should be capable for expending and hiding by users.
- (m) Users should be able to create/edit the document record, create/edit the documents relationship, retrieve the action history of the specific project document or other document related manipulation functions under Internet Explorer.

4.3 Security

- (a) All aspects of the programme shall remain confidential. Information shall only be published or disclosed upon explicit permission. The system shall be developed and implemented with security measures and controls to ensure confidentiality, integrity and availability of the information kept by the EDMS. The Contractor shall comply with relevant statutory requirements. The EDMS together with all the associated servers and endpoint workstations provided under the Contract shall also be equipped with security software against ransomware and malware attacks. The EDMS shall include security features to enable the system administrator to assign different rights (including read, write, delete, or register) to different users or groups of users to work on different files or different folders of files.
- (b) The EDMS shall allow authorised access and restrict unauthorised access to the system from external user through the use of software and hardware firewall or equivalent technique. The system shall be able to build a hierarchy of users and restrict rights and privileges of different class of users.
- (c) The EDMS shall set up a user access restriction mechanism through which the system administrator can control the access of particular group(s) of users or individual(s) to the file/document/record before and after file/document/record distribution.
- (d) The EDMS shall log the following items of each activity: -
 - (i) Login (successful attempt), login (unsuccessful attempt), archive, restore
 - (ii) Create user profile, update user profile, delete file
 - (iii) Date & time of the activity
 - (iv) User who carried out the activity
- (e) The audit trail shall be viewed in convenient format according to the descending order of date & time, for:
 - (i) All activities
 - (ii) All activities of the selected file
 - (iii) All activities carried out by the selected user, or by the user himself
- (f) The system administrator shall be able to sorting and filtering (file and user only) of

viewing activities shall be included in EDMS.

4.4 Data management

- (a) All data in the EDMS shall be kept in a relational database management system, which shall be ODBC compliant, such as Microsoft SQL Server or equivalent. All document files shall be kept in a separate file server.
- (b) All data including files kept in the EDMS shall be separated from the software, programs and scripts so that it shall be feasible to retrieve the data by other applications.
- (c) The EDMS shall be able to build multiple layers of relationship and linkage between folders. All incoming correspondence can be related by 'Reply to/by' relationship with more than one outgoing correspondences or vice versa.

4.5 Scanning

- (a) The EDMS shall interface with the scanning facilities. It shall include physical files scanning, and files registration into the EDMS. The operation of scanning, optical character recognition, optional optical character recognition, storing and registering of files shall be done seamlessly in a batch mode. The scanning operation shall be able to accommodate the different document size to A3. The scanning operation shall also provide a way to divide the enclosure in different portions to facilitate partial distribution of document to different users. Processing monitor shall be provided for checking the status of all processes. A log file recording above status shall be provided for facilitating the system administrator to identify any errors occurred.
- (b) The scanning operation shall be able to be operated in background mode and shall not affect normal PC operation. The scanning operation shall support two scanners operating concurrently from two scanning workstations and shall work separately from the document profile editing.

4.6 Action assignment and document profile distribution

- (a) The EDMS shall enable users to register a document through the completion of a document profile and distribute the registered document in accordance with the sample document flow to be specified by the Supervising Officer. The fields of the document profile shall be user-definable.
- (b) The EDMS shall provide a function for assignment of action, which shall allow the Supervising Officer to instruct the distribution profile by specifying the following criteria: -
 - (i) Action group/staff
 - (ii) Action/Information by whom
 - (iii) Document section (full/part of copy, i.e. partial document distribution)
 - (iv) Remark/Message
 - (v) Due date
- (c) The EDMS shall provide a user interface, which allows action responsible staff to retrieve

and deal with the document through the system. Users with assigned action shall be able to reply to the action assigner or communicate through the system with other users.

- (d) The EDMS shall provide a function so that a user can send action messages to any user in the system, including himself/herself. The action messages may or may not make reference to any other documents, messages and records in the system. Status of each action message shall be tracked by the system such as whether it has been acknowledged by the recipient and completed by the recipient.
- (e) The EDMS shall enable all the users to click on any subordinates to retrieve the details of action assignment, including the progress of action taken. The related documents shall be displayed during this checking process.
- (f) The EDMS shall allow action responsible staff to attach message to the document as annotations and description of action taken.
- (g) The EDMS shall facilitate the action responsible staff to assign the action to other staff with remarks/messages.
- (h) All the documents described in this section shall be able to hyperlink to the physical file for display, including an optional operation for displaying all the associated files in a tree format.
- (i) All the assignment history and the communication dialogue associated with a document shall be able to be easily viewed by all the users.
- (j) The EDMS shall allow specified users to assign the action while the action responsible staff will be able to reply directly to the specified users.

4.7 Miscellaneous requirements

- (a) The EDMS shall be able to handle registration of Site Photos. A map viewing interface that incorporates the site map of the project should be provided for users to indicate easily the location of photos taken. This map viewing interface should provide navigation function that user can easily zoom in/out or fit the site map to the map viewing area. A unique naming convention will be assigned automatically to the uploaded site photos that users can retrieve the date, location, file number and photographer easily from the name of the uploaded site photos.
- (b) The map viewing interface is not only available for site photos registration to assist the users to register the site photos. This map viewing interface should be provided for users in viewing the uploaded site photos through the web browser. Users can view the site photos from different registrations by specifying the location from the map viewing interface by simply mouse click through Microsoft Internet Explorer 11.0 or above. All registered site photos should be divided into appropriated location hierarchy that other than locate by map viewing interface, it provided another mean for users to retrieve the site photos easily.
- (c) The EDMS shall allow the system administrator to archive files from different levels of logical structure, such as Division, Department, Project/Contract Number, File Type and File Number, etc. It may facilitate the future replication of file repository among multiple servers. The EDMS shall support archiving of selected information to off-line storage. Each part or whole of the project/contract databases shall be able to be transferred, via

suitable storage devices (e.g. tapes or hard disks), to centralize database after project completion.

- (d) The EDMS shall conform to the requirements specified in the WBTC no. 19/93.
- (e) The EDMS shall allow specified user to correct mistakenly assigned folio number and file reference number. A function shall be provided to backward the status in the creation of folio number operation.
- (f) The EDMS shall be delivered to the temporary accommodation in stages firstly for reviewing the operation and system requirements, then designing, developing and implementing the system, and finally testing, tuning, commissioning, training and nursing.
- (g) Within 6 months from the contract commencement, fully functioned EDMS shall be commissioned.
- (h) Uninterruptible Power Supply (UPS) for the EDMS server and scanning workstations shall be provided. UPS shall have online capacity greater than 1.5 KVA, able to supply power by itself for 30 minutes continuously after failure of electricity supply. The UPS shall auto shut down the system when battery is under voltage. It shall restart the system automatically when the AC power is restored. The UPS shall generate audible noise less than 55dB.
- (i) The EDMS server and scanning workstations must be able to function properly and reliably under office environmental conditions of a site office in Hong Kong.

Power supply for the system shall be 220 volts AC, 50Hz from normal building wiring circuit mains. Power regulator, stabilizer or transformer shall be supplied by the Contractor for the computer system such that the system can function efficiently.
- (j) All the software and hardware of the EDMS shall be provided with continuous maintenance, on-site technical support and debugging services
- (k) Not used.
- (l) All and documentations relating to EDMS shall be submitted to EPD for record and comments.

4.8 Software part of the Electronic Document Management System (EDMS)

- (a) The system shall be an application developed to run on different computer operating systems used by different users and making use of the local area network infrastructure within the temporary accommodation. Remote office (such as Environmental Protection Department's Head Office) can access the system through the means of remote access services through dedicated data communication network to the temporary accommodation. The client computers must be able to run with the Microsoft Edge web browsers / Google Chrome web browser and their upper versions to ensure equal chance for accessing the system in different web browsers for different users.
- (b) The core of the system shall be a server side application (web server, application server and database server). The EDMS servers shall be located in the computer room of the temporary accommodation. The client computers shall be used for sending request and browsing information.

- (c) The system shall make use of a relational database management system to store profile information of all logical entities. All electronic documents shall be stored in a file server. The system shall provide interface to work with document scanner for handling incoming or out-going document scanning and registration into the system.
- (d) All wording and prompt shall be in English but the system itself shall support data with Chinese character.
- (e) Proprietary products and development tools should be avoided in view of cost incurred. On the other hand, open source should be adopted as much as possible. The development tools shall be able to perform in different operating systems and platforms.
- (f) Not used.
- (g) The Contractor has to provide sufficient licenses for implementing the EDMS.
 - (i) Relational Database System for the server (Microsoft SQL Server or equivalent)
 - (ii) Desktop Software for handling Site Photo Registration geographically (Intergraph GeoMedia or equivalent). For facilitating the site photos registration handling function, the system shall involve a map window interface customized from an off-the-shelf map viewing desktop product that displayed the layout of the construction site. It shall capable to provide site photo registration function to input the location in key-in and/or graphically locating method together with the input of the corresponding background attributes, including date, reference number by unique naming convention automatically assigned to the uploaded site photo records in EDMS. It shall provide user-friendly map manipulation functions including zoom in, zoom out, fit and pan in the graphical platform. The data source of the map window would be able to import from any reference CAD data (both Intergraph MicroStation DGN and AutoCAD DWG/DXF) and read directly without any conversion or translation. Moreover, it shall allow displaying of feature attributes and allow displaying different levels of CAD data depending on the zooming level
 - (iii) Web Server Software for Site Photo Review geographically (Intergraph GeoMedia WebMap or equivalent). The map window interface shall not only allow site photo registration in the desktop environment, it shall provide the reviewing of site photos uploaded via the web browser through at least Microsoft Internet Explorer 11.0 or above. Users shall be allowed to review site photos from different registrations by specifying the location on map. Individual records shall be retrieved by single mouse click for reviewing both the photos and relevant attributes. The interface shall also provide map manipulation functions including zoom in, zoom out, fit, locate and pan, and attribute search functions including date, location, and reference number to retrieve the corresponding range of site photos records in EDMS onto both graphical and textual views. Any modifications of existing or new registered site photos via the desktop interface shall be updated instantly in this web interface with single refresh button but no batch process or synchronization shall be required. Moreover, it shall allow displaying of feature attributes and allow displaying different levels of CAD data depending on the zooming level as desktop version did. The web server software license should allow 2 concurrent access and unlimited named users.
 - (iv) Software for Barcode Generation and Print Out (Codesoft 5 Premier Edition or equivalent).

- (v) The operating system and office automation software are specified in the Software Requirement. The Contractor has to choose the most suitable software application for implementation of the EDMS for the approval of the Supervising Officer.

4.9 Hardware part of the Electronic Document Management System (EDMS)

- (a) Scanner which can scan A3 and A4 documents
- (b) Image Accelerator with cable for scanner (PCI Bus), or products having equivalent functions or performance
- (c) Ascent Capture as OCR software to capture the text content during scanning process
- (d) Not used
- (e) Not used
- (f) All necessary consumables.
- (g) EDMS, Database and File Servers (1 No)

Specification of the server shall be referred to the section of Server Computer of the Hardware Requirement for Contract Computer Facilities.
- (h) Scanning Workstations (2 Nos)

Specification of the scanning workstation shall be referred to the section of Desktop Computer of the Hardware Requirement for Contract Computer Facilities.

A proposal highlighting the required hardware and software for the implementation of the EDMS shall be submitted with the system proposal.

4.10 Training of the Electronic Document Management System (EDMS)

- (a) The Contractor shall provide training to Employer and Supervising Officer for the use of EDMS.

4.11 Licence General Requirements

- (a) All software and hardware provided shall be licensed to the "HKSAR Government". All data, software and system provided and developed shall become the property of the HKSAR Government unless otherwise instructed by the Supervising Officer.
- (b) The ownership and all Intellectual Property Rights in all reports, plans, models or other particulars or things received by the Contractor from the Government or its authorised users in the course of the Contract shall be and remain vested in the Government of the HKSAR (save and except for any third party Intellectual Property Rights materials) and the Contractor shall not use any such documents, particulars or things or disclose the contents thereof to any third person, in any manner outside the course of the Contract without the prior express approval in writing of the Government of the HKSAR or the Government of HKSAR's Representative.
- (c) The Contractor shall not infringe any of the Intellectual Property Rights or any other rights

of any person by its creation, implementation and maintenance of the EDMS and shall in any event indemnify and keep the Government of the HKSAR, its authorised users, assigns and successors-in-title fully and effectively indemnified against all actions, claims, losses, damages and costs which may be sustained by Government of the HKSAR arising out of or in connection with any allegation of or claim for such infringement.

4.12 Transfer of EDMS

- (a) All the essential components, hardware, software and all necessary means, of the EDMS shall be transferred to Environmental Protection Department upon completion of the Construction works for future use of the system and document by the Environmental Protection Department. The Contractor shall submit and agree with the Supervising Officer a list of hardware and software to be transferred.

4.13 Other requirements

- (a) The design of the EDMS shall also facilitate the Contractor's softcopy submissions to the Supervising Officer. Notwithstanding the aforesaid, any direct emailing of softcopy submissions in the form of attachments shall not be allowed to avoid document control issues and overwhelming of the Supervising Officer's account. Only emails in the form of notification on the Contractor's submission to the Supervising Officer shall be allowed.
- (b) The Contractor shall also take into considerations and with the necessary provisions in his design of the EDMS to facilitate the related various aspects on the requirements of Building Information Management (BIM) from the stage of design, construction and Operation.
- (c) Any form of cloud based storage using web browser access shall have data security and data management satisfy the requirements under the relevant and applicable guidelines on cloud computing under OGCIO. Details of the cloud based service provider and all relevant details shall be submitted to the Supervising Officer for consent.
- (d) The Contractor shall also provide his solutions and the necessary provisions addressing the above requirements during the system development of the EDMS.

APPENDIX 1.08 CHECK CERTIFICATES FOR APPROVAL IN PRINCIPAL AND DETAILED DESIGN APPROVAL

(Clause 1.7 of the Employer's Requirements refers)

The Government of the Hong Kong Special Administrative Region

**Contract No. EP/SP/174/20
Food Waste Pre-treatment Facilities at Sha Tin Sewage Treatment Works**

To: The Supervising Officer pursuant to Part 1 of the Employer's Requirements.

Check Certificate for Approval In Principle

1. This Check Certificate refers to submission No. _____ which comprises
 - (a) Works covered by this Certificate
(nature and description of the submission)

in respect of :
(description of Works to which the submission refers)

 - (b) The contents of this submission are scheduled in Schedule A below and are attached to this Check Certificate.
 2. I/We certify that
- *Designer's certification**
- (a) the design of the Works, as illustrated and described in the documents scheduled in Schedule A below, complies with the Contract requirements including without limitation the Employer's Requirements and the Contractor's Plan.
 - (b) an in-house check has been undertaken and completed to confirm the completeness, adequacy and validity of the design of the Works as illustrated and described in documents scheduled in Schedule A below, and
 - (c) all necessary and required approvals relating to the design of the Works, as illustrated and described in the documents scheduled in Schedule A below, have been obtained.

Signed :

for

(name of designer)

(name)

(position/designation)

(date)

3. I/We certify that

Contractor's certification

- (a) the above Check Certificate is issued by the designer on the basis that it has exercised all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in the performance of its duties relating to the preparation, review, checking and certification of design of the Works.
- (b) I/We endorse the content of the above Check Certificate.

Signed : _____
for _____

(name of Contractor)
(name)
(position/designation)
(date)

4. I/We certify that

Design Checker's certification

- (a) I/We certify that the design has been independently checked using all reasonable skill and care and that I/we am/are satisfied that the design checked complies in all respects with the terms and conditions of the Contract.
- (b) I/We am/are satisfied that the detailed design of
(Name of structure or works)

can commence.

- (c) I/We further certify that I am/we are satisfied that the checking of the above design is completed.

Signed : _____
for _____

(name of Design Checker)
(name)
(position/designation)
(date)

* Where the Contractor is the designer the Contractor shall complete both the declaration for the Contractor and for the designer.

Schedule A

Submission No. _____ comprises the following

Documents: *(Title, reference number and revision)*

Drawings: *(Title, drawing number and revision)*

Others: _____

(Contractor to bind and attach all documents, drawings and copies of necessary and required approvals associated with this Check Certificate)

The Government of the Hong Kong Special Administrative Region

Contract No. EP/SP/174/20
Food Waste Pre-treatment Facilities at Sha Tin Sewage Treatment Works

To: The Supervising Officer pursuant to Part 1 of the Employer's Requirements

Check Certificate for Detailed Design Approval

1. This Check Certificate refers to submission No. _____ which comprises
 - (a) **Works covered by this Certificate**
(nature and description of the submission)

in respect of :
(description of Works to which the submission refers)

 - (b) The contents of this submission are scheduled in Schedule A below and are attached to this Check Certificate.
 - (c)# This submission is made with special reference to:

(# delete if not required)
 2. I/We certify that
- *Designer's certification**
- (a) the design of the Works, as illustrated and described in the documents scheduled in Schedule A below, complies with the Contract requirements including without limitation the Employer's Requirements, the Contractor's Plan, the submission no(s). _____ for which an Approval in Principle that has been issued together with any conditions and comments pertaining thereto.
 - (b) an in-house check has been undertaken and completed to confirm the completeness, adequacy and validity of the design of the Works as illustrated and described in documents scheduled in Schedule A below, and
 - (c) all necessary and required approvals relating to the design of the Works, as illustrated and described in the documents scheduled in Schedule A below, have been obtained and copies of such approvals are annexed at Schedule B below.

Signed : _____
for _____

(name of designer)
(name)
(position/designation)
(date)

3. I/We certify that

Contractor's certification

- (a) the above Check Certificate is issued by the designer on the basis that it has exercised all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in the performance of its duties relating to the preparation, review, checking and certification of design of the Works.
- (b) I/We endorse the content of the above Check Certificate.

Signed : _____
for _____

(name of Contractor)
(name)
(position/designation)
(date)

4. I/We certify that

Design Checker's certification

- (a) I/We certify that the design has been independently checked using all reasonable skill and care and that I/we am/are satisfied that the design checked complies in all respects with the terms and conditions of the Contract.
- (b) I/We am/are satisfied that the construction of
(Name of structure or works)

can commence.

- (c) I/We further certify that I am/we are satisfied that the checking of the above design is completed.

Signed : _____
for _____

(name of Design Checker)
(name)
(position/designation)

- * Where the Contractor is the designer the Contractor shall complete both the declaration for the Contractor and for the designer.

Schedule A

Submission No. _____ comprises the following

Documents: *(Title, reference number and revision)*

Drawings: *(Title, drawing number and revision)*

Others: _____

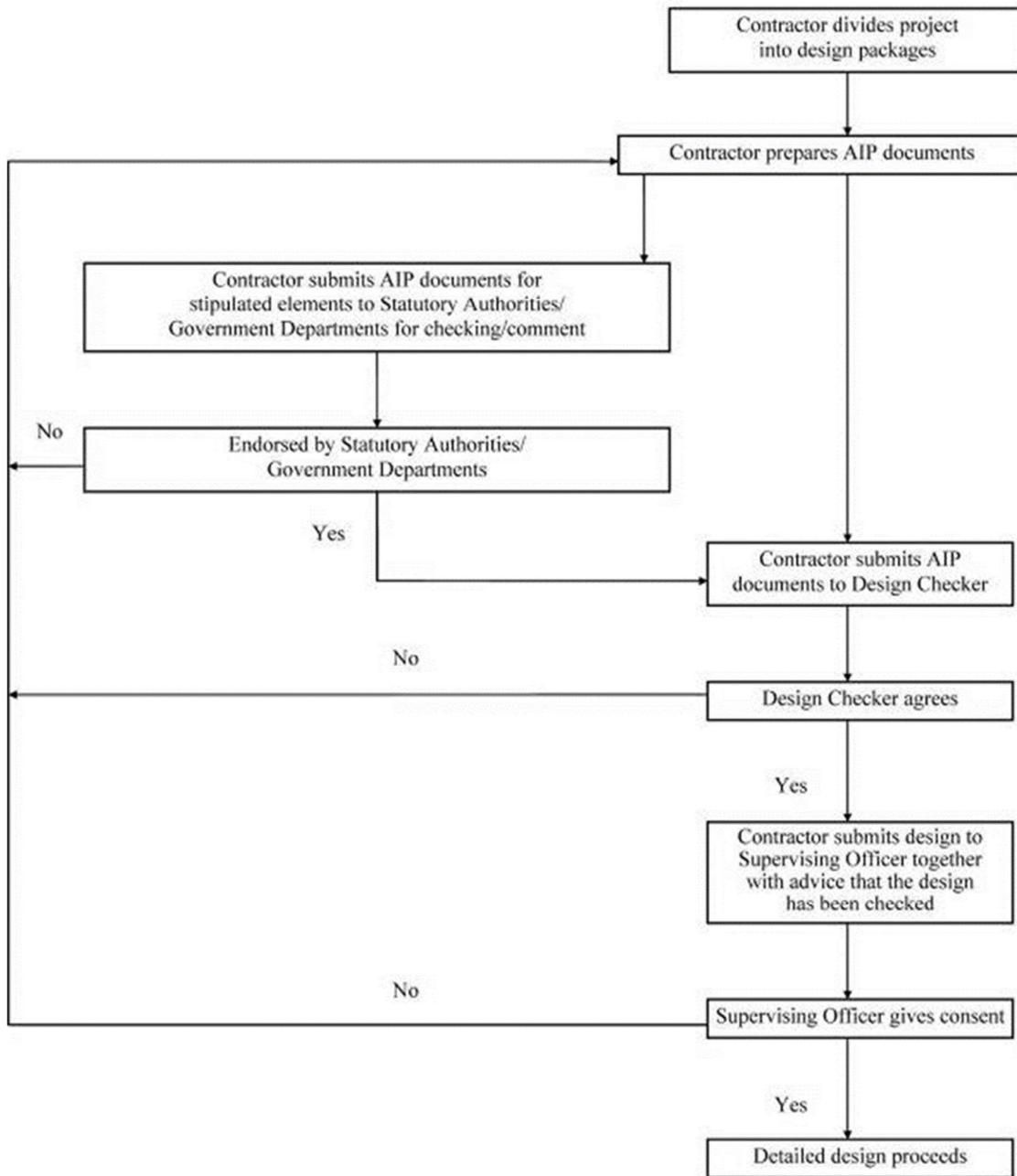
Schedule B

Approvals from: *(List of Government Departments or Statutory Authorities)*

(Contractor to bind and attach all documents, drawings and copies of necessary and required approvals associated with this Check Certificate)

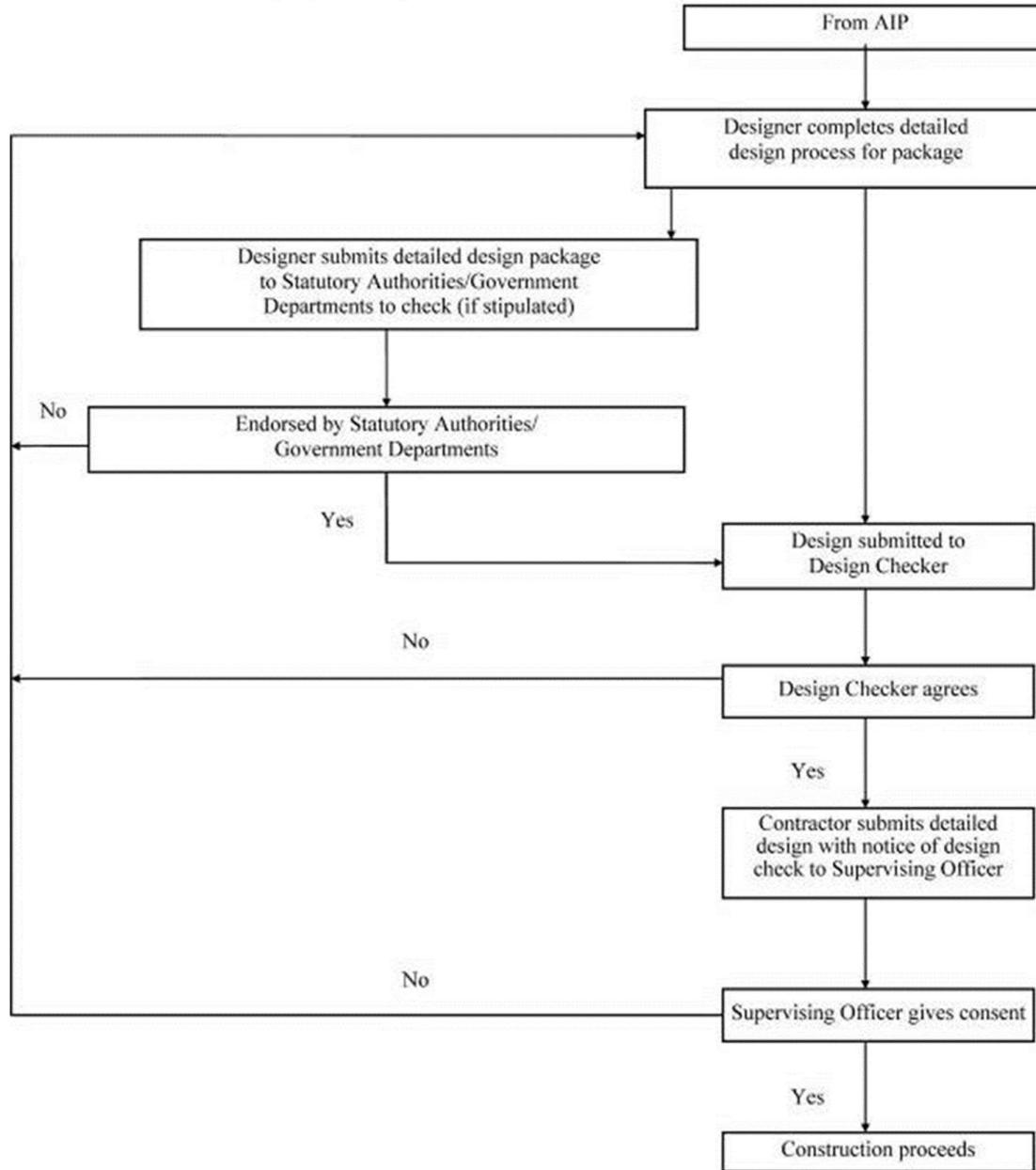
APPENDIX 1.09 FLOWCHART FOR AIP SUBMISSIONS

(Clause 1.7.1B of the Employer's Requirements refers)



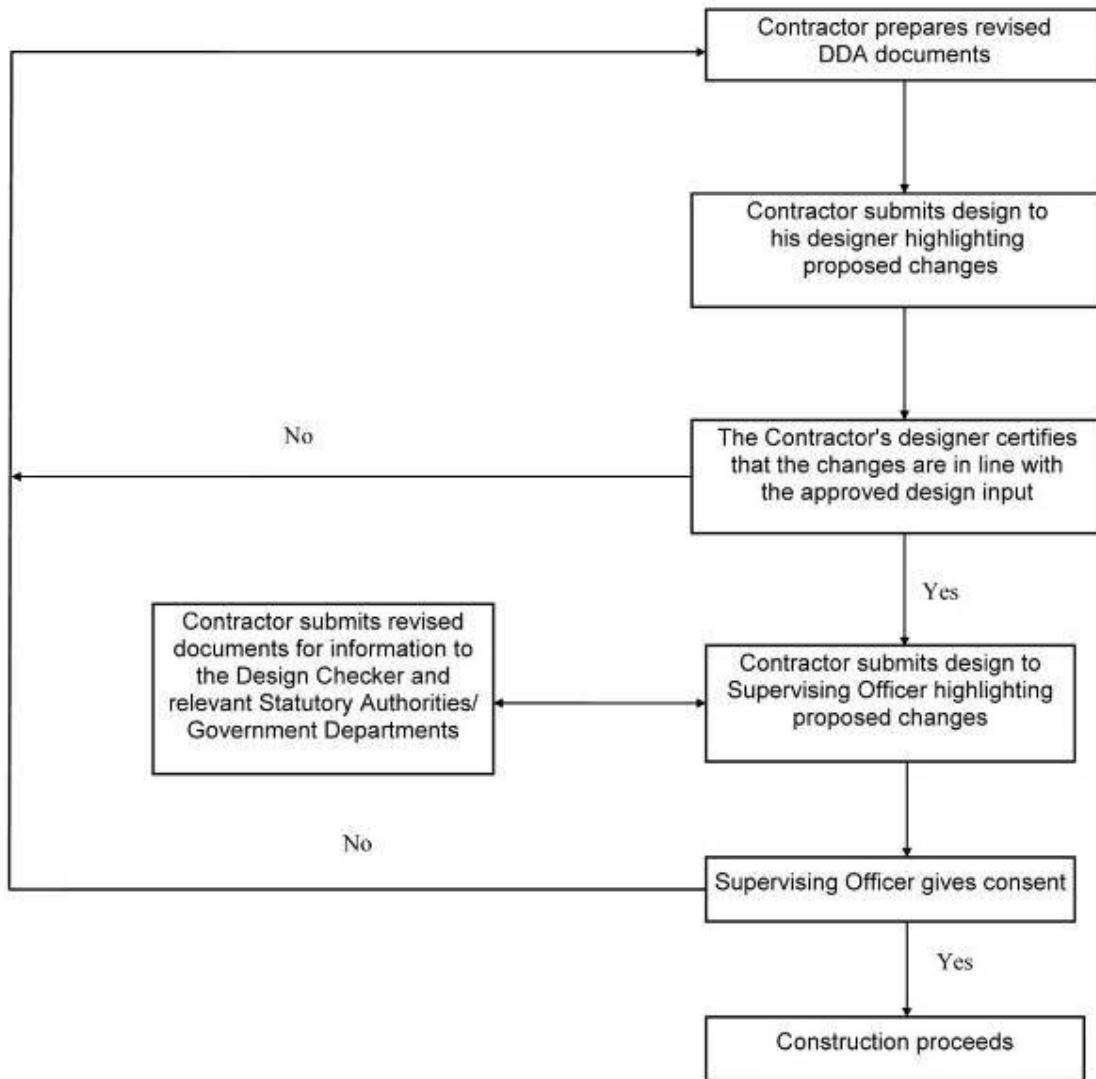
APPENDIX 1.10 FLOWCHART FOR DDA SUBMISSIONS

(Clause 1.7.1C of the Employer's Requirements refers)



APPENDIX 1.11 FLOWCHART FOR MINOR CHANGES TO DDA SUBMISSIONS

(Clause 1.7.1E of the Employer's Requirements refers)



APPENDIX 1.12 SAMPLE FOR QUALITY CHECK FORM

(Clause 1.7.4A of the Employer's Requirements refers)

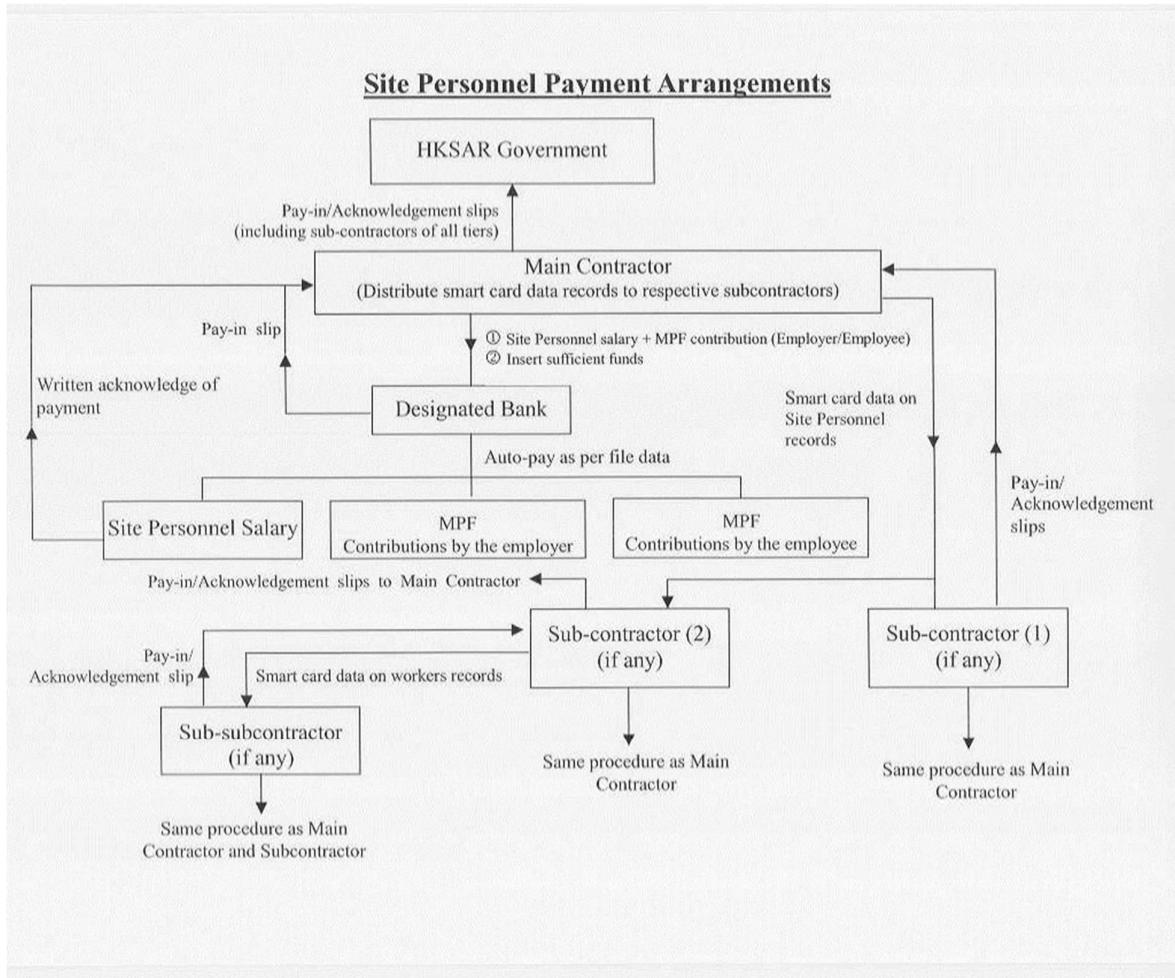
QUALITY CHECK FORM (Page 1 of 2)

ENVIRONMENTAL PROTECTION DEPARTMENT THE HONG KONG SAR GOVERNMENT	DATE: FORM NO:
FOOD WASTE PRE-TREATMENT FACILITIES AT SHA TIN SEWAGE TREATMENT WORKS CONTRACT NO EP/SP/174/20	
PART A: To Be Completed by Contractor	
Element No & Rev:	
Element Title:	Attachments: Yes/No
Type of Inspection: _____ _____	
Location: _____ _____	
Date: _____	Time: _____
Other Related Quality Check Forms No(s):	
Signed: _____	Position: _____
Name: _____	Organization: _____ (Contractor)
Date: _____	Time: _____
PART B: To be Completed by Design Checker	
Design Checker is to Witness Inspection?	Yes/No
Inspection _____ (Contractor)	Location: _____
Date: _____	Time: _____
Results of Inspection:	
<i>Satisfactory</i> <i>Satisfactory with Comments</i> <i>Satisfactory with Comments, please resubmit</i> <i>Unsatisfactory</i>	NCR Ref.:
Inspection Comments:	
NCR cleared on:	Witnessed: YES/NO
Signed: _____	Position: _____
Name: _____	Organization: _____ (Design Checker)
Date: _____	Time: _____

QUALITY CHECK FORM (Page 2 of 2)

APPENDIX 1.13 SITE PERSONNEL PAYMENT ARRANGEMENTS

(Clause 1.29.10 of the Employer's Requirements refers)



APPENDIX 1.14 DAILY RECORD SUMMARY

(Clause 1.29.13 of the Employer's Requirements refers)

“Daily Record Summary” to record daily disposal of construction & demolition (C&D) materials from the *Site “每日逕載記錄報表” 記錄每日由*地盤所傾卸的拆卸物料											
(1) Contract no. & title 合約編號及名稱 : _____ (2) Date of disposal 傾卸日期: _____ (3) Disposal ground (s) designated in the Contract or directed by the Architect/Engineer 合約指定或建築師/工程師指示接收設施: (a) _____ (b) _____ Others 其它											
(4) Approved alternative disposal grounds 另可接受的接收設施											
CHIT/ DDF no. 裝運入帳 拆卸物 料逕載 記錄單 編號	Vehicle registration mark 車輛登記號碼	Approx. vol (e.g. Full/Three Quarter/Half/One quarter) 大約承載量 (例如全、 3/4、半、1/4)	C&D materials type (e.g. inert or non-inert) 建築廢料種類 (例如惰性 或非惰性)	Disposal ground 接收設施	Signature & Name of the Contractor's Designated person before departure 於離開地盤時 間前，承建商的指 定人仕姓名及 簽名	Departure time from *Site 離開地盤時 間	Signature & name of the Architect/Engineer's supervisory staff before departure or other time as agreed between the Architect/Engineer's Representative and the Contractor ¹ 於離開地盤前或其它時間承建商與建築師/工程師代表同意的時間：建築師/ 工程師監管人員姓名及簽名	Actual disposal ground 真正接收設施	Arrival time at disposal ground 抵達接收設施 時間	Remarks 備註:	

Part 1¹甲部

Submitted by 呈交：
Signature 簽名：
Date 日期：
Received by 接收：
Post 職位：
Date & Time 日期及時間：

Part 2² 乙部

[Name of Contractor's Designated Person
承建商的指定人仕姓名]
[Name and signature of the
Architect/Engineer's staff]
建築師/工程師監管人員姓名及簽名

APPENDIX 1.15 SAMPLE OF DELIVERY CHIT

(Clause 1.29.13 of the Employer's Requirements refers)

**香港法例第354章廢物處置條例
廢物處置(建築廢物處置收費)規例
Waste Disposal Ordinance (Chapter 354)
Waste Disposal (Charges for Disposal of Construction Waste) Regulation**

**載運入帳票
CHIT**

入帳票編號: Chit No.: 選擇「 <input checked="" type="checkbox"/> 」一個打明設施: Tick (✓) One Prescribed Facility: <input type="checkbox"/> 垃圾區 <input type="checkbox"/> 清潔分類設施 Landfills Sorting Facilities <input type="checkbox"/> 公眾填料接收設施 Public Fill Reception Facilities <input type="checkbox"/> 遠島廢物轉運設施 Outlying Islands Transfer Facilities 車牌號碼 Vehicle Registration Mark:	入帳票編號: Chit No.: 選擇「 <input checked="" type="checkbox"/> 」一個打明設施: Tick (✓) One Prescribed Facility: <input type="checkbox"/> 垃圾區 <input type="checkbox"/> 清潔分類設施 Landfills Sorting Facilities <input type="checkbox"/> 公眾填料接收設施 Public Fill Reception Facilities <input type="checkbox"/> 遠島廢物轉運設施 Outlying Islands Transfer Facilities 車牌號碼 Vehicle Registration Mark:	車牌號碼: Vehicle Registration Mark: 使用日期: Date of Use: 簽發人: Issued by: 建築廢物產生地點: Construction Waste Generated Site:	有效期至: Valid Until: 建築物產生地點: Construction Waste Generated Site: 帳戶名稱: Name of the Account-holder:
E 199279	帳戶編號: Account No.: 甲部份: 由帳戶主保留 Part A: retained by Account-holder	帳戶編號: Account No.: 乙部份: 由廢物運輸商保留 Part B: retained by Waste Hauler	CEDD Civil Engineering and Development Department 丙部份: 由政府保留 Part C: retained by Government

APPENDIX 1.16 SAMPLE OF DISPOSAL DELIVERY FORM

(Clause 1.29.13 of the Employer's Requirements refers)

Sample of the Disposal Delivery Form (DDF) for Disposal of C&D Materials at Disposal Grounds (Other than Prescribed Facilities) as Designated in the Contract or as Directed by the Supervising Officer, or Alternative Disposal Grounds Proposed by the Contractor and Approved by the Supervising Officer.

Serial No. 0012345678	Serial No. 0012345678	
Date of Use: 使用日期: _____	Construction and Demolition Materials Disposal Delivery Form 拆建物料運載記錄票	
Disposal Ground : 接收設施: _____	Contract No: _____	Contract Title: _____
Vehicle Registration Mark. : 車牌號碼: _____	合約編號: _____	合約名稱: _____
Issued By: 簽發: _____	Date of Use: 使用日期: _____	Time of departure from site: 離開地盤時間: _____
Vehicle Registration Mark: 車牌號碼: _____		
Disposal Ground: 接收設施: _____		
Arrival Time/Date: 抵達日期/時間: _____ <i>(This part retained by Disposal Ground) (此部分由接收設施保留)</i>		
Chop of Disposal Ground 接收設施蓋印	Chop of Disposal Ground Representative 接收設施蓋印	Chop of Engineer's/Architect's 工程師 / 建築師代表蓋印

APPENDIX 1.17 PROCEDURE FOR ENSURING THE SAFETY OF LIFTING EQUIPMENT

(Clause 1.24.15 of the Employer's Requirements refers)

1. General

- 1.1 This procedure applies to all slings, shackles and such-like equipment that are required to be certified by regulation.
- 1.2 This procedure shall apply to the Contractor and all sub-contractors working on the Site. The Contractor shall ensure that each sub-contractor on site receives a copy of the procedure.
- 1.3 The Contractor shall distribute a copy of the procedure to his equipment suppliers and shall ensure that all his suppliers use only certified lifting equipment on the Site. Such equipment will not feature on the Site Lifting Gear Register (the Register) if it is only present on a temporary basis during loading/unloading of plant, equipment or materials.

2. Arrival on the Site

- 2.1 Upon arrival on the Site, all contractors shall ensure that their lifting equipment is properly certified and identifiable (i.e. any stamping is legible). If it is not certified or the stamping is not legible, then the equipment shall be quarantined and shall not be used until such time as it has been tested and the required certificates can be provided.
- 2.2 Sub-contractors shall report to the Contractor's Safety Officer (SO) who shall ensure that the certification and the stamping are satisfactory, before entering the equipment in the Register and painting the equipment with the appropriate colour (see para. 3.1 below). The Register shall include the due date for re-examination of the equipment.

3. Routine Monitoring

- 3.1 A colour coding system shall be in use for the calendar months as noted below

January	-	February	-	March:	Blue
April	-	May	-	June:	Yellow
July	-	August	-	September:	Green
October	-	November	-	December:	Orange

To be removed from the Site: Red

Equipment in quarantine in the Contractor's central yard: White

- 3.2 The Contractor and the sub-contractors shall familiarise themselves with the colour for that month and ensure that personnel in their charge use only equipment painted in the appropriate colour.
- 3.3 On the last working day of each month (except as noted in 3.5) the SO shall update the Register and shall issue copies of the updated Register to all sub-contractors on site. The Contractor and the sub-contractors shall then check all equipment on their batches for compatibility with the Register ensuring that the stamping is still legible and the colouring is appropriate. Any equipment in doubt shall be removed from the working area and delivered to the Contractor's central yard whereupon the sub-contractors will be required to have it quarantined, re-certified or scrapped as appropriate. The SO or Safety Supervisors shall ensure that the equipment in

quarantine is painted white.

- 3.4 During day-to-day operations, it is the responsibility of all concerned to ensure that proper lifting equipment is used. Any irregularity shall be immediately reported to the SO who shall then take action as necessary.
- 3.5 On the following days of each year, or as soon thereafter as practicable but in any event within 14 days, all lifting equipment shall be inspected by the SO who shall also check the validity of the certificates as stipulated in the Factories & Industrial Undertakings (Lifting Appliances & Lifting Gear) Regulations (hereinafter referred to as FIU(LA & LG)).

The days are 31st March,
30th June,
30th September, and
31st December.

Upon satisfactory inspection and certification, the SO shall ensure that the said equipment is painted with the new colour in accordance with paragraph 3.1 of this Appendix and make a record in the Register accordingly.

- 3.6 The SO shall be responsible for ensuring that all equipment is painted with the appropriate colour and an updated Register of such equipment is kept. The SO shall be advised to take appropriate action in the event of any deviation from the standard colour coding as revealed in routine monitoring carried out in accordance with paragraphs 3.3 and 3.4 of this Appendix to the Employer's Requirements. Any equipment in obvious faulty conditions shall be painted red and the Contractor shall make arrangements for its immediate removal from the Site.
- 3.7 The colour coding procedure does not absolve the Contractor of his duty under the FIU(LA & LG) Regulations to have all his or his sub-contractors' lifting equipment examined every six months by Registered Professional Supervising Officers.

4. Removal from the Site

- 4.1 From time to time, or upon completion of his work, a sub-contractor may need to remove equipment from the Site. The SO shall be notified of any such removal and shall then update the Register accordingly.
- 4.2 Any removed equipment brought back to the Site shall be treated in the same way as detailed in Section 2 of this Appendix to the Employer's Requirements.

APPENDIX 1.18 NOT USED

APPENDIX 1.19 RECORD OF HAZARD IDENTIFICATION ACTIVITY (HIA) MEETING

(Clause 1.24.17(a) of the Employer's Requirements refers)

Contract No.: _____ Name of Contractor:
Contract Title: _____

Team Reference (<i>if appropriate</i>):	
Date :	Time :
Potential Hazards/Irregularities/Unsafe Acts or Unsafe Conditions	Safety Precautionary Measures/Rectification Actions/Improvement Actions
Name of Leader :	
Signature :	Position :

(Please complete one sheet for one HIA Meeting)

APPENDIX 1.20 DETAILED REQUIREMENTS ON SUPPORT UTILITY SERVICES

(Clause 1.24.19(a) of the Employer's Requirements refers)

DETAILED REQUIREMENTS ON SUPPORT UTILITY SERVICES

Standard Requirements on Support of Utility Services
For Reference in Audit Inspection of Highways
(Version 7 dated 15/2/2007)

UU	Type of Services	Maximum Separation of Supports
CLP Power Hong Kong Ltd. (CLP) Hong Kong Tramways Ltd. (HKTL) The Hongkong Electric Co., Ltd. (HEC)	33kV and below power cables (with or without duct) 132kV and above power cables (with or without duct), cable joint and/or concrete cable slab protection covers. Communication or pilot cables (with or without duct) Power overhead line tower/pole, stay and tramway overhead line pole Tram track Other installations (such as distribution/transformer pillar, manhole, underground pit, gas pipe, ash duct (PFA) and joint bay concrete structure)	Maximum 1 metre interval. Not allowed to be exposed/supported without prior approval of CLP/HEC. (The standard support of maximum 1 metre interval cannot be applied.) Maximum 1 metre interval. Not allowed without prior approval of CLP/HEC/HKTL. Not allowed without prior approval of HKTL. Not allowed without prior approval of CLP/HEC/HKTL.
Highways Department/Street Lighting (HyD/St Lgt)	Public street lighting cables (with or without duct) Other installation (such as lighting column, public lighting controller)	Maximum 2 metres interval. Not allowed without prior approval of HyD/St Lgt.

UU	Type of Services	Maximum Separation of Supports
The Hong Kong and China Gas Co., Ltd. (HKCG)	Ductile iron pipe and galvanized iron pipe	Maximum 2.2 metres interval.
	Polyethylene (PE) pipe	Maximum 1 metre interval for pipes less than 250mm in diameter. Maximum 2 metres interval for pipes of 250mm or above in diameter.
	Steel pipe	Minimum 1 support for exposed pipeline less than 2 metres in length, otherwise at least 2 supports at maximum 8m interval.
Water Supplies Department (WSD)	Mild steel pipe	Support at every joint and at maximum 2 metres interval.
	DI pipe	Support at every joint and at maximum 2 metres interval.
	GI pipe/Lined GI pipe	Support at every joint and at maximum 2 metres interval.
	CI pipe	Support at every joint and at maximum 1 metre interval.
	Asbestos cement pipe	Support at every joint and at maximum 1 metre interval.
	PE pipe	Support at every joint and at maximum 1 metre interval.
	UPVC pipe	Support at every joint and at maximum 1 metre interval.
	Cables	Support at maximum 1 metre interval.
	Valves	Should not be disturbed or exposed without providing proper support and WSD's prior agreement.
	Valve chambers	
	Thrust blocks	
Hong Kong Broadband Networks Ltd. (HKBN) Hong Kong Cable Television Ltd. (HCK) Hutchison Global Communications Ltd. (HGC) New World Telecommunications Ltd. (NWT) PCCW Ltd. (PCCW) Towngas Telecom (TGT) Wharf T&T Ltd. (WTT)	Telecom optical fibre cables with ducts	Maximum 1.5 metre interval except for PCCW. (For PCCW's optical fibre cables with ducts, prior approval by PCCW is required.)
	Telecom copper cables with ducts	Maximum 1.5 metre interval.
	Telecom cables without ducts	Maximum 1.5 metre interval.
	Telecom cable joint	Not allowed without prior approval of HKBN/HKC/HGC/NWT/PCCW/TGT/WTT.
	Telecom joint chamber (underground pit)	Not allowed without prior approval of HKBN/HKC/HGC/NWT/PCCW/TGT/WTT.
	Drainage pipes	Support at every joint and at maximum 1.5 metre interval.
	Drainage manholes	Not allowed without prior approval of DSD/ HyD/U.

Note: The Contractor shall comply this latest version document together with its relevant appendices in HyD website.

APPENDIX 1.21 SAFETY PRECAUTIONS WHEN WORKING IN SEWERS, DRAINS AND OTHER ENCLOSED SPACES WHERE FOUL OR EXPLOSIVE GASES MAY BE ENCOUNTERED

(Clause 1.24.21(b) of the Employer's Requirements refers)

1. **Responsibility**

The person-in-charge (e.g. foreman or gang leader) of the confined space operation shall be full time on Site and should ensure that:

- (a) detailed working procedures and safety precautions are drawn up for the work being carried out;
- (b) all workmen are provided with adequate training and information on the personal hygiene and health precautions, the use of personal protective equipment etc;
- (c) all workmen are instructed in the working procedures and safety precautions to be followed;
- (d) equipment is provided in sufficient quantities and readily available in serviceable condition at the scene for immediate use so that the working procedures and safety precautions can be followed;
- (e) the working procedures and safety precautions are correctly carried out;
- (f) the requirements of the Factories and Industrial Undertakings (Confined Spaces) Regulation, which came into operation on 19.6.2000, and other requirements stated in the Contract are strictly complied with;
- (g) a DCP is appointed to carry out risk assessment of the working environment and the works to be carried out in the confined space and make recommendations on measures to be taken in relation to safety and health of workmen when work is to be undertaken, and he shall not be the certified worker in the same confined space operation;
- (h) no workmen enter or work in the confined space other than certified workers (For the purpose of this Contract, a certified worker refer to a person who possesses the valid qualification of certified worker pursuant to s.2 and s.4(1) of the Factories and Industrial Undertakings (Confined Spaces) Regulation and simultaneously holds a valid "Certificate for Certified Workers" as stated in 1.24.8(l) of the Employer's Requirements (refer to hereinafter as "DCW"));
- (i) he shall attend the Site and shall not leave the Site until all persons entering the confined space have left that space and return to the open atmosphere; and
- (j) he shall not be a person entering the confined space to carry out any work thereat throughout his discharge of duties in that operation.

The DCP shall:

- (a) attend the Site and shall not leave the Site until all persons entering the confined space have left that space and return to the open atmosphere;

- (b) have sufficient knowledge and experience in supervising the work in confined space appointed by the Contractor and accepted by the Supervising Officer;
- (c) carry out risk assessment of the working environment and the works to be carried out in the confined space and make recommendations on measures to be taken in relation to safety and health of workmen when work is to be undertaken in compliance with the Factories and Industrial Undertakings (Confined Spaces) Regulations; and
- (d) not be a person entering the confined space to carry out any work thereat throughout his discharge of duties in that operation .

The Contractor's representative (e.g. sub agent or safety officer) shall:

- (a) be directly and wholly employed by the Contractor;
- (b) be authorized by the Contractor to endorse the risk assessment and issue / void the Permit for the work to be proceeded in the confined space ;
- (c) be responsible for determining the continuation / suspension / resuming of confined space operation at the onset of / during / after adverse weather conditions and / or the lowering of adverse weather warning signals;
- (d) attend the Site and shall not leave the Site until all persons entering the confined space have left that space and return to the open atmosphere; and
- (e) not enter the confined space to carry out any work thereat throughout his discharge of duties in that operation.

2.

Safety Equipment

- (a) Every gang working in manholes, sewers, storm water drains and other confined space must check that they have the following safety equipment readily available in a serviceable condition at the scene in addition to normal working tools:-
 - sufficient number of gas detection apparatus (NB: At least 1 no. of gas detection apparatus shall be carried into the confined space to continuously monitor the atmosphere therein.)
 - 1 No. of dead-man type audio-visual personal alarm, maintaining in active operating mode throughout his/her stay in that space, for each person entering the confined space to alert those staying outside. (WARNING: The dead-man type personal alarm emits "rescue signal" rather than "warning signal for danger detected". Its major use is for locating the victim in a rescue. The dead-man type alarm shall never be relied upon, whether knowingly or unknowingly, as an alarm of danger detected because serious harm could have already been done to the person wearing it before it is activated.)
 - 1 No. of safety harness for each workmen.
 - 1 No. of lifeline for each workmen, each 15m long.
 - 1 No. of man-lifting tripod, or other lifting equipment approved by the Supervising Officer.
 - 1 No. of first aid kit.
 - 1 No. of crowbar.
 - Sufficient sets of spark-proof / explosion-proof lamp or torch.
 - soap, antiseptic and an adequate supply of clean water.

- 3 Nos. of safety chains, each 3 m long.
 - Other than those to be used by personnel entering the confined space, minimum 1 set of standby approved type of breathing apparatus (BA) shall be ready available at the scene for immediate use at each job location / work front in case of emergency (NB: The nos. of BA required in each shift of operation should be sufficient to cater for the extent, time to be spent and the nos. of personnel to enter into the confined space).
 - Effective two-way communication device (e.g. spark-proof / explosion-proof walkie talkie or microphone and speaker).
 - 1 set of resuscitation equipment.
 - 1 No. of mechanical blower.
 - 1 No. of stretcher.
 - 1 set of fire fighting equipment.
- (b) Each workman shall be provided with protective headgear, helmet, goggles, hearing protection, a pair of industrial gloves, rubber boots and other protective clothing as required by the working environment and the nature of the works to be carried out.
- (c) The weather condition should be checked and under continuous monitoring by those personnel staying outside the confined space.
- (d) Zoom / CCTV camera shall be set up at manholes or end of pipeline for real-time monitoring of the condition of workers staying in the confined space where direct line of sight between the standby person at the entrance of that space and the person entering that space is impossible.

3. **General Precautions**

- (a) Prohibit smoking, naked lights, fires or internal combustion engine (diesel generator set) located near to any entrance to manholes, drains, sewers or nullahs and only spark-proof / explosion-proof lamp or torch are to be used anywhere below ground level or inside confined space.
- (b) Unhealed cuts or scratches, however, must be covered by impermeable plaster.
- (c) Any abrasion, scratch or cut, no matter how slight, must be cleaned immediately and dressed with antiseptic gauze and impermeable plaster.
- (d) Before eating and after changing clothing, all men should wash their hands and forearms with soap and water containing disinfectant.
- (e) Use caution and common sense at all times.

4. **Precautions Before Commencing Work**

- (a) Check that all safety equipment is readily available and in serviceable condition.
- (b) Check the position and likelihood of exceptional discharges or any influx of dangerous substances, either vapour/gases or liquid, from factories and other places affecting the area in which the gang is working.
- (c) Check that the sewers, drains, manholes, confined space, etc., in which the gang is working, is structurally stable.

- (d) Locate nearest telephone for summoning assistance in case of an emergency.
- (e) Ventilate the area to be worked by opening the manhole covers and if necessary by providing forced ventilation. At least one manhole upstream and one manhole downstream of the length of sewer or drain being worked / inspected should be opened in addition to those on the length being worked / inspected.
- (f) All open manholes shall be marked with Danger Notice Boards and guarded at all sides so that vehicles and persons are kept well clear.
- (g) Proper temporary traffic arrangement (TTA) and lighting, signing and guarding shall be provided.
- (h) Alternative confined space exit point(s) is practicably available and imminently serviceable for evacuation / escape purpose. The location(s) and route(s) to reach these exit point(s) shall be made known to all personnel concerned before the commencement of each shift of man-entry confined space operation. These exit point(s) shall be opened and illuminated throughout each operation.

5. Before Entering Manholes, Sewers or Drains

- (a) Standby persons shall be full time on Site and stationed at those points where workmen are entering or leaving a manhole, sewer, drains and other confined space as may be necessary for safety.
- (b) After a sufficient period (at least half an hour) has elapsed for the sewer, drain, manhole and other confined space to be ventilated, a gas detection apparatus shall be lowered into that space to test whether or not it is safe for workmen to enter.
- (c) If working inside conduits is required, a gas detection apparatus shall be placed inside the concerned part of the conduits to test whether or not it is safe for personnel to enter.
- (d) Even though the gas tests indicate safe conditions, if there is a peculiar smell or if there are any suspicious circumstances workmen must not enter the sewer, drain, manhole or confined space.
- (e) Clean down the manhole shaft and step irons or access ladder.
- (f) Check any other works activities being implemented in the vicinity that may affect the safety of the workmen staying inside the sewer, drain, manhole or confined space.
- (g) Set up a man-lifting tripod, or other lifting equipment approved by the Supervising Officer, for holding lifelines. The tripod need not sit directly over the manhole or entrance / exit point during the works but must be placed in the vicinity such that it will be ready available for rescue purpose in case of emergency.

6. Duties of Standby Persons

Standby persons are responsible for ensuring the safety of all personnel staying in the confined space and should:

- (a) keep in touch with the personnel staying in the confined space via suitable two-way

communication device at reasonable intervals, normally not more than every 2 minutes (Direct calling/shouting is not encouraged and the Contractor is required to explore and formulate alternative more effective means of communication before the commencement of confined space operation);

- (b) ensure the lifelines are holding firmly on a man-lifting tripod, or other lifting equipment approved by the Supervising Officer, pay out and reel in the lifelines as required, so that at all times the lifeline can be used in an emergency;
- (c) in the event of a warning being received that working environment is likely to become dangerous, or if they themselves suspect danger, instruct all personnel staying in the confined space to return to the open atmosphere immediately;
- (d) be on the lookout for signs of danger including:
 - (i) sudden increases in flow,
 - (ii) heavy rain falling in the area or upstream, and
 - (iii) signs of hot or peculiar smelling discharges;
- (e) ensure all confined space including manholes etc. required for ventilation are kept open;
- (f) prohibit smoking and ensure that no naked lights, fires and internal combustion engine (diesel generator set) are located near to the confined space openings;
- (g) check that all personnel have returned to the open atmosphere on completion of the operation and that all manhole covers are properly reinstated;
- (h) not be the person-in-charge nor the Contractor's representative; and
- (i) not be a person entering the confined space to carry out any work thereat throughout his discharge of duties in that operation.

7. **Men Working in Manholes, Sewers and Drains**

All persons staying in manholes, sewers, drains and other confined space should:

- (a) be DCW;
- (b) wear adequate protective clothing and safety harness with lifeline;
- (c) keep in touch with the standby persons and obey any instructions given by them;
- (d) carry a gas detector with them and perform continuous gas monitoring throughout the period of stay;
- (e) wear a dead-man type personal alarm, maintaining in active operating mode throughout his/her stay in that space;
- (f) place safety chains etc. in manholes where facilities are provided for them; in particular downstream of the area being worked;

- (g) avoid stirring up silt and check frequently for gas when this is unavoidable;
- (h) be on the lookout for signs of danger including:
 - (i) sudden increases in flow,
 - (ii) signs of hot or peculiar smelling discharges,
 - (iii) signs of gas shown by the gas detector equipment, and
 - (iv) tiredness, faintness, headaches;
- (i) return to the open atmosphere immediately when the working environment become dangerous or weather condition become worsen;
- (j) observe procedures implemented by the person-in-charge of the confined space operation;
- (k) observe instructions and advice and attend training provided by the person-in-charge of the confined space operation; and
- (l) make full and proper use of, and forthwith report to the person-in-charge of the confined space operation any fault or defect in, any safety equipment or emergency facilities provided.

8. **In an Emergency**

- (a) In the event of physical injury, first aid should be given and the injured person must be brought out of the manhole, sewer, drain or confined space as quickly as possible, care being taken not to aggravate the injury. Depending upon the seriousness of the injury, the person-in-charge must decide whether medical or other assistance is required.
- (b) In the event of a person collapse in the sewer, drain, manhole or confined space, any personnel with him/her must warn the top person and unless they are able to drag the casualty clear at once, leave the sewer, drain, manhole or confined space as quickly as possible.

NO FURTHER RESCUE ATTEMPT SHOULD BE MADE WITHOUT BREATHING APPARATUS and help must be summoned AS QUICKLY AS POSSIBLE by dialing 999 and asking for FIRE CONTROL.

APPENDIX 1.22 PROFORMA FOR WEEKLY ENVIRONMENTAL WALK

(Clause 1.24.22 of the Employer's Requirements refers)

Weekly Environmental Walk Inspection Report Summary of Follow-up Actions

Part I:

Contract No. _____

Contract Title _____

Date of Inspection _____ Time _____

Persons making the inspection:

	Name in Block Letters	Designation	Signature
1.		Contractor's Agent (or his representative if agreed by Employer)	
2.		Not used	
3.		Supervising Officer	

Item No.	Location	Situation Requiring Action	Follow-up	Agreed Due Date for Completion	Date Completed	Remarks

To be signed at the end of inspection:

The Contractor's performance on nuisance abatement and waste management *is/is not to the satisfaction of the Design Checker's nominated site representative at the time of inspection. (* delete as appropriate)

Supervising Officer _____
Contractor's Agent or his representative _____

Part II: (To be countersigned after ALL actions are completed)

Contractor's Agent or his
representative _____ Supervising
Officer _____
Date _____ Date _____

APPENDIX 1.23 SPECIFICATION FOR WHEEL WASHING SYSTEM

(Clause 1.24.23 of the Employer's Requirements refers)

1. Wheel washing system with facilities as detailed below, shall be provided at all exit points where vehicles will be leaving the Site.
2. The facilities shall have the following characteristics:
 - (a) A space for the vehicle to stop where the washing is being done, with heavy duty metal grating capable of taking the heaviest vehicles envisaged for the Site, with a trough below for collecting wastewater, etc.;
 - (b) A system of high pressure jets by which the water is sprayed on to all exposed parts of each of all the wheels of the vehicle simultaneously;
 - (c) A pump to increase the water pressure so that the water impinges on the wheels at a reasonable force;
 - (d) Collection of wastewater in the vicinity of the washing facility to the wastewater treatment facilities of the Site, if any.
 - (e) Use of recycled water from the Site for the washing facilities.
3. The result of washing shall be to the satisfaction of the Employer or Supervising Officer. The Contractor shall submit the design of the facilities to the Employer for information prior to its set up on the Site, and shall maintain the facilities to satisfy the requirements in this specification.

APPENDIX 1.24 SPECIFICATION FOR THE MECHANICAL DUMP TRUCK COVERS

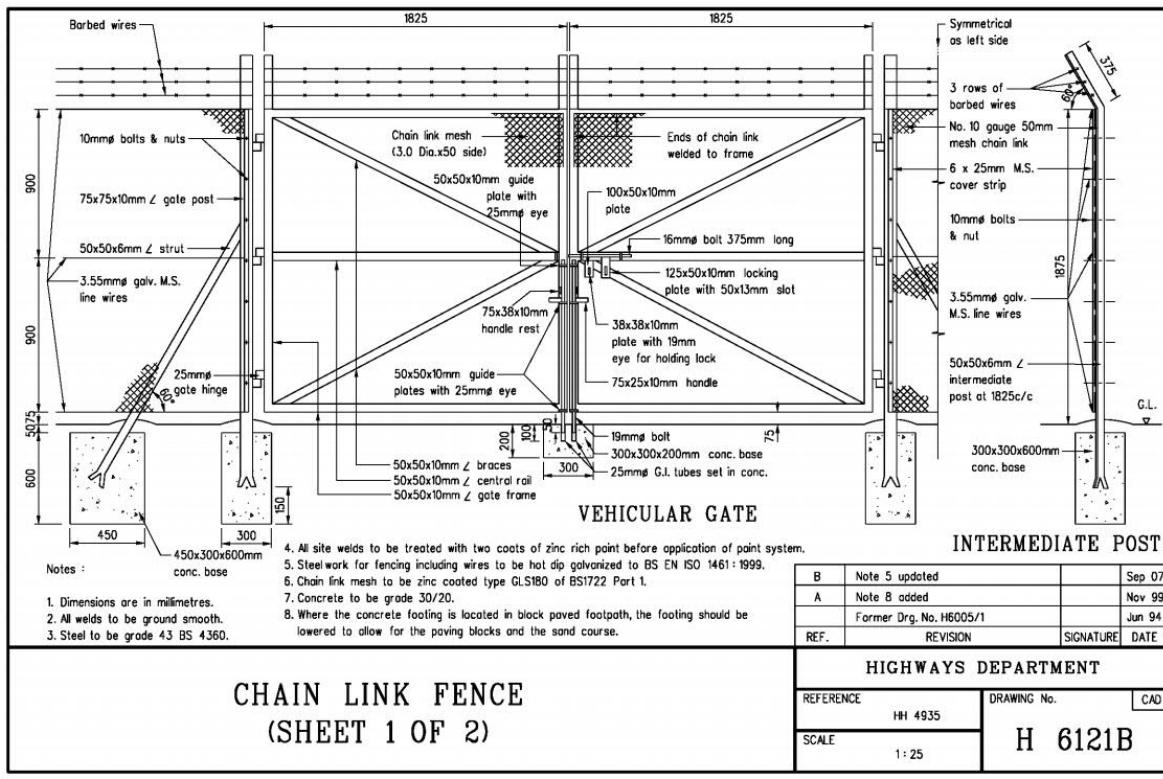
(Clause 1.24.23 of the Employer's Requirements refers)

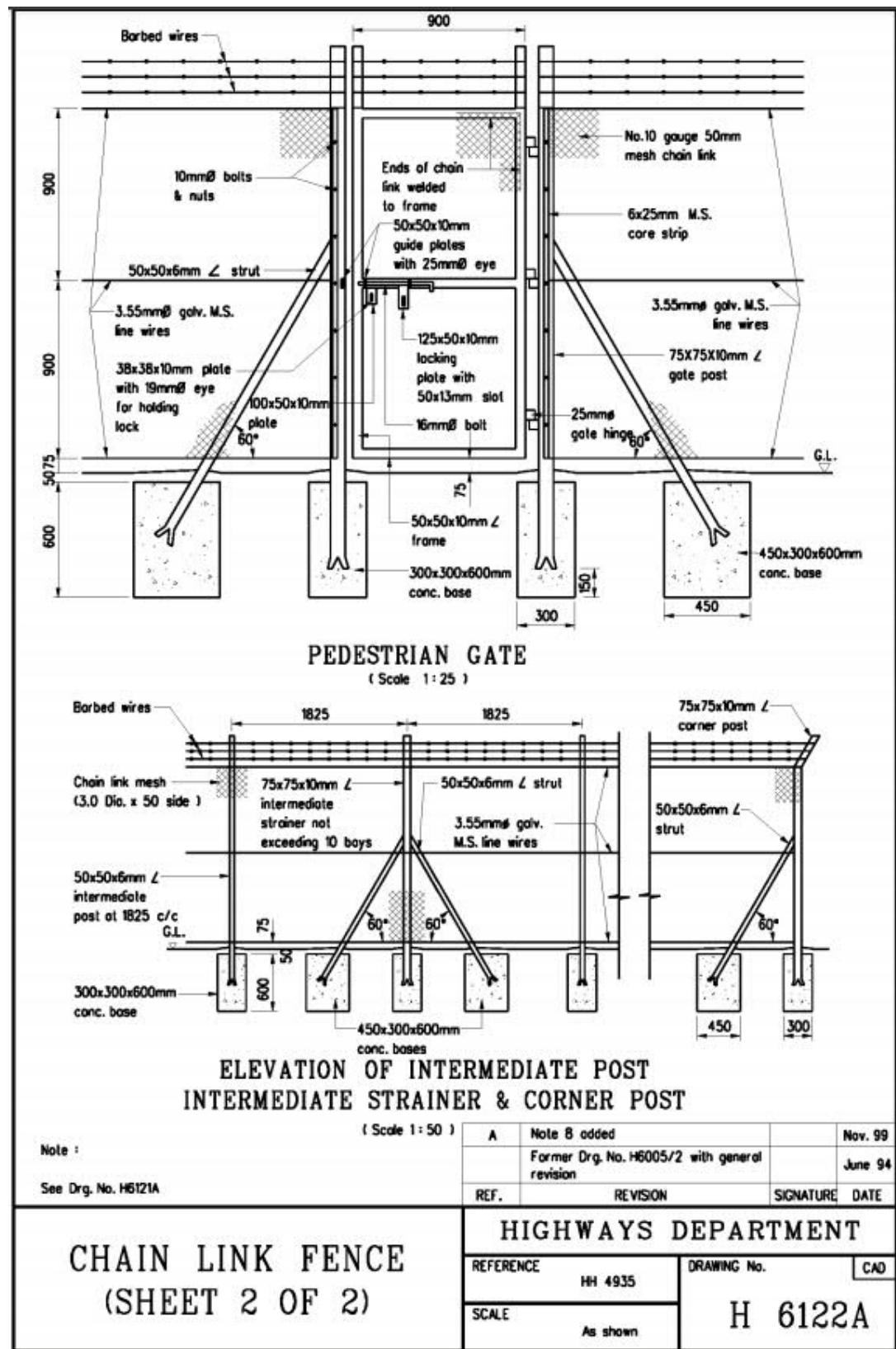
1. All C&D materials shall be delivered to the appropriate designated outlets by dump trucks fitted with covered box type dump bed. Such dump trucks shall comply with the following:
 - (a) The cover to the dump bed shall be power operated with manual backup, so that the operator would not need to climb on to the dump bed to operate the cover (both under power mode and manual mode). Operation from driver cab or with the operator standing on the ground is acceptable.
 - (b) After the cover to the dump bed is closed, any gap left on the system of enclosure should be less than 25 mm wide measured in a direction across the gap. Any remaining gap is to be sealed up tightly with a layer of nylon bristle of sufficient length to bridge across the gap.
 - (c) The Contractor shall be responsible for selecting a design of dump truck cover satisfying the above requirements without impairing the operation of the dump truck at any time. No claim by the Contractor shall be entertained for any loss of use of dump trucks as a result of complying with this specification.
 - (d) The Employer or Supervising Officer shall –
 - i) refuse entry into the Site any dump truck that fails to meet this specification; and
 - ii) require any loaded dump truck to unload its contents before leaving the Site if its dump bed and cover is found not to comply with the above requirements after loading.

Provided always that approval for leaving the Site of a loaded dump truck by the Employer or his site supervisory staff does not absolve the liability of the Contractor from complying with the relevant legislation, and no claim against the Employer will be entertained for any offence by the Contractor (or his truck drivers) in relation to transportation of the C&D materials from the Site

APPENDIX 1.25 CHAIN LINK FENCE

(Clause 1.2.1A(h) of the Employer's Requirements refers)

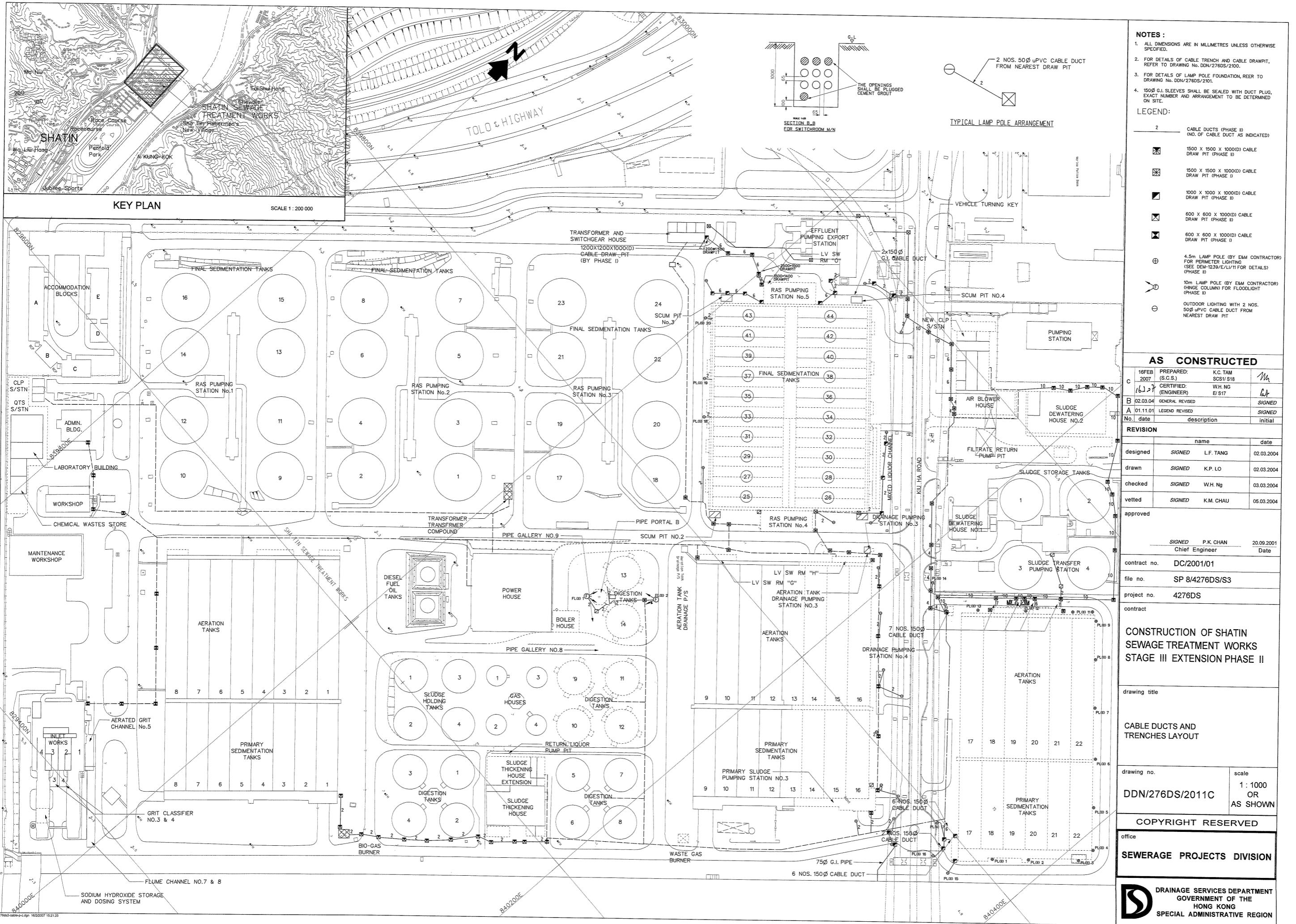


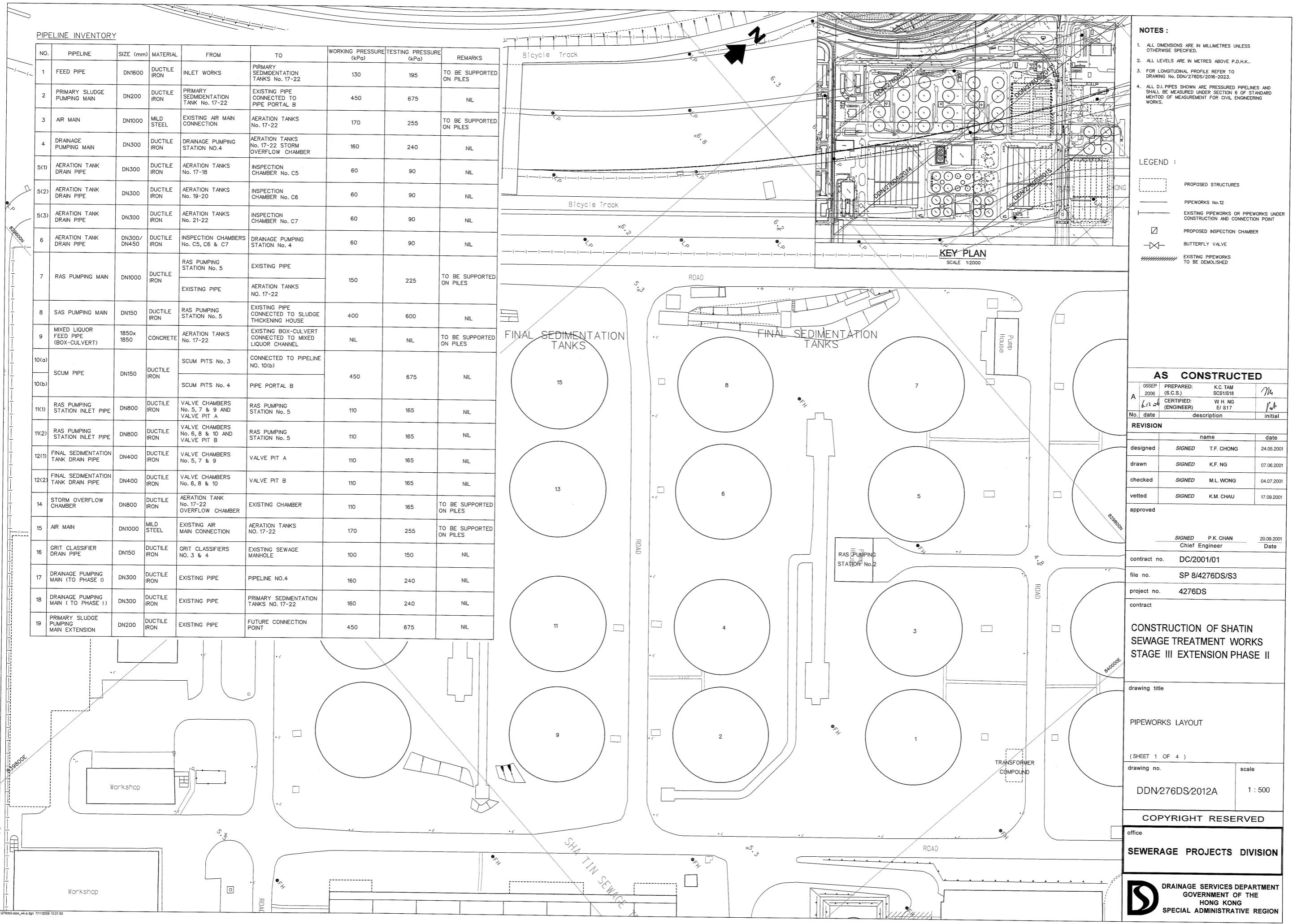


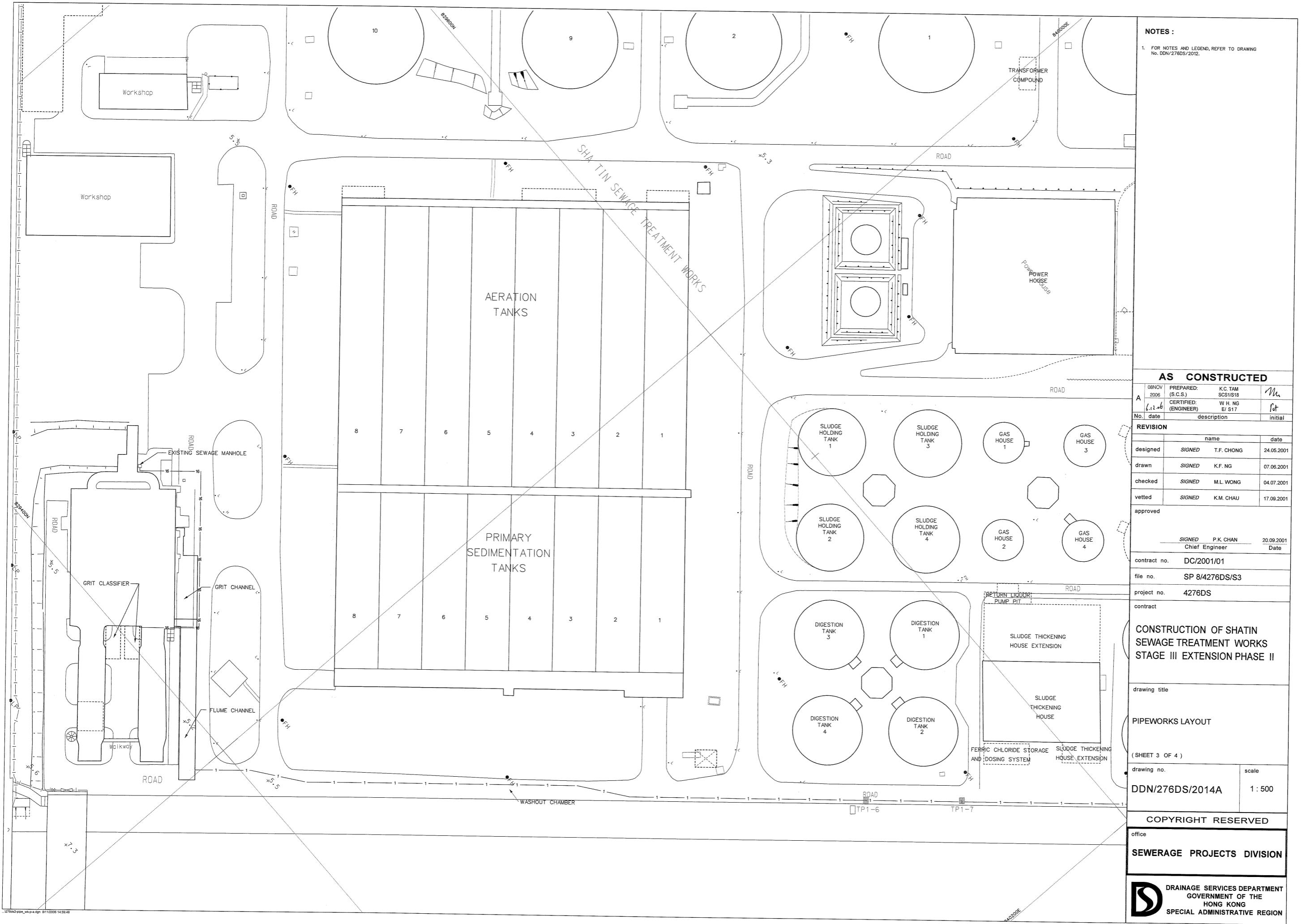
APPENDIX 1.26 RECORDS OF EXISTING UTILITIES OF THE EXISTING FACILITIES

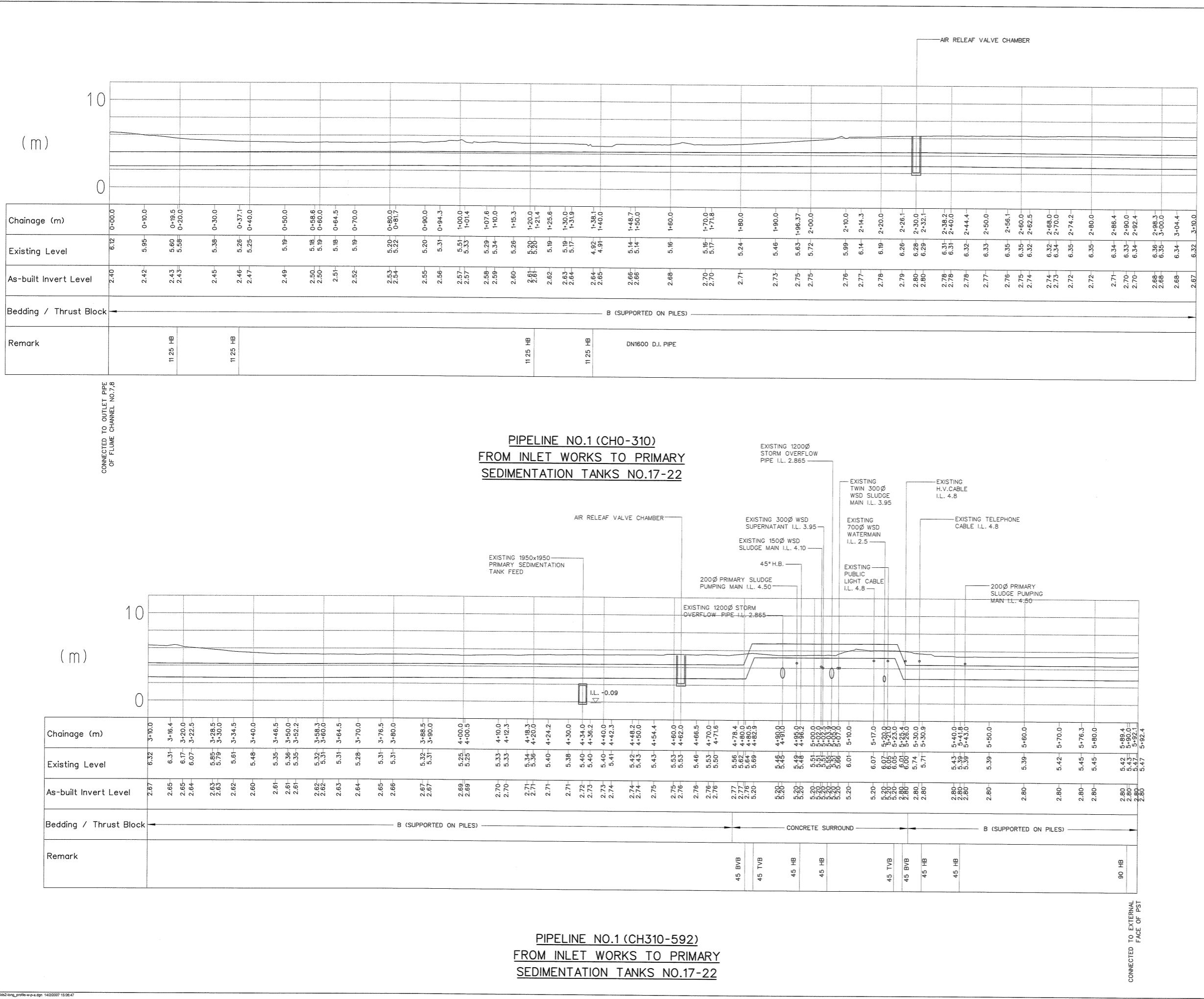
(Clause 1.2.1S(c) of the Employer's Requirements refers)

Sheet Number	Sheet Title	Page
DDN/276DS/2011C	Cable Ducts and Trenches Layout	ER-209
DDN/276DS/2012A	Pipeworks Layout (Sheet 1 of 4)	ER-210
DDN/276DS/2014A	Pipeworks Layout (Sheet 3 of 4)	ER-211
DDN/276DS/2016A	Shatin Sewerage Treatment Works Stage 3 Extension Phase II Pipeworks Longitudinal Profiles (Sheet 1 of 8)	ER-212
HAA/O/I/H501R	Sha Tin New Town Sewage Treatment Works Works Pipelines Sheet 1 Layout Plan	ER-213
HAA/O/I/H502R	Sha Tin New Town Sewage Treatment Works Works Pipelines Sheet 2 Layout Plan	ER-214
HAA/O/I/H504R	Sha Tin New Town Sewage Treatment Works Works Pipelines Sheet 4 Sections	ER-215
HAA/O/I/H520R	Sha Tin New Town Sewage Treatment Works Surface Water Drainage Pipelines Sheet 1 Layout Plan	ER-216
HAA/O/I/H521R	Sha Tin New Town Sewage Treatment Works Surface Water Drainage Pipelines Sheet 2 Layout Plan	ER-217
HAA/O/I/H525R	Sha Tin New Town Sewage Treatment Works Washwater and Potable Water Systems Sheet 1 Layout Plan	ER-218
HAA/O/I/H526R	Sha Tin New Town Sewage Treatment Works Washwater and Potable Water Systems Sheet 2 Layout Plan	ER-219









NOTES :

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

ALL LEVELS ARE IN METRES ABOVE P.D.H.K.

ALL CHANGES REFER TO HORIZONTAL DISTANCE MEASURED IN METERS ALONG THE CENTRE LINE OF THE PIPES.

ALL PIPES SHALL BE SPIGOT AND SOCKET AND ALL FITTINGS SHALL BE ALL SOCKET UNLESS OTHERWISE SPECIFIED.

GEND:

DSD CLASS B BEDDING

DSD TYPE I CONCRETE SURROUND

1. HORIZONTAL BEND

1.B. TOP VERTICAL BEND

1.B. BOTTOM VERTICAL BEND

1. THRUST BLOCK

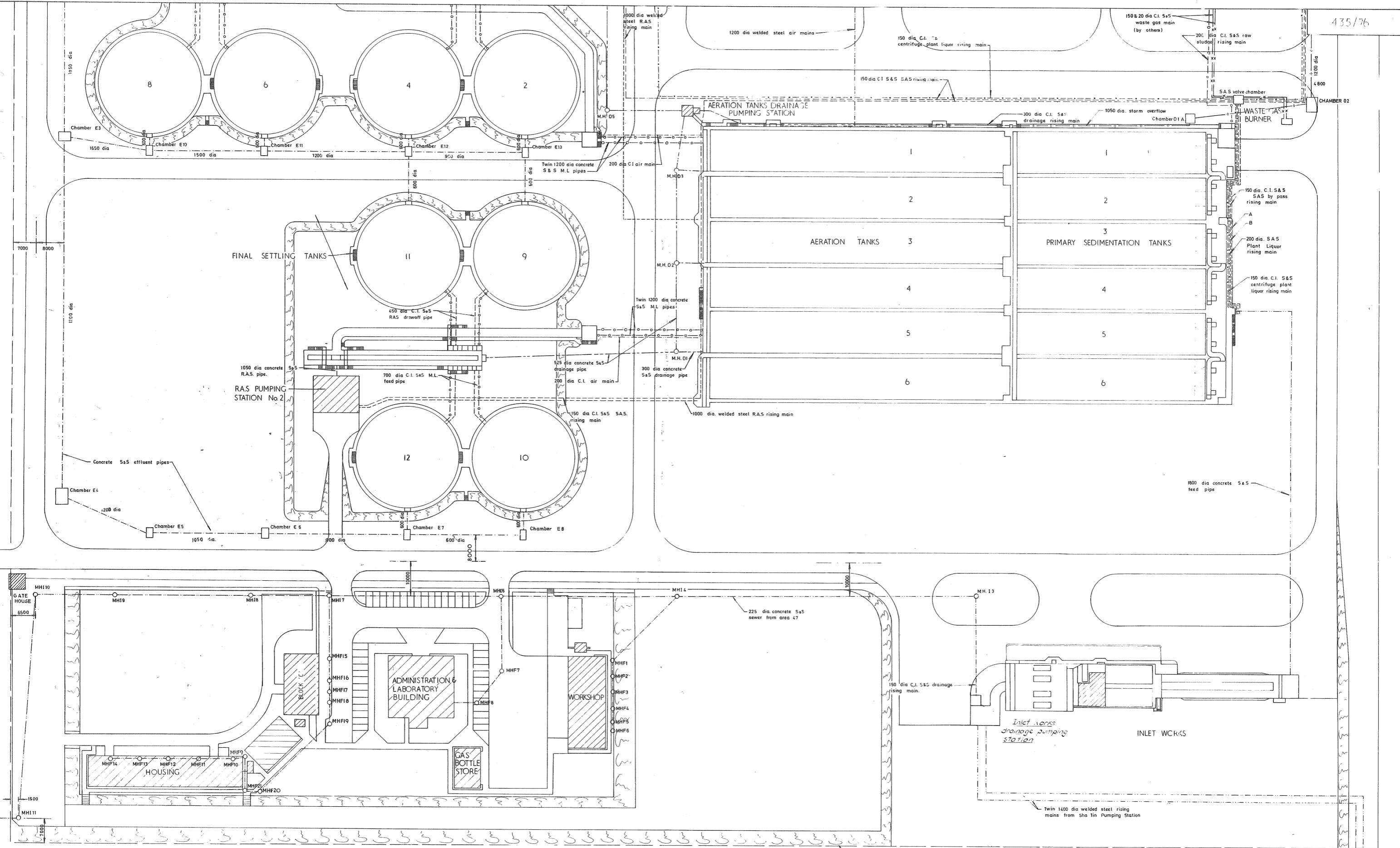
1. CONCRETE SURROUND

LARGE DISPLACEMENT EXPANSION PIPE JOINT

FLANGE ADAPTOR

RESTRAINED COUPLER

AS CONSTRUCTED			
14FEB 2006	PREPARED: (S.C.S.)	K.C. TAM SCS1/S18	<i>Vha</i>
(4.1.1- date)	CERTIFIED: (ENGINEER)	W.H. NG E/S17	<i>fch</i>
		description	initial
VISION			
	name	date	
igned	SIGNED T.F. CHONG	26.6.2001	
wn	SIGNED C.Y. MAK	18.07.2001	
cked	SIGNED M.L. WONG	20.7.2001	
ed	SIGNED K.M. CHAU	17.09.2001	
roved			
SIGNED P.K. CHAN		20.08.2001	
Chief Engineer		Date	
tract no. DC/2001/01			
no. SP8/4276DS/S3			
ect no. 4276DS			
tract			
CONSTRUCTION OF SHATIN SEWERAGE TREATMENT WORKS STAGE III EXTENSION PHASE II			
wing title			
SHATIN SEWERAGE TREATMENT WORKS STAGE 3 EXTENION PHASE II PIPEWORKS LONGITUDINAL PROFILES			
HEET 1 OF 8)			
ving no. DN/276DS/2016A		scale VERT. 1: 200 HORI. 1: 500	
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SEWERAGE PROJECTS DIVISION			
 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION			



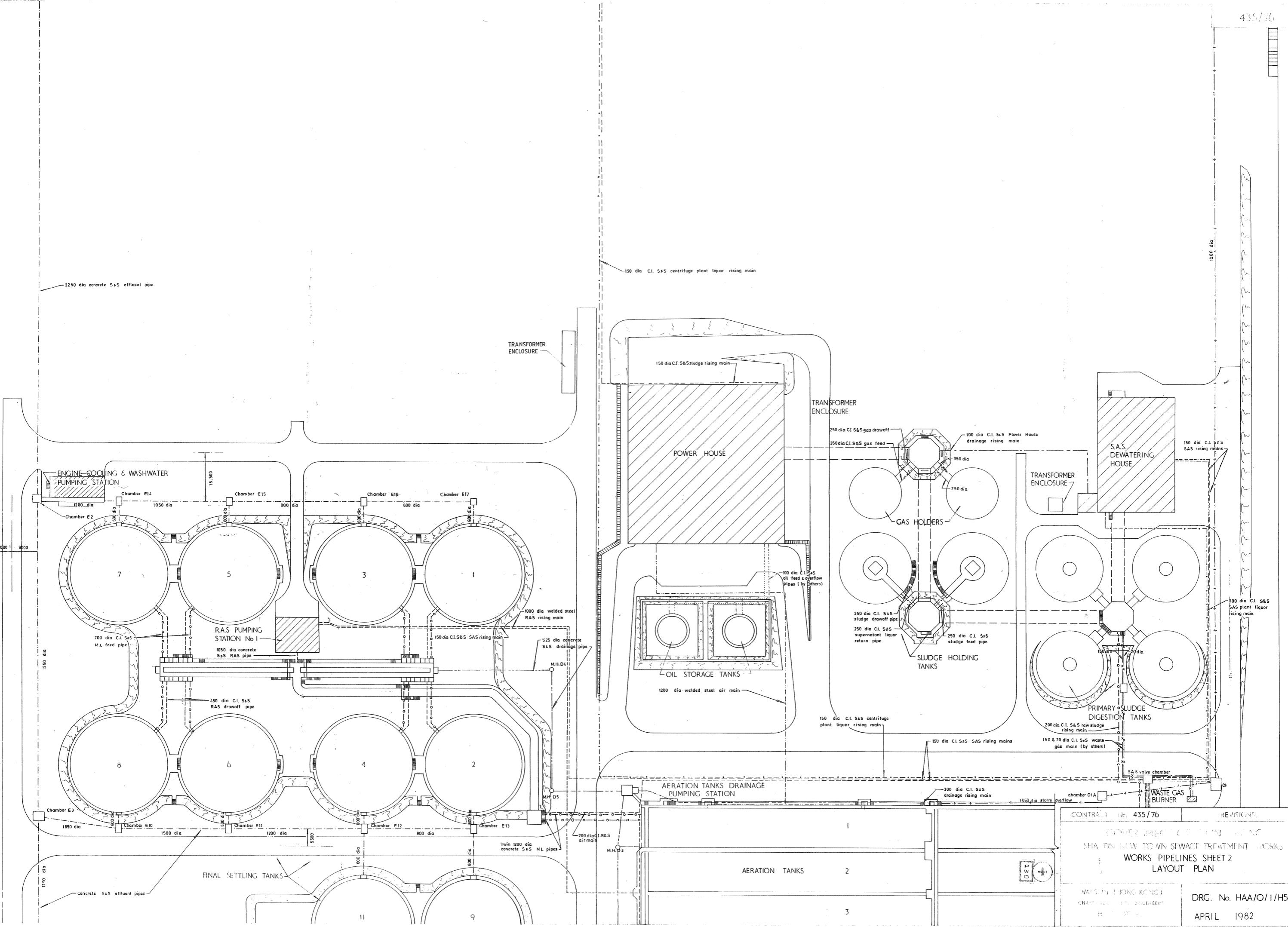
KEY

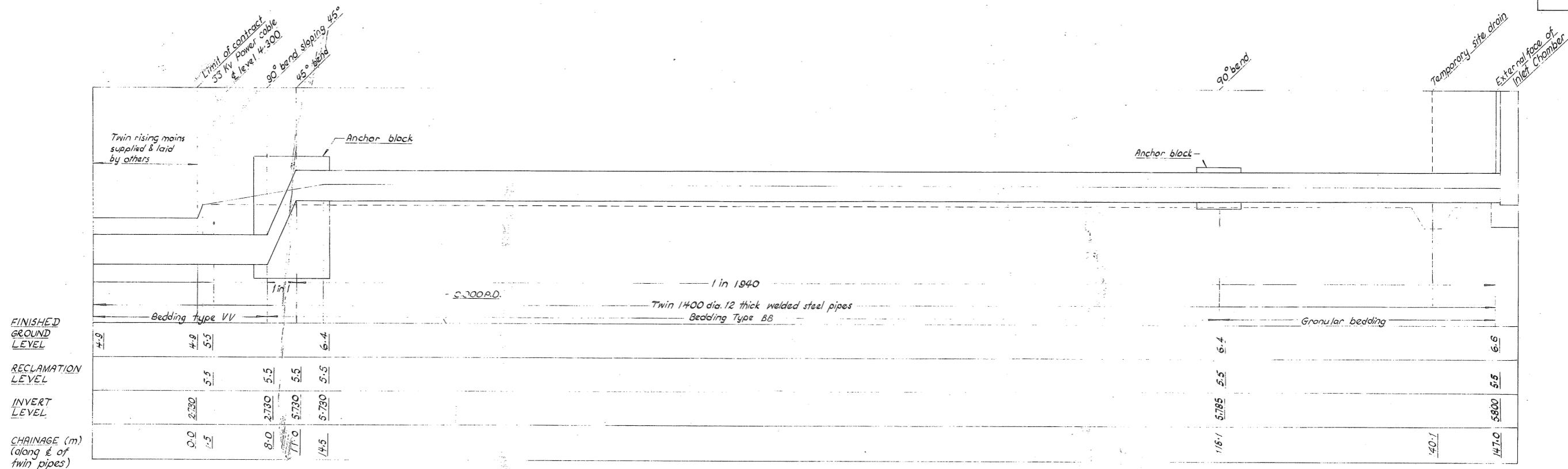
CRUDE SEWAGE	R.A.S.	RETURN ACTIVATED SLUDGE
SETTLED SEWAGE	M.L.	MIXED LIQUOR
— o — o —	S.A.S.	SURPLUS ACTIVATED SLUDGE
MIXED LIQUOR	C.I.	CAST IRON
— - - - -	S&S	SPIGOT & SOCKET
FINAL EFFLUENT		
WORKS DRAINAGE		
DECANTED LIQUORS		
CRUDE SLUDGE		
RETURN/SURPLUS ACTIVATED SLUDGE		
DIGESTED SLUDGE		
AIR		
		OIL FEED AND OVERFLOW
		X - X - WASTE GAS
		XX - XX - GATE GAS DRAWDOWN
		XXX - XXX - GAS FEED

1:500

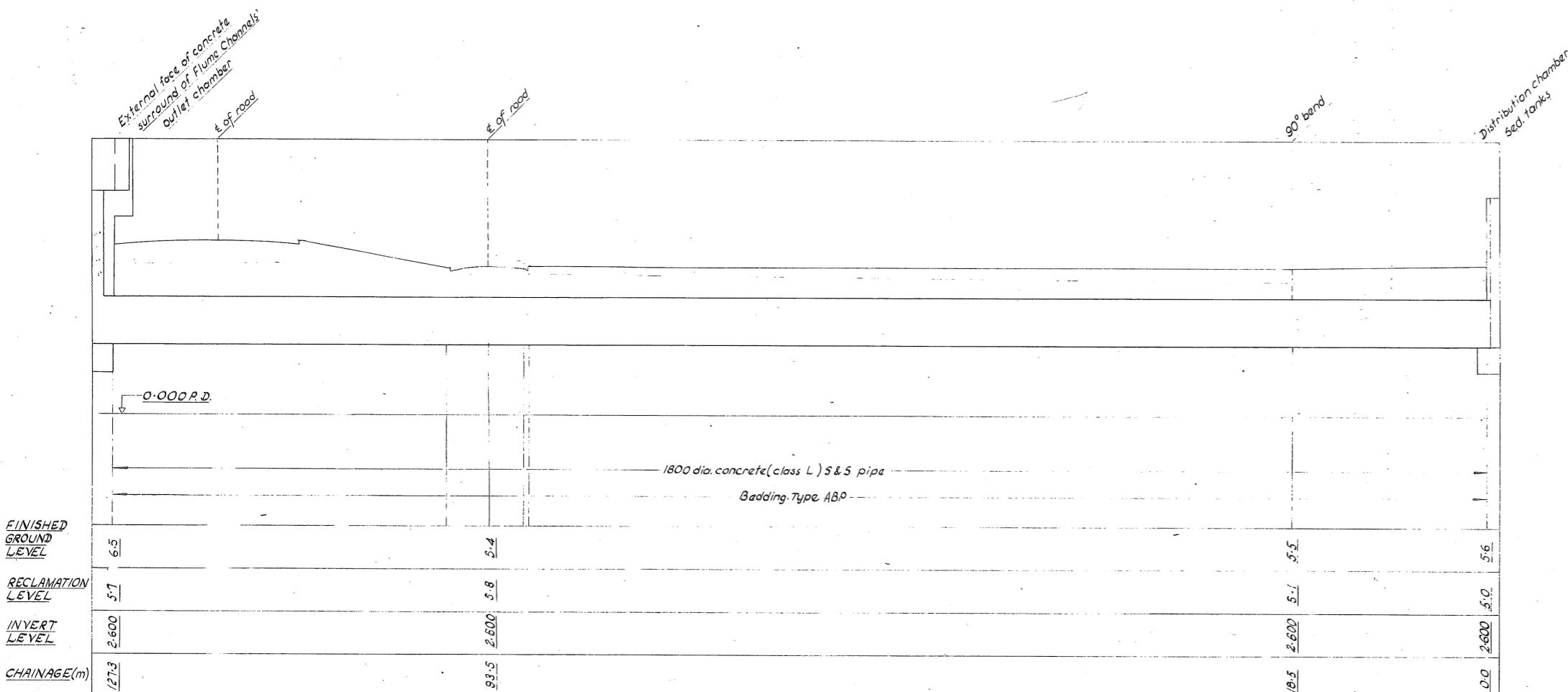


GOVERNMENT OF HONG KONG
SHA TIN NEW TOWN SEWAGE TREATMENT WORKS
WORKS PIPELINES SHEET I
LAYOUT PLAN





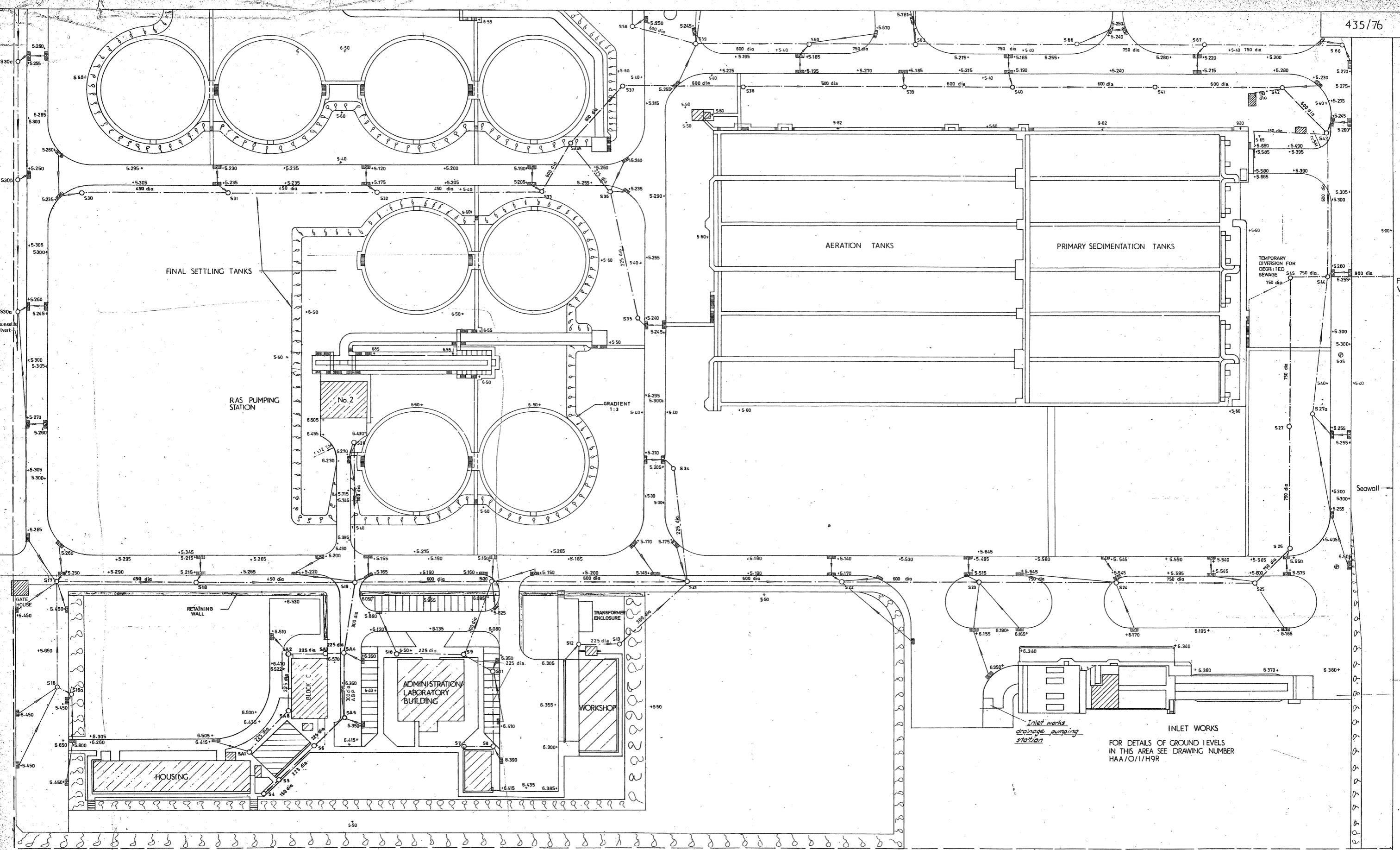
TWIN RISING MAINS FROM SHA TIN MAIN PUMPING STATION

PRIMARY SEDIMENTATION TANKS FEED
INLET WORKS — PRIMARY SEDIMENTATION TANKS

Horizontal Scale 1:250
0 10 20 m

Vertical Scale 1:100
0 1 2 3 4 5 6 7 8 9 10 m

CONTRACT No. 435 / 76	REVISIONS
GOVERNMENT OF HONG KONG	
SHA TIN NEW TOWN SEWAGE TREATMENT WORKS	
WORKS PIPELINES SHEET 4	
SECTIONS	
WATSON (HONG KONG) CHARTERED CIVIL ENGINEERS HONG KONG	DRG. No. HAA/O/1/H504R APRIL 1982



NOTE 1. ALL CONNECTING PIPES FROM GULLIES TO MANHOLES
TO BE 225 mm IN DIAMETER UNLESS OTHERWISE
SPECIFIED IN DETAIL DRAWING

Scale 1:500

0 10 0 10 20 30 40 50 m



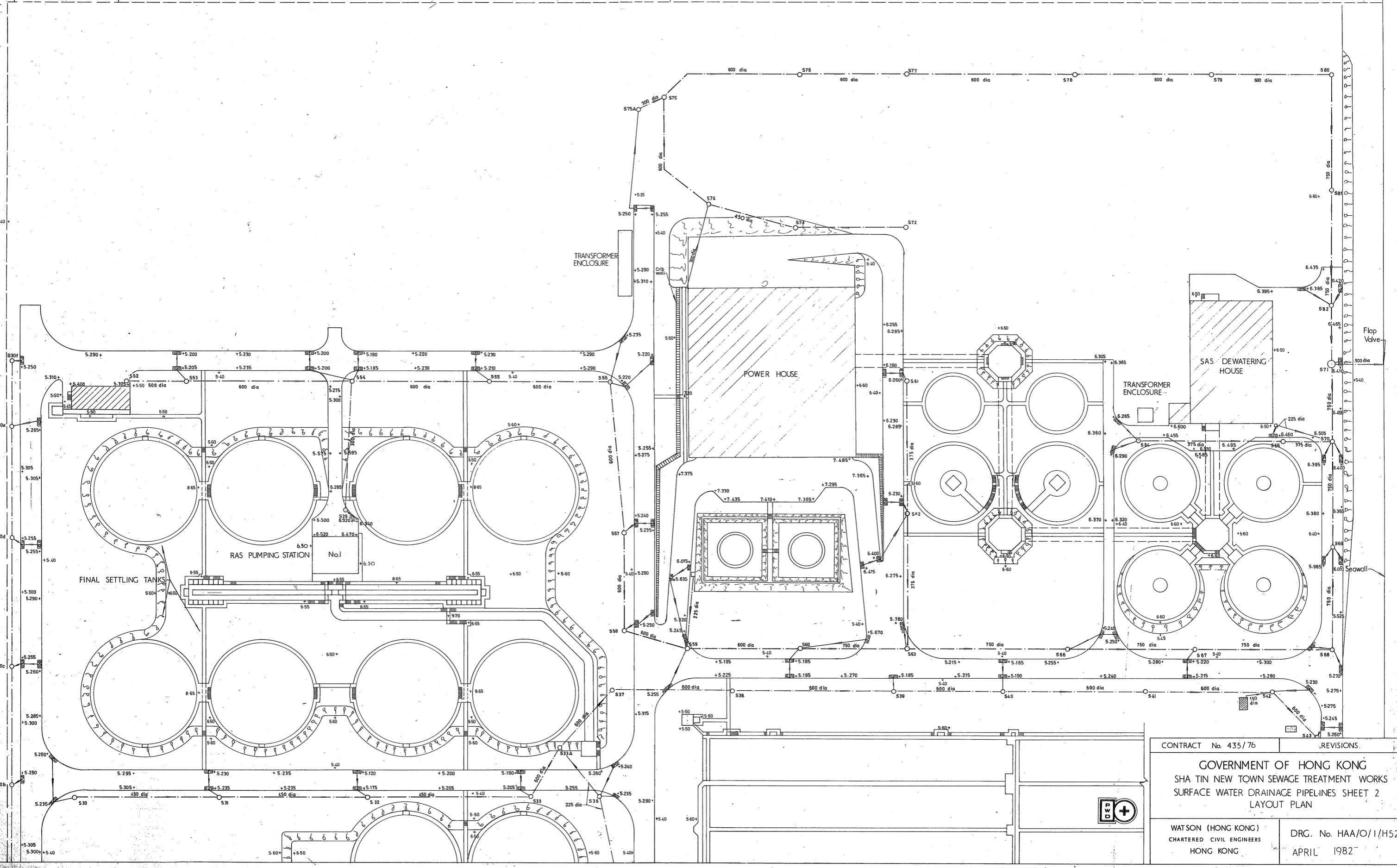
CONTRACT No. 435 / 76

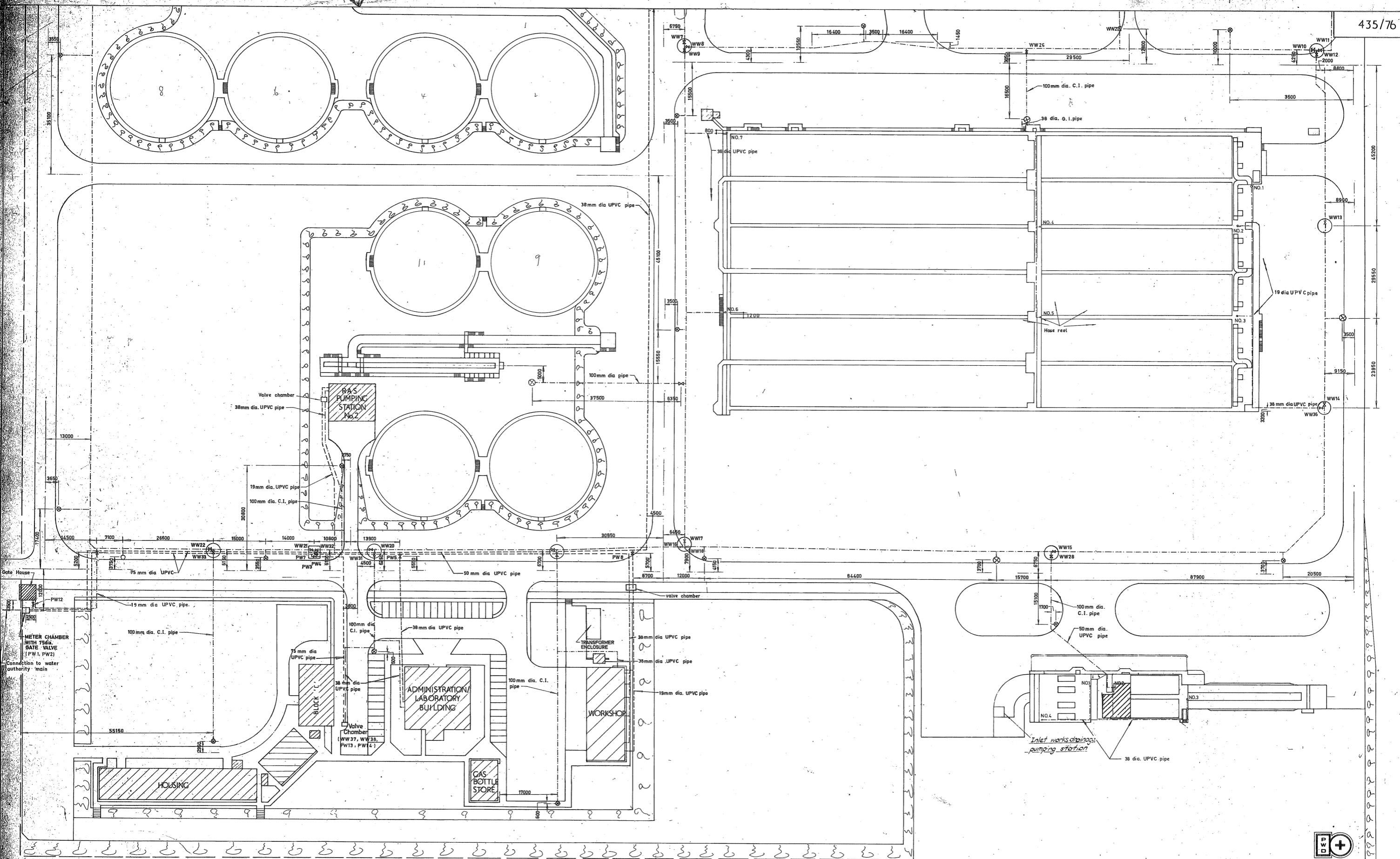
REVISIONS.

GOVERNMENT OF HONG KONG
SHA TIN NEW TOWN SEWAGE TREATMENT WORKS
SURFACE WATER DRAINAGE PIPELINES SHEET 1
LAYOUT PLAN

WATSON (HONG KONG)
CHARTERED CIVIL ENGINEERS
HONG KONG

DRG. No. HAA/O/I/H520R
APRIL 1982





Notes:

1. Minimum cover to all UPVC pipe to be 700mm.

2. All UPVC pipes to be comply with BS 3035:1968 class D.

3. ALL Fire Fighting / Flushing / Washwater pipes are 750 mm dia C.I. pipes unless otherwise indicated.

4. All C.I. pipes to be class 2.

5. For layouts and diameters of pipes adjacent to buildings, refer to relevant building services drawings.

6. For details of valve chambers, see drawing No. HAA/O/1/H542R.

7. All UPVC pipes laid underneath roads are sleeved.

KEY:

POTABLE WATER PIPE

FIRE FIGHTING/FLUSHING/WASHWATER PIPE

COOLING WATER PIPE TO ENGINES

COOLING WATER PIPE TO ENGINE GAS BOOSTERS

GATE VALVE CHAMBER

GATE VALVE

HYDRANT

COLLECTING HEAD FOR EMERGENCY FIRE SERVICES DEPARTMENT CONNECTION

Scale 1:500

m 10 0 10 20 30 40 50 m

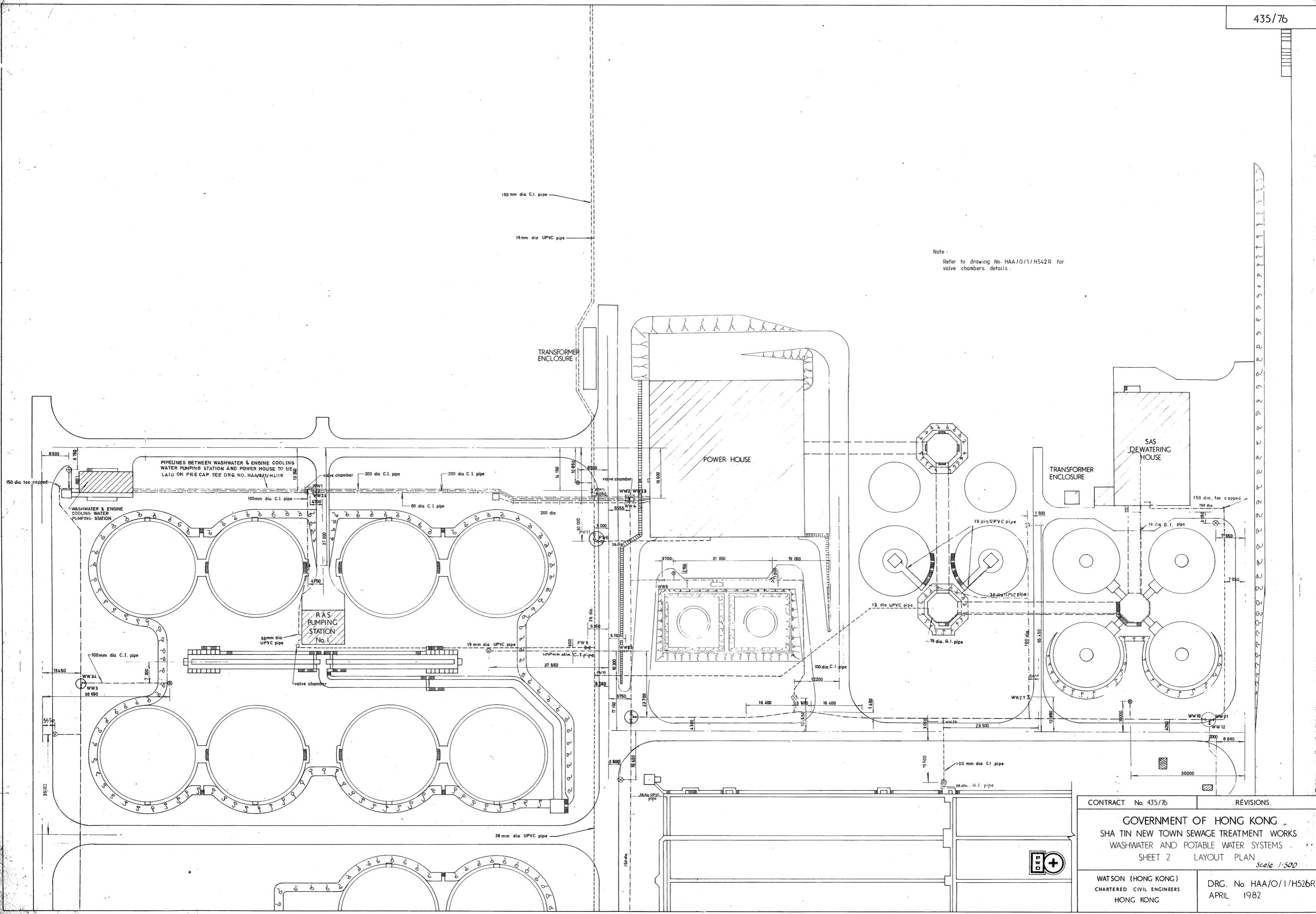
(Pipework details not to scale)

CONTRACT No. 435/76 REVISIONS.

GOVERNMENT OF HONG KONG
SHA TIN NEW TOWN SEWAGE TREATMENT WORKS
WASHWATER AND POTABLE WATER SYSTEMS
SHEET 1 LAYOUT PLAN

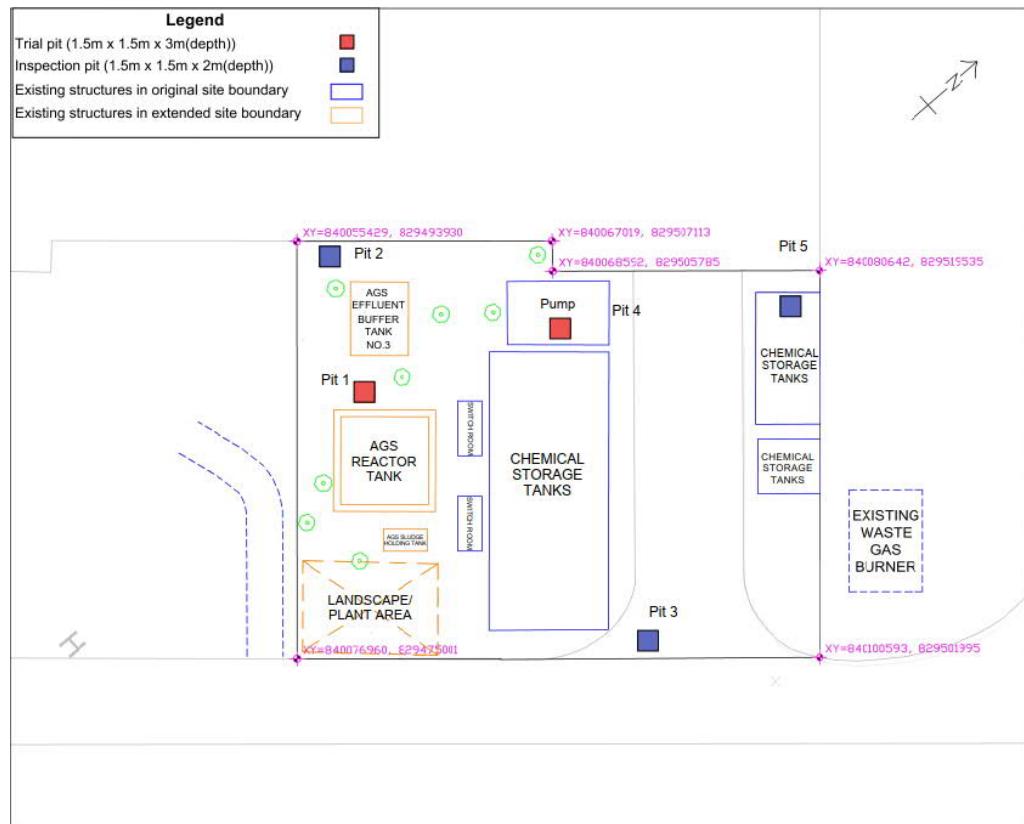
WATSON (HONG KONG)
CHARTERED CIVIL ENGINEERS
HONG KONG

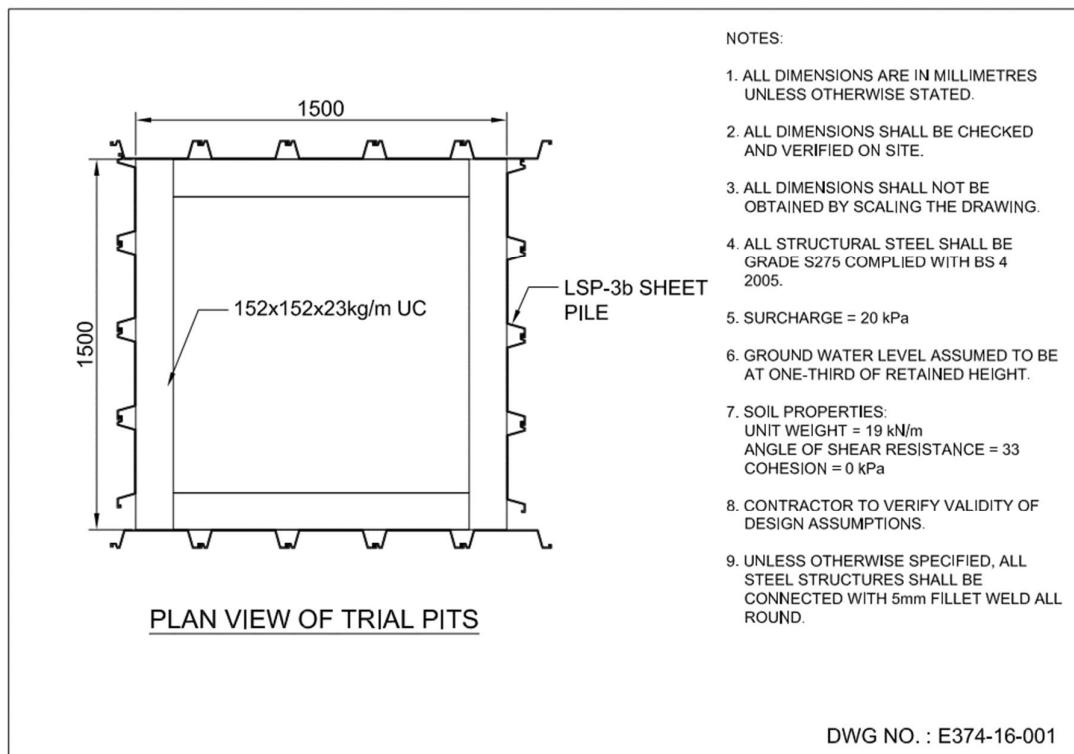
DRG. No. HAA/O/1/H525R
APRIL 1982



APPENDIX 1.27 RECORDS OF LOCATIONS AND DESIGN OF PREVIOUS TRIAL/INSPECTION PITS WITHIN THE SITE

(Clause 1.24.19(b) of the Employer's Requirements refers)





PART 2 MECHANICAL SPECIFICATION

2.1 Introduction

2.1.1S Scope of Specification

GS Clause 2.1.1 is deleted and replaced by the following: -

- (a) This Part specifies the requirements of the materials and workmanship of mechanical installations specific to the Facility.
- (b) The materials and mechanical installations shall comply in every aspect with this Employer's Requirements, the Drawings and/ or the Standard Drawings relating to the Contract or modified by written instruction of the Supervising Officer.
- (c) The Contractor shall be responsible for the process, electrical and mechanical works as set out in the Employer's Requirements and this shall include the design, manufacture, supply, storage, works testing, transportation, taxes, fees, permits, delivery to site, unloading at site, construction, installation, testing, commissioning, operation and maintenance, including but not limited to the following major process, electrical and mechanical works: -
 - (i) Reception System;
 - (1) Food Waste reception;
 - (2) Weighing system;
 - (3) Food Waste storage;
 - (ii) Food Waste Pre-treatment System;
 - (1) Food Waste pre-treatment;
 - (2) Food Waste polishing;
 - (3) Residues storage and disposal;
 - (iii) Food Waste Conveyance System;
 - (iv) Pre-treated Food Waste Conveyance System;
 - (v) Deodorisation System;
 - (vi) Electrical works including power supply from switchboard in the sludge thickening house of the Existing Facilities;
 - (vii) Electrical switchboard including motor control centres, distribution boxes (MCB), control panel and SCADA system for per-treatment food waste facilities;
 - (viii) Building services works with corresponding management system;
 - (ix) Instrumentation works;
 - (x) Potable water and process water supply;
 - (xi) Operation management system
 - (xii) Drainage and sewerage system; and
 - (xiii) Ancillary facilities including but not limited to vehicles and mobile plants.
- (d) Process, electrical and mechanical works shall be designed to facilitate the Facility to achieve the following: -

- (i) Ease and safe construction, installation, testing, commissioning, operation and maintenance;
 - (ii) Meeting the specified Facility's operation requirements and availability or better;
 - (iii) Meeting the specified design life or better;
 - (iv) Minimum life cycle cost;
 - (v) Optimised flexibility to accommodate for any short-term and long-term changes in the characteristics of Food Waste; and
 - (vi) Optimised energy efficiency.
- (e) The Contractor shall take account of, but not limited to, the Standards and Codes of Practices in the Design, Construction and Testing of the Process, Electrical & Mechanical Works listed in Appendix 1.02 of the Employer's Requirements.
- (f) The requirements, as given in the Employer's Requirements, are of the minimum process, electrical and mechanical requirements of the Employer. Notwithstanding the aforesaid, it is also the Contractor's responsibility to thoroughly understand the requirements of the Employer's Requirements, and to ensure the completeness of his Design and the required provisions are in compliance with the Contract. The Contractor shall be responsible for all the necessary equipment and systems, including components, ancillaries, associated items etc., deemed to make up a complete and functional installation, whether explicitly specified or not. Every item supplied under the Contract shall be a complete unit, well-coordinated, compatible with each other and shall perform and function integrally meeting the requirements of the Contract.
- (g) The design, manufacture, installation, construction, testing and commissioning of the process, electrical and mechanical works shall be in accordance with, but shall not be restricted to, the standards, statutory and other requirements as specified in the Employer's Requirements.
- (h) The Contractor shall provide all the process, electrical and mechanical equipment necessary for complying with the design requirements as specified. All process, electrical and mechanical equipment of the Facility shall be of proven design and have a considerable number of successful operational references with significant periods in operation (5 years minimum unless otherwise specified). The Contractor shall provide a sufficient standby equipment/units and spare parts in order to prevent any treatment process or facilities operation from shut down unpredictable.
- (i) All necessary electrical and mechanical works shall be designed with due considerations to prevent any potential hazardous risks pose to the operators, third party, surroundings and equipment during the construction, testing, commissioning, start-up, daily normal operation, scheduled and unscheduled shutdowns, emergency situations, overhauls and break-downs. Safety features shall be provided to ensure operation and maintenance safety and also to protect any personnel within the Facility. Such safety features shall include, but not limited to the following:-
- (i) Equipment/ systems hardware and software protection/safety interlocks;
 - (ii) Safety Guards;
 - (iii) Guarding or lagging protection from high temperature;
 - (iv) Protection from excessive noise;
 - (v) Handrails;
 - (vi) Working platforms;

- (vii) Warning alarms and signage;
 - (viii) Panic switches;
 - (ix) Sirens;
 - (x) Closed circuit television (CCTV);
 - (xi) Gas detection system; and
 - (xii) Any other item(s) as considered to be necessary by the Contractor or as required by the Supervising Officer.
- (j) Areas classified as “Confined Space” and with “Specified Risk” (defined under Factories and Industrial Undertakings (Confined Spaces) Regulation, Cap 59AE by the HKSAR) shall be minimised in the design, wherever possible. If these areas are unavoidable, provisions shall be incorporated into the design and installation to ensure safe and easy access during operation, maintenance and emergency rescue.
- (k) The design and installation of the process, electrical and mechanical works shall be inherently: -
- (i) Safe in operation and maintenance;
 - (ii) Reliable and resilient in operation;
 - (iii) Easy and safe to maintain;
 - (iv) Not used; and
 - (v) Minimum design life of 10 years in general.
- (l) The Contractor shall make due considerations during the design and installation of the electrical and mechanical works of occupational health and safety of the personnel working within the Facility. The Contractor shall pay particular attention to the relevant requirements under the Labour Department’s Legislation of Occupational Safety and Health Ordinance, Factories and Industrial Undertakings Ordinance, and other guidelines including but not limited to “A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment” and “Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace”, when necessary to include mitigating measures or provide the required personal protection equipment (PPE) for all the personnel and warning signs at certain locations where appropriate. Studies shall also be conducted by the Contractor as per the Labour Department’s “A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment” in manned areas susceptible to air impurities, including but not limited to the building blocks. Such studies shall be conducted during the design stage and the first Operating Year to set up the study baseline and, unless otherwise as instructed by the Employer, every two Operating Years afterwards. Details of the studies shall be proposed by the Contractor and submitted for the Supervising Officer’s consent.
- (m) The Contractor shall submit a hazardous area assessment in the design submissions to determine and classify the “hazardous zones” as per BS EN 60079 based on his design of the Facility. The assessment shall include, but not limited to all the necessary calculation, assumptions and their basis, references, substantiations etc. This assessment shall also include a summary table containing, but not limited to the following information: -
- (i) Hazardous zone (namely zone 0 to zone 2);
 - (ii) Locations within the Facility;

- (iii) Type of equipment in the classified zones;
 - (iv) Equipment applicable standards in the classified zones; and
 - (v) Any other relevant information considered to be necessary by the Supervising Officer to facilitate the consent process.
- (n) Equipment/ systems located in areas that are identified as hazardous zone shall be carefully designed and chosen to minimise risks including but not limited to fire and explosions.
- (o) Unless otherwise specified, all electrical and mechanical equipment shall not exceed a maximum noise level of 85 dB(A) measured from 1 metre away from the equipment body or its enclosure (if fitted). Any equipment unable to meet this requirement shall be provided with acoustic enclosure or silencer as a noise suppression measure in order to achieve the aforesaid maximum noise level requirement. The Contractor shall provide in the design submissions details of the equipment selection and noise ratings and its compliance in operation against occupational health regulations and required limits of exposure to operators and others from noise.
- (p) All materials, equipment and systems supplied under this Contract shall be brand new and manufactured/assembled from new components and of the latest model and version. Any reconditioned, reused, new old stock, obsolete components or alike shall not be accepted and shall be removed from the site immediately by the Contractor at his own cost if delivered.
- (r) All materials of construction (including surface protection) of the equipment/ systems shall have the appropriate mechanical properties and be corrosion resistant over the requirement of the operating environment.
- (s) The Contractor shall ensure that all exposed moving machine parts shall be provided with suitable and effective protection to prevent harm to personnel. Guards shall be removable for inspection and maintenance purposes and where appropriate, shall be fitted with interlocking devices to disable/ stop the machine from operation upon opening of the guards. Such guards and interlocking devices shall comply with BS EN ISO 14119 and BS EN ISO 14120 respectively or other equivalent standards.
- (t) Unless otherwise specified, all electrical and mechanical equipment shall be installed and supported on concrete plinths not less than 100 mm high above finished floor level. Unless otherwise consented by the Supervising Officer, all anchor bolts, nuts, washers, shims and packers for equipment installation shall be constructed of stainless steel or better. Direct bolting electrical and mechanical equipment to the finished floor shall not be allowed. Any other type of equipment installation method and/ or arrangement recommended by the equipment/ system manufacturer shall be consented by the Supervising Officer before commencing installation.
- (u) The Contractor shall provide all the civil provisions for the installations, modifications, testing and commissioning of equipment/ system to satisfy the requirements for the Works and also operation and maintenance safety. The civil provisions shall be identified and predetermined during design and formed and/or casted-in during construction/ installation. Unless otherwise consented by the Supervising Officers, any in-situ coring and/or cutting of concrete structures shall not be allowed. Such civil provisions shall include, but not limited to the following: -
- (i) Equipment plinths;
 - (ii) Equipment installation bays;
 - (iii) Cable trenches, ducts, shafts, sleeves, draw pits etc.;

- (iv) Concealed pipework and conduits;
 - (v) Floor and wall openings, box-outs and temporary walls;
 - (vi) Puddle flanges and pipe sleeves;
 - (vii) Buried or concrete encased pipe work;
 - (viii) Pipe trenches; and
 - (ix) Sump pits.
- (v) Handling, transferring, transporting, conveyance by road, loading and unloading facilities for all chemicals, fuel and any other potentially hazardous materials shall be installed at dedicated locations provided with all the necessary safety features and provisions (including but not limited to, spillage management) to ensure personnel health and safety, and minimise possible nuisance during operation and maintenance. Such safety features and provisions shall be carefully selected, designed and installed based on the operation requirements and nature of the materials to be handled. The Contractor shall, in his design, pay particular attention to the relevant legislative requirements (including, but not limited to, those requirements from Labour Department, Fire Services Department (FSD) and Environmental Protection Department (EPD) etc.), the requirements of handling the materials (including, but not limited to, the chemical supplier's Material Safety Data Sheets (MSDS)), and any other requirements applicable. Such features and provisions shall include but not limited to the following items: -
- (i) Spillage containment;
 - (ii) Leakage detection;
 - (iii) Drench showers and eye washes;
 - (iv) Sand buckets;
 - (v) Fire extinguishers;
 - (vi) Protective clothing;
 - (vii) Breathing apparatus;
 - (viii) Hazardous gas detection (fixed type and portable type);
 - (ix) Air extraction and scrubbing system, where necessary to protect the operator's within, in case of any presence of dangerous fumes or gases;
 - (x) Dust suppression control;
 - (xi) Manual safety call points, visual and audible alarm; and
 - (xii) Any other as required by the Fire Services Department.
- (w) The Contractor shall provide storage for, maintain and keep in stock on site the following items throughout the entire Operation Period, and also during the time when the Facility is handed back to the Employer.
- (i) E&M spares parts:-
 - (1) Unless otherwise consented by the Supervising Officer, the minimum quantity provided shall be sufficient for 1 year or as recommended by the manufacturers.
 - (2) The Contractor shall also clearly identify and list out physically large and/or heavy and/ or long lead time spare parts, and submit a procurement and stocking strategy plan for the Supervising Officer's consent.

- (ii) Lubrication grease and oil: -
 - (1) Unless otherwise consented by the Supervising Officer, the minimum quantity provided shall be sufficient for 1 year or as recommended by the manufacturer.
 - (2) Hydraulic oil which shall be sufficient for 1 year or as recommended by the manufacturer.
- (iii) All special tools required for servicing and maintenance of any part of the installations: -
 - (1) Unless otherwise consented by the Supervising Officer, the minimum quantity provided shall be sufficient for 1 year or as recommended by the manufacturer.
- (iv) Chemical consumables:
 - (1) Unless otherwise consented by the Supervising Officer, the minimum quantity provided shall be sufficient for 2 weeks of operation.
- (v) The complete list of minimum spares, lubrication and special tools shall be included in the design submissions.
- (x) Unless otherwise consented by the Supervising Officer, each identical equipment/system of the same model, size, capacity and/ or application shall be from the same manufacturer and manufactured in the same country of origin. Any equipment/ system found not meeting with this requirement shall be considered as non-compliant, and may be rejected and required to be removed from site at the costs of the Contractor.
- (y) Due considerations shall be paid by the Contractor as per Code of Practice on Wind Effects in Hong Kong published by Buildings Department on any outdoor installed/ erected equipment/ systems which may be subject to the effects of high winds.
- (z) The Contractor shall logically divide the Facility, based on his design, into systems/ areas with respect to their process/ functional purposes. Demarcation as well as the number of systems and their respective subsystems shall be included in the design submissions.
- (aa) All pipe or cable sleeves for pipe or cable civil structure penetrations shall be suitably and adequately sealed and made good (if necessary) to ensure compliance with Fire Services Department (FSD) requirements and aesthetically acceptable to the Supervising Officer.
- (bb) The Contractor should submit a working platforms/ access/ walkway schedule, details shall include but not limited to the materials of construction, area of use, type, loading, brand and model for the Supervising Officer's consent. As for minimum, all walkways, stairs, ladders, platforms, flooring, and handrailing shall be fabricated from steel of hot dip galvanized to BS EN ISO 1461 or other materials of construction as consented by the Supervising Officer.
- (cc) Unless otherwise specified, the Contractor shall accordingly design and provide the process, electrical and mechanical equipment/ system standby and/ or redundancy with due considerations to cater for the operation and maintenance needs, routine testing and calibration of equipment/ system, emergency situations, statutory inspections and certifications, and meeting the Facility's operation requirements as per the Contract.
- (dd) The Contractor shall submit method statements for any permanent and/ or temporary works and installations related to construction and testing and/ or commissioning of the Facility to the consent of the Supervising Officer prior to execution.

- (ee) The Contractor shall submit all the necessary detailed calculations and full details in his design submissions to substantiate their compliance of the Facility's operation requirements for the Supervising Officer's consent.
- (ff) Unless otherwise consented by the Supervising Officer, the Contractor shall require and be responsible to ensure the consistence of equipment/ materials/ system supplied and their workmanship of the following as practically as possible. Failure in complying with this requirement may result in the rejection by the Supervising Officer. Any resulting removal and replacement of the equipment/ materials, and/ or demolition of installation and reinstallation of the works, with all time and costs shall be borne by the Contractor.
 - (i) Similar manufacturer brand, type and materials of construction for the similar application shall be as used throughout the Facility; and
 - (ii) Similar method used for installation/ construction for the same application shall be adopted throughout the Facility.
- (gg) Requirements on electrical and mechanical components, equipment and systems whether explicitly specified or not, but are necessary to make up a complete, functional, safe to operate and maintain Facility, meeting the treatment capacity and performance requirements shall be responsible by the Contractor.

2.1.1A Permanent Equipment Labels and Name Plates

- (a) The Contractor shall provide all permanent identification labels, nameplates and warning labels necessary for the identification and safe operation of the Facility, and all inscriptions shall be in both Traditional Chinese and English.
- (b) The international power station designation system, Kraftwerk-Kennzeichen-System (KKS), shall be used to identify all elements of the Facility.
- (c) All permanent identification labels, nameplates and warning labels shall be securely fixed to items of Facility and equipment with stainless steel rivets, plated self-tapping screws or other approved means.
- (d) Labels, nameplates etc. shall not impede the operation of Facility or equipment.
- (e) Materials of construction of these permanent labels shall be durable and suitable for location of installation.

2.1.1B Signs

- (a) The Contractor shall be responsible for providing all temporary and permanent safety symbols and safety signs. This shall include all necessary signs for the following information:-
 - (i) Information signs;
 - (ii) Warning signs;
 - (iii) Hazard signs ;
 - (iv) Emergency signs;
 - (v) Mandatory signs;
 - (vi) Prohibition signs; and
 - (vii) Traffic signs.
- (b) All signs shall comply with the requirements of BS 5499 where appropriate.

- (c) The signs shall be made of a material which is weather resistant and robust for the conditions prevailing on site, and shall be fastened with permanent fixings suitable for the specific location, whereas cable ties shall not be used.
- (d) The positions for the signs shall be chosen so that they are within the field of vision of the persons to whom they apply. The safety signs shall be mounted or installed in such a manner that there is no possibility of misunderstanding. Final position shall be agreed and confirmed on site by the Supervising Officer.
- (e) Temporarily dangerous areas including but not limited to, construction sites, assembly areas and overhead working, shall also be marked by movable signs, and where necessary, cordoned off with black and yellow tape.
- (f) All written signs shall be both in Traditional Chinese and English.

2.1.1C Pipework, Equipment, Services, Identification and Colour Codes

- (a) Pipelines, other than buried pipelines, shall be identified using basic identification colours and code indications in the form of either colour bands or symbols in accordance with BS 1710 Colours and BS 381C. These shall be applied by painting the basic identification colour on the pipe or duct over the whole length and superimposing the colour code indications at intervals.
- (b) The basic identification colours shall be placed at all junctions, at both sides of valves, service appliances, bulkheads, wall penetrations and any other place where identification is necessary.
- (c) The colour-coding schedule shall include further information on the pipelines to define precisely their contents. This further information may be either the name of the fluid, in full or abbreviated, or a recognised symbol which shall be placed at the same positions as the colour banding.
- (d) Information regarding the fluid characteristics including but not limited to, pressure, temperature etc. shall be placed on the basic identification colour band. The names, abbreviations or chemical symbols shall be in either black or white in order to contrast clearly with the colour of the pipe or with the basic identification colour. The direction of flow of the material conveyed shall be indicated by an arrow situated in the proximity of the basic identification colour and painted black or white in order to have a clear contrast.
- (e) For central heating and air conditioning systems, and other closed circuits where it is necessary to indicate separately the flow and return pipes, this shall be done by the use of the word “Flow” or the letter “F” on the one pipe and the word “Return” or the letter “R” on another.
- (f) Identification of the pipelines and services shall comply with BS 1710. Safety signs and colours shall comply with BS EN ISO 7010:2020+A1:2020, BS ISO 3864-4:2011 and BS 4800:201. Deviation from the requirements shall require to be substantiated.
- (g) Valves may be painted with the basic identification colour unless the pipeline has been coded with the safety colour for firefighting that then the valves shall be painted red (04-E-53 in BS 4800:2011).

2.2 Material of Construction

2.2.1 General Requirements of Metallic Items

- (e) All metal parts of the equipment offered in contact with Food Waste and/ or Pre-treated Food Waste shall be constructed in stainless steel, unless otherwise specified. If the Contractor wish to adopt different material grade for metal parts in contact with Food Waste/ Pre-treated Food Waste, the Contractor shall state clearly in his submission for the Design Checker's certification and the Supervising Officer's consent.

2.17S Deodorisation System

Clause 2.17 is deleted and replaced by the following: -

2.17S.1 General

- (a) The Contractor shall design, supply, install and operate a deodorisation system to collect and treat the air extracted from but no limited to the process block(s), process equipment such as metering bunker, separation mill, skip, polishing system and buffer tank. The Deodorisation System shall ensure the exhaust discharge comply with the relevant requirements in the Contract.
- (b) Unless otherwise specified, the treatment technologies, locations and number of the Deodorisation System shall be determined by the Contractor based on his design of the Facility. The Contractor shall provide sufficient information and design calculations in the Design Submission to substantiate the relevant requirements are satisfactorily complied for the Design Checker's certification and the Supervising Officer's consent.
- (c) The minimum air change per hour (ACH) required for the respective areas are as follows: -

Area	Minimum ACH
Locations with man access (e.g. process block(s) etc.)	12 ACH
Locations without man access (e.g. enclosed process equipment, covered tanks etc.)	3 ACH

- (d) Notwithstanding the above minimum air change requirements, the Contractor shall provide all necessary covers and enclosures and mechanical ventilation to all potential odour sources in order to maintain negative pressure of the enclosed area/ equipment to avoid any odour from escaping to the atmosphere. The Contractor shall ensure sufficient ventilation so as to provide a safe and healthy working environment for the operators and works within the Facility.
- (e) The Deodorisation System shall be designed to treat odorous air having a constant inlet hydrogen sulphide (H_2S) and ammonia (NH_3) concentration not less than 5ppm and 10 ppm respectively at maximum air inlet flow.
- (f) The following are the minimum requirements for the selection of the treatment technologies and design of the Deodorisation System:-
- (i) Capable of reaching a hydrogen sulphide (H_2S) not exceeding 0.05 ppm before discharging to the atmosphere; and
- (ii) Capable of reaching an ammonia (NH_3) not exceeding 0.5 ppm before discharging to the atmosphere.

- (iii) Efflux velocity of treated odour from discharge stack of activated carbon shall not be less than 15 m/s.
- (g) Deodorisation system shall consist of biotrickling filter, activated carbon (AC) polishing filter, exhaustion fan, nutrient feed system, dehumidifier, per-filter, after-filter, dampers, louvers, air ductworks and associated equipment.
- (h) Materials used in the construction of the deodorisation system shall be resistant to corrosive attacks and suitable for its working environment. The components of the deodorisation system, including ductwork, dampers, louvers, air grilles, supports, fixings, guards, fan casing etc., shall be of grade 316 stainless steel or glass reinforced plastic (GRP) or equivalent.
- (i) Contaminated air shall be taken from the source through ductwork, delivered to the deodorisation system and discharged to atmosphere with sufficient height. The location of the discharge outlet should not be less than 5m away from any windows, doors and intake of ventilation system of buildings.
- (j) The deodorisation system shall be designed for continuous operation in 24 hours a day, 7 days a week in an outdoor environment.
- (k) The deodorisation system shall be automatically controlled and connected to the SCADA/PLC system for control and monitoring purposes.
- (l) All openings of the deodorizer shall be sealed up with gasket to prevent odour leaked to the surrounding area.
- (m) The deodorisation system shall be rated to handle 100% of the specified air flow and odour loading as specified in the Particular Specification.
- (n) Access manholes shall be provided to allow access to the deodorizer for inspection, removal and maintenance purposes. The deodorizer shall include with all piping, valves and fittings. Lifting and hold down lugs shall be provided.
- (o) Supporting framework and maintenance platform including handrailings, toe boards, non-skid tread surface, etc. for the deodorizer shall be provided for the operation and inspection. The entire system shall be factory assembled and made of grade 316 stainless steel or GRP or equivalent. All bolts and fasteners including anchor bolts and flange bolts shall be grade 316 stainless steel.

2.17S.2 Biotrickling Filter

- (a) Biotrickling filter shall be vertical flow configuration with upflow air passage and countercurrent liquid flow. Biotrickling filter shall comprise packed media sections, demister section, recycle pump system and nutrient feeding system.
- (b) The reactor vessel shall be constructed of corrosion resistant fibreglass reinforced plastic (FRP). The resin of the FRP shall be premium grade chemical resistant vinyl ester resin. The external final coat shall be resin rich coat with pigment and with integral UV inhibitors in the resin applied.
- (c) The vessel shall be designed to support the required number of media layers and treatment stages. All materials of construction shall be corrosion resistant.
- (d) Access manholes for inspection, removal and maintenance of all internal parts shall be provided. Lifting and hold down lugs shall be provided.
- (e) The packing media shall be made from synthetic material or suitable inorganic media.
- (f) A mist eliminator shall be located above the final packed bed and shall prevent carryover of liquid droplets with the outlet gas stream. Mist eliminator shall meet the following

performance criteria; i) The mist removal efficiency shall be able to remove not less than 98% on 20 micron moisture droplet. ii) The mist eliminator shall be constructed from polypropylene, PVC or other corrosion resistant materials, and configured and constructed to allow ease of disassembly and removal.

- (g) Irrigation system shall be provided above each media layer for proper irrigation. The irrigation solution shall be distributed by spray type nozzles. Spray nozzle shall be constructed from polypropylene (PP), PVC, FRP or other corrosion resistant materials. Spray nozzles shall be positioned to achieve a uniform liquid distribution on the packed media.
- (h) A pH-controlled chemical dosing system for effective neutralization and catering for surge load shall be equipped. Re-circulation system shall be provided to neutralize the discharge water of the reactor vessel for irrigation.
- (i) Nutrient feed system shall be provided to store and deliver the nutrients to reactor vessel through the irrigation system to support biological growth. The nutrient solution shall be non-hazardous and non-toxic.
- (j) The nutrient storage tank shall be properly sized to provide continuous operation usage of the nutrient for the biotrickling filters. Mechanical mixer, if necessary, shall be provided for the nutrient tank

2.17S.3 Not used.

2.17S.4 Not used.

2.17S.5 Not used.

2.17S.6 Activated Carbon Filter System

- (a) Technical and testing requirements shall follow the relevant Clauses of Part 2 of the GSEMSFI, where applicable and also following Clauses.
- (b) The filter media of potassium hydroxide (KOH) impregnated activated carbon shall NOT be used. The activated carbon shall be made of coal substrate and suitable for adsorption of odourous compounds, namely, hydrogen sulphide, ammonia and mercaptans. The Contractor shall apply a catalytic activated carbon media in carbon filter system
- (c) The air velocity through the carbon filter media shall not be greater than 0.3 m/s with an overall carbon contact time of not less than 3.0 seconds at required flow condition for deodorisation system. The breakthrough time of the carbon filter beds shall not be less than twelve (12) months under continuous operation as specified.
- (d) The Contractor shall provide the filling of the filter media at installation stage and arrange a complete replacement of the used filter media during the Operation Period. Filter media shall be replaced 1 months before the end date of Operation Period or as instructed by the Supervising Officer. The Contractor shall provide test certificate to verify the capacity of the activated carbon for initial filling. The replacement filter media shall only be delivered to Site 3 months before the end date of Operation Period or as instructed by the Supervising Officer.

- (e) The filter media shall be totally inorganic, non-toxic, and self-incombustible and shall not support any microbial growth. The air velocity through the filter media shall not be greater than 0.3 m/s.
- (f) The corresponding breakthrough time of the activated carbon filter beds shall not be less than twelve (12) calendar months under continuous design operation conditions.
- (g) Technical requirements of the reactor vessel:
 - (i) The vessel shall be constructed of corrosion resistant fibreglass reinforced plastic (FRP). The resin of the FRP shall be premium grade chemical resistant vinyl ester resin.
 - (ii) The resin shall have fire resistance rating of Class 1 (frame spread rating less than 25) when tested in accordance with ASTM E-84 or equivalent. The external final coat shall be resin rich coat with pigment and with integral UV inhibitors in the resin applied. The construction of the FRP for the vessel shall have resin rich inner surface, an interior corrosion barrier, an interior structural layer and an exterior layer and UV resistant coating.
 - (iii) The vessel shall be designed to support the required number of media layers and treatment stages. All materials of construction shall be corrosion resistant.
 - (iv) Access manholes for inspection, removal and maintenance of all internal parts shall be provided. Access manholes shall be provided with flat FRP plate. Lifting and hold down lugs shall be provided. A drain point with an isolation valve shall be provided at the bottom level of vessel.

2.17S.7 Technical requirements of the pre-filter and after-filter unit

- (a) A pre-filter and after-filter unit shall be installed at the inlet and outlet of the activated carbon filters respectively for the removal of particulate. It shall be in a readily accessible and removable frame and have an average efficiency of not less than 40% when tested in accordance with ASHRAE 52-76.
- (b) The framework shall be made of stainless steel. The pre-filter shall be made of stainless steel. The pre-filter shall be designed so as to facilitate side removal of the filter elements. After-filter shall have at least 90% particulate removal efficiency and shall be of disposable type.

2.17S.8 Technical requirements of the dehumidifier

- (c) Fresh air shall be drawn into the dehumidifier, dried and then discharged into the foul air stream. The mixed air is then conveyed to the activated carbon filter. No foul air shall be in contact with the dehumidifier.
- (d) Dehumidifier shall be provided to reduce the relative humidity of the foul air to 85%RH (max) under any conditions. The Contractor shall provide one set of humidity sensor with suitable measuring range to measure the humidity of foul air before entering activated carbon filter. The humidity sensor shall meet the following requirements:
 - (i) Measuring humidity range: 0 to 100%RH
 - (ii) Accuracy: ±5% RH
 - (iii) Operating temperature: 0 to 50 Deg C

- (iv) Operating humidity: 99% RH
- (v) Enclosure protection: IP65
- (e) The dehumidifier shall be of adsorption type and designed with 1 duty and 1 standby arrangement. The dehumidifier shall complete with high efficiency, incombustible, non-toxic silica gel impregnated rotor, process air fan, reactivation air fan, electrical heater, air filters, control panel and duct type remote humidistat. The rotor shall be washable.
- (f) The cabinet of the dehumidifier constructed from stainless steel.
- (g) Stainless steel or FRP weatherproof enclosure shall be provided for the dehumidifier.

2.17S.9 Technical requirements of discharge stack

- (a) Discharge stack shall be constructed of FRP and shall be provided for discharging the treated air after the activated carbon filter system to the atmosphere. The height of discharge stack shall not be less than 13m above floor level.
- (b) A by-pass discharge duct with motorized isolation damper shall be provided to connect the outlet of biotrickling filter system to discharge stack without entering the activated carbon filter system.

2.17S.10 Technical requirements of hydrogen sulphide sensors and ammonia sensors

- (a) The Contractor shall provide an electrochemical cell type hydrogen sulphide sensor for monitoring the concentrations of H₂S at the inlet of each biotrickling filter. Hydrogen sulphide concentration range from 0 ppm to 100 ppm shall be displayed on the deodorisation system local control panel and the SCADA system. The resolution of hydrogen sulphide sensor shall be 1 ppm or better and with accuracy of ±5% or better over its full scale measuring range. The enclosures for the sensor and transmitter shall have IP65 protection or better.
- (b) The Contractor shall provide an electrochemical cell type hydrogen sulphide sensor for monitoring the concentrations of H₂S at the outlet of each biotrickling filter. Hydrogen sulphide concentration range from 0 ppb to 1000 ppb shall be displayed on the deodorisation system local control panel and the SCADA system. The resolution of hydrogen sulphide sensor shall be 1 ppb or better and with accuracy of ±5% or better over its full scale measuring range. The enclosures for the sensor and transmitter shall have IP65 protection or better.
- (c) The Contractor shall provide an electrochemical cell type hydrogen sulphide sensor for monitoring the concentrations of H₂S at the outlet of each activated carbon adsorber. Hydrogen sulphide concentration range from 0 ppb to 1000 ppb shall be displayed on the deodorisation system local control panel and the SCADA system. The enclosures for the sensor and transmitter shall have IP65 protection or better.
- (d) The Contractor shall provide a head loss sensor including transmitter and indicator to measure the pressure drop across the packing media sections for each biotrickling filter.
- (e) The Contractor shall provide an electrochemical cell type ammonia sensor for monitoring the concentrations of NH₃ at the inlet of each biotrickling filter. Ammonia concentration range from 0 ppm to 100 ppm shall be displayed on the deodorisation system local control panel and the SCADA system. The resolution of sensor shall be 1 ppm or better and with accuracy of ±5% or better over its full scale measuring range. The enclosures for the sensor and transmitter shall have IP65 protection or better.

- (f) The Contractor shall provide an electrochemical cell type ammonia sensor for monitoring the concentrations of NH₃ at the outlet of each activated carbon adsorber. Ammonia concentration range from 0 ppm to not more than 75 ppm shall be displayed on the deodorisation system local control panel and the SCADA system. The enclosures for the sensor and transmitter shall have IP65 protection or better.

2.17S.11 Technical requirements of the differential pressure sensors

- (a) The Contractor shall provide a differential pressure sensor including transmitter and indicator to measure the pressure drop across the packing media sections for each biotrickling filter for displaying on the DOU1 local control panel and the SCADA system.
- (b) The Contractor shall provide differential pressure sensors including transmitters and indicators gauges to measure the pressure drop across all filters, including each activated carbon filter, pre-filter and after-filter, for displaying on the deodorisation system local control panel and the SCADA system.

2.17S.12 Technical requirements of supporting framework and maintenance platform

- (a) Supporting frameworks, maintenance and access platforms and stairs including hand railing, toe boards, non-skid tread surface, etc. for biotrickling filter system and activated carbon adsorber system shall be provided for the operation and maintenance (calibration, adjustment, replacement, etc.) and inspection of internals (e.g. spray nozzles and spray pattern, instrumentation, media conditions, etc.) via the inspection ports. Appropriate access and guard railing around the perimeter of vessel top shall be provided for the biotrickling filter for inspection of the spray nozzles and mist eliminator. The entire system shall be factory assembled and made of stainless steel or FRP. The supporting frameworks, maintenance and access platforms and stairs shall not impose undue stress on the vessel.

2.17S.13 Technical requirements of the odour extraction fans:

- (a) The odour extraction fans shall be capable of providing the sufficient odour extraction rate against the respective system losses.
- (b) The centrifugal fans shall be heavy duty type equipped with non-return dampers to extract odour from the specified locations to the deodorisation system for treatment.
- (c) The fans shall be constructed of FRP with moulded reinforced housing. The resin of the FRP shall be premium grade chemical resistant vinyl ester resin. The resin shall have fire resistance rating of Class 1 (frame spread rating less than 25) when tested in accordance with ASTM E-84 or equivalent. The external final coat shall be resin rich coat with pigment and with integral UV inhibitors in the resin applied.
- (d) The fans shall be V-belt driven and designed for continuous operation. The fan shaft shall be constructed of stainless steel grade 316 and oversized to run below critical speed. The impeller and shaft assemblies shall be statically and dynamically balanced.
- (e) The requirements of the drive motors are as follows:
- (i) Motor: IP55 protection, 380V, 3-phase and 50 Hz
- (ii) Insulation Class: Class F insulation for Class B operation

- (f) Variable frequency drive (VFD) shall be provided to drive the fan. The motor should be suitable for variable frequency drive running. The fan cowl of the motor shall be provided with separately-driven fan for motor cooling. The fan motor shall have a service factor of 1.15 times the rated shaft power and sized to operate throughout the entire fan performance curve. The rated efficiency of the fan motor shall be 88.5% at least.
- (g) The fan shall not generate a noise level exceeding 70dBA measured at 1m from the fan in all directions at rated speed. Acoustic enclosure of accepted design and silencer complete with stainless steel casing at the discharge outlet and/or the fan motor shall be provided to achieve this requirement. Access opening shall be provided for the acoustic enclosure.

2.17S.14 Commissioning of Deodorisation Systems

- (a) The installation, equipment set up and functional performance of the deodorisation system shall be endorsed by the manufacturer of the deodorisation system and to the satisfaction of the Supervising Officer prior to commissioning of the deodorisation system
- (b) The commissioning shall include H₂S and NH₃ testing as outlined below to demonstrate the discharge gases removal efficiency of deodorisation system. Removal efficiency is defined as:
 - (i) % removal = (inlet concentration – outlet concentration)/ inlet concentration x 100%
- (c) The commissioning shall not be carried out until the Contractor is satisfied that the equipment has reached its optimum operational performance. A written notice complete with evidence of support shall be submitted to the Supervising Officer acceptance.
- (d) The method statement for commissioning procedures shall be recommended by the manufacturer of deodorisation system and shall be submitted for the Supervising Officer's consent.
- (e) The Contractor shall during the Commissioning period demonstrate the operation, function and performance of deodorisation system to the satisfaction of the Supervising Officer.
- (f) Duration of the commissioning period shall be 24 hours per day continuously over seven (7) consecutive days.
- (g) The Contractor shall provide artificial hydrogen sulphide gas and ammonia gas to verify the removal efficiency as specified in clause 2.17.1 of this Employer's Requirement under simulated air flow conditions if the concentration of hydrogen sulphide and ammonia of the inlet ductwork is below 5ppm and 10 ppm respectively.
- (h) No manual adjustment of valves or instrumentation associated with deodorisation system will be allowed during the commissioning period.
- (i) The odour extraction rate and the inlet gas pressure shall be maintained as close as practical to the designed conditions.

- (j) The Contractor must satisfy the odour extraction rate through deodorisation system is in accordance with the designed gas flow rates and conditions.
- (k) The odour extraction rate and the pressure losses across the vessel are to be either recorded continuously by the online measurement (if applicable), or manually measured and recorded at a frequency or time as agreed with the Supervising Officer.
- (l) Other operating parameters such as pH, conductivity, any unusual events, etc., have to be recorded for each day of the commissioning, with frequency or time as agreed with the Supervising Officer.
- (m) Within 7 calendar days of the completion of the commissioning period, the Contractor shall provide a written commissioning report, complete with all the instrument calibration certificates, laboratory and field test results and including copies of all data log sheets. The report shall state the conclusions of the commissioning with reference to the performance requirements specified.
- (n) The methods to obtain all measurements and calculations shall be included in the commissioning procedures and shall be carried out to the satisfaction of the Supervising Officer.
- (o) If in the opinion of the Supervising Officer that the deodorisation system fails to meet the functional and performance requirements, the Contractor shall rectify the problems immediately. The Contractor shall, at no extra cost to the Employer, carry out all rectification and modification work necessary to the satisfaction of the *Project Manager* and repeat the whole commissioning.
- (p) The Contractor shall include in his scope of work all the sampling and laboratory analysis tasks. Laboratory analyses shall be done by an independent testing laboratory. The laboratory responsible for the analyses shall have documented QA/QC standards for the analysis and accredited under HOKLAS for the test categories of “Environmental Testing” and the test areas of “Water and Wastewater”. The details of proposed testing laboratory shall be submitted for the Supervising Officer’s consent before executing the work.
- (q) Minimum sampling requirements for laboratory analysis throughout the commissioning period shall include but not limited to the following:

Location of sample	Laboratory Analysis	No. of Sample Requirements during Commissioning period
1) Inlet of biotrickling filter	H ₂ S and NH ₃	One sample per day
2) Outlet of biotrickling filter	H ₂ S	One sample per day
3) Outlet of activated carbon filter	H ₂ S and NH ₃	One sample per day

- (r) The continuous online readings of inlet and outlet H₂S sensors for deodorisation system are to be recorded throughout the commissioning period.
- (s) The commissioning of deodorisation unit shall be considered successful, subject to the Supervising Officer, when the following results are satisfied:

- (i) H₂S and NH₃ removal efficiency calculated from laboratory analysis results meet minimum designed H₂S and NH₃ removal efficiency, for each day of the commissioning period.
- (ii) Average H₂S and NH₃ removal efficiency, at every 15 minutes, calculated from the online inlet and outlet H₂S and NH₃ sensors meet minimum designed H₂S and NH₃ removal efficiency, for each day of the commissioning period.
- (t) All costs incurred for the tests and re-tests, including labour, testing equipment, materials, artificial hydrogen sulphide gas, ammonia gas and all necessary accessories shall be provided by the Contractor.

2.18 Reception System

2.18.1 Food Waste reception

- (a) The Contractor shall designate an area within the Facility to receive Food Waste from food waste collection vehicles. This area shall be provided and installed with all necessary equipment and tools to facilitate the unloading of Food Waste from food waste collection vehicles.
- (b) The designated area shall be enclosed and provided with adequate odour suppression arrangements to prevent leakage of odorous air to surrounding area when unloading food waste. Odour suppression arrangements shall include but not limited to the followings:
 -
 - (i) Provide and install air curtains at man and vehicle entrances;
 - (ii) Provide and install fast-action door at vehicle entrances;
 - (iii) Confine potential odour sources and extract odorous air to the odour control system; and
 - (iv) Odour-masking agent shall be sprayed during Food Waste reception.
- (c) The Contractor shall ensure the Facility can unload Food Waste from vehicles and waste bins safely and reliably. The unloading process should be efficient and easy to control.
- (d) Food waste in slurry form would be discharged to upstream of separation mill for carrying out the treatment process. The Contractor shall design, provide and install all necessary facilities to unload and discharge the food waste slurry from tank truck or tanker to appointed location. Food Waste in slurry form shall not be disposed into the metering bunker.
- (e) The electromagnetic flowmeter shall be provided and installed to measure the volume of food waste slurry unloading and discharging.
- (f) The Contractor shall design and provide the weighing system to measure the net weight of Food Waste delivered by different kind of vehicles to the Facility. The weighing system shall include but not limited to weighing scale and metering bunker.
- (g) The data in the weighing system shall be logged and stored in the SCADA System. All data logged and stored shall not be amendable and erasable. A complete history of all logged data, including any voided data shall be readily available upon the Employer's request.

2.18.2 Bin tipper

- (a) The Contractor shall provide and install bin tippers to unload Food Waste delivered to the Facility in waste bins into the metering bunker automatically.

2.18.3 Weighing scale

- (a) The Contractor shall provide and install a weighing scale to weigh the tail-lift truck, tanker and tank truck of food waste collection vehicles. The weighing scale shall be designed with an accuracy of $\pm 1\%$ under static. The weighing system shall consist of, but not limited to the following:
- (i) Load cells;
 - (ii) Display unit of the measured weight; and
 - (iii) All other necessary accessories for a complete and functional system.

2.18.4 Metering bunker

- (a) The Contractor shall provide and install a metering bunker for storage of food waste before pre-treatment. The metering bunker shall be capable to weigh material stored inside.
- (b) The metering bunker shall provide at least 30 m^3 of storage volume. Leachate from Food Waste stored in the metering bunker shall be collected and pumped to the Separation Mill.
- (c) The bottom of the metering bunker shall have conveyors to move the stored Food Waste to a collection conveyor. The collection conveyor shall then convey the Food Waste to subsequent Food Waste pre-treatment equipment.
- (d) The conveyor motors shall be variable speed drives to control the feeding rate to downstream pre-treatment equipment.
- (e) The Contractor shall collect a sample from incoming food waste delivered by individual food waste collection vehicle.
- (f) Metering bunker shall accommodate with metal covers/lids to avoid odorous air escaping. The covers/lids shall be fully closed once there is no food waste dumping.

2.19 Food Waste Pre-treatment System

2.19.1 Bag opener

- (a) The Contractor shall provide and install bag opener to open plastic liner bags. The bag opener shall be designed to open plastic liner bags instead of reducing the particle size of food waste. The specifications of plastic liner bags is shown in Appendix 2.01 to the Employer's Requirements.
- (b) The bag opener can be an individual equipment or incorporate with the metering bunker. The Contractor shall ensure the bag opener can effectively open and empty plastic liner bags.
- (c) The bag opening blades/ hammers of the bag opener for opening plastic liner bags shall be easily maintained/ replaced when damaged. The bag opening blades/ hammers shall be wear-resistant.
- (d) The bag opener shall be designed to be easily opened hydraulically for maintenance. The drum and its drive shall be easily dismantled when needed to facilitate repair and maintenance.

- (e) The drum rotating speed and capacity of the bag opener shall be adjustable by means of variable speed drive. If overloading torque is detected during operation, the infeed shall be stopped, and the drum shall automatically turn in opposite direction for a short period of time.

2.19.2 Separation Mill

- (a) The Contractor shall provide and install Separation Mill to perform the separation of Food Waste from the impurities. The Separation Mill shall at least have the following functions and features: -
- (i) Mechanical unpacking;
 - (ii) Extraction of organic matters;
 - (iii) Separation and washing of impurities; and
 - (iv) Robust against undesired material such as wood, metal and glass.
- (b) The Separation Mill shall consist the following components: -
- (i) Rotor with hammers;
 - (ii) Drum sieve; and
 - (iii) Screw press.
- (c) The Separation Mill shall have an opening mechanism which allows quick access of the internal treatment chamber for cleaning and/ or maintenance.
- (d) The following particulars of the proposed party(ies) for the execution of design and supply of Separation Mill shall be submitted to the Supervising Officer within one (1) month from the date of the Letter of Acceptance: -
- (i) Name of the proposed party(ies) for design and supply separation mill to Organic Waste Treatment Facilities; and
 - (ii) Past experience with contract titles, dates together with certified true copies of any documentary proofs.
- (e) The Separation Mill shall be designed to treat organic waste and food waste. It shall separate impurities such as packaging materials and hard shells easily. It shall be robust against hard material such as wood, metal and glass.
- (f) The mill adds dilution / process water to prepare the food waste into organic slurry with suitable solids content so that it can be pumped and transported directly to downstream buffer tanks for retention.
- (g) The drum sieve in the Separation Mill shall be resistant to abrasion. The particle size of organic matters / substrates to be obtained by Separation Mill shall not be larger than 12mm.
- (h) The Separation Mill shall be integrated with a screw press to squeeze the water left in the impurities and inert material. The water squeezed out shall be reused in the pre-treatment process.

- (i) The Separation Mill shall have minimum one (1) job references in design capacity of Facility in Organic Waste Treatment Facilities for continuous period of three (3) years within the past ten (10) years.(j) The Contractor shall engage a manufacturer representative of Separation Mill on site within period of equipment installation and plant commissioning test. The representative is responsibility to supervise the equipment installation and to carry out the plant commissioning test.
- (k) The representative shall be delegated by manufacturer of Separation Mill. The representative shall have minimum experience for three (3) nos. of Separation Mill installation and for carrying out three (3) nos. of Separation Mill commissioning test. The Contractor shall submit name, qualification and experience of the representative(s) to the Supervising Officer for approval prior to installation

2.19.3 Residues handling

- (a) The impurities and inert material separated out after pre-treatment shall be Residues to be disposed of at Designated Landfill or other locations as instructed by the Employer. The Contractor shall collect the Residues and store it properly before any disposal.
- (b) The Residues shall be stored in an enclosed container to ensure water in the Residues will not leak. The air inside the container shall be extracted to the deodorisation system for treatment.

2.19.4 Macerator

- (a) The Contractor shall provide and install macerators to ensure particle size of the Pre-treated Food Waste/organic slurry shall be less than 6mm in any plane before pumping to the digesters. The macerator shall reliably macerate fibres and solids present in the Pre-treated Food Waste to reduce the viscosity and homogenise liquids and suspensions. The liquid flow shall transport all floating and suspended solids within the medium to the screen and macerate by rotating cutting blades.
- (b) The macerator shall at least have the following components: -
 - (i) Screen with passage not larger than 6mm; and
 - (ii) Cutting blade.
- (c) The macerator shall be installed inline with Pre-treated Food Waste/organic slurry delivery pipework. The cutting blades shall be a primary wear part with the screen being second in organic slurry flow.
- (d) The macerator shall be designed for low and easy maintenance. All wearing parts, including the blades and screen, shall be easily accessible and replaceable.
- (e) The cutting blade shall be wear-resistant and positioned against the screen in a self-adjusting manner. The blade and the screen shall be constant contact.
- (f) The operation of the macerator shall be fully automatic and low maintenance. The cutting pressure shall be monitored to ensure its performance is satisfactory. If blockage is detected during the cutting, the blade shall reverse repeatedly until the blocking matter is macerated.
- (g) The macerator shall have cleaning ports to facilitate the removal of any heavy material settled.

- (h) The Contractor shall provide and install at least one unit of standby macerator in operation system. The standby unit would be put in operation simultaneously while the duty unit of macerator shuttled down. The capacity of standby macerator shall cater the throughput of Separation Mill.

2.19.5 Transfer pump

- (a) The transfer pumps shall be provided to deliver organic slurry from separation mill to buffer tank. The transfer pumps would be designed to provide sufficient delivery head for organic slurry passing through the macerators to buffer tank.
- (b) The Contractor shall provide and install at least one unit of standby pump for delivery of organic slurry from separation mill to buffer tank. The standby unit would be operated simultaneously while the duty unit of transfer pump shuttled down. The capacity of standby pump shall cater the capacity of standby unit of macerators.

2.19.6 Polishing

- (a) The Food Waste pre-treated by the Separation Mill shall be further polished to remove grits and other heavy impurities. The Contractor shall provide and install hydrocyclones to separate grit and impurities of high specific gravity in the organic slurry.
- (b) The hydrocyclone shall be wear-resistant and designed to treat organic slurry. The extracted grit and heavy impurities shall be transferred to grit washer for further cleaning before disposal.
- (c) The grit washer shall wash the extracted grit and heavy impurities to minimise its organic content before disposal. The wash water shall be reused as the dilution water in the Separation Mill.

2.19.6 Potable and Process water system

- (a) The Contractor shall design and provide a potable water system and a process water system which can minimize the consumption of potable water. The process water would be used for non-human contact application such as deodorization system, separation mill, polishing system and dilution water to prepare 3-5% DS pre-treated food waste/ organic slurry etc. The part of process water would be collected from waste water generated from cleaning activities or leachate split from food waste receiving/unloading. The remaining amount of process water necessary for the operation of the food waste pre-treatment facility is supplemented by potable water.
- (b) The process water system shall include but not limited to process water tank, transfer pumps, strainer/mesh guard, valves and associated automation control for cooperation the control of process waters' consumer.
- (c) The estimated consumption of process water would be listed out and advised by the Contractor for Supervising Officer information. The design of process water system shall be consented by Supervising Officer before provision.

2.20 Food Waste Conveyance System

- (a) The Contractor shall design and provide the Food Waste Conveyance System, which can be of belt conveyor, screw conveyor or pumping, for conveying the Food Waste in the Facility.
- (b) The Food Waste Conveyance System shall be made accessible safely and easily for daily operation and maintenance.

- (c) Safety device capable of tripping the equipment operation when activated shall be provided to safeguard operation and maintenance personnel.
- (d) The Contractor shall design the Food Waste Conveyance System with due considerations of the viscosity and nature of the conveying material.

2.21 Pre-treated Food Waste Conveyance System

2.21.1 Buffer tank

- (a) The Contractor shall provide and install a buffer tank to store the Pre-treated Food Waste/organic slurry before pumping to the digesters. The storage capacity of the buffer tank shall be at least one day, and the dry solids content of the Pre-treated Food Waste/organic slurry stored is not more than 5 %.
- (b) The buffer tank shall have partitions to ensure the Pre-treated Food Waste produced daily are not mixed. Mixer shall be provided to each partition to ensure the Pre-treated Food Waste is fluidised and suitable for pumping at any time.
- (c) Sampling points shall be installed to facilitate daily sampling of the Pre-treated Food Waste.
- (d) The buffer tank shall be fully enclosed and covered. The air inside shall be extracted to the deodorisation system for odour treatment.
- (e) As biogas may be generated in the buffer tank, the Contractor shall have due considerations in his design to monitor and prevent any leakage of biogas. The Contractor shall observe all the relevant requirements related to biogas safety when designing the buffer tank.

2.21.2 Pre-treated Food Waste Transfer pipe

- (a) The Pre-treated Food Waste transfer pipes, fittings and pipe supports between the Facility and the digesters shall be constructed of stainless steel grade 316 pipes. The Contractor shall design and construct a distribution pipework on the roof of the pipe portal of sludge digester no. 1 to no. 4. The distribution pipework shall be capable to select digester(s) by manual valve for dosing of Pre-treated Food Waste. The manual valve would be 5 way ball valve to be 1-in and 4-out design and to be provided with manual lever for manual switching of treated food waste to different digesters. The material of valve's casting and ball shall be made of stainless steel grade 316 and the valve connection shall be flange end. Structural support frame shall be provided to support all valves from the ground.
- (b) An isolation valve shall be provided and installed before the transfer pipes entering individual digester via the access hatches on the digesters. The access hatches on the digesters shall be consented by operators of the Existing Facilities.
- (c) The design of the transfer pipe shall minimise the use of elbow fitting over 45°. If use of 90° elbow fitting is necessary, tee fittings with blank flanges shall be used to facilitate future maintenance. The inner diameter of the transfer pipe shall be at least 200 mm.
- (d) The Contractor shall conduct condition survey on existing structures that support the transfer pipes to ensure the installation of the transfer pipes will not affect the integrity of any existing structures.

- (e) The Contractor shall provide and install a flushing system to flush the transfer pipe after pumping the Pre-treated Food Waste generated in Operation. The design of the flushing system shall ensure minimum amount of process water is used while the entire length of the transfer pipe is flushed. For avoidance of doubt, volume of process water used for pipe flushing shall be taken into account in determination of the quality of Pre-treated Food Waste specified in Clause 1.5A.5 of the Employer's Requirements.
- (f) The Contractor shall provide and install the access hatch covers and flanges in 4 nos. of existing digesters for transfer pipe connection. Material of cover and flange shall be identical with material of transfer pipes.
- (g) The flushing and drainage points shall be provided for any sunken pipes which Pre-treated Food Waste would be accumulated in transfer pipes.
- (h) The design of the Pre-treated Food Waste Conveyance System shall also submit to the operators of the Existing Facilities and Supervising Officer for consent. The submission shall include the estimated construction time and the relevant traffic arrangement during construction.
- (i) The Contractor shall provide and install the on-line pH sensor with associated instrument in pipework to monitor the real-time of pH value of transferring Pre-treated Food Waste to digesters. The pH reading shall be recorded and tracked in SCADA system.
- (j) The sufficient sampling tape points with isolation valves should be provided to facilitate the future sampling of the Pre-treated Food Waste.
- (k) The Contractor may take reference from Existing Facilities to counter propose an alternative Pre-treated Food Waste diversion arrangement (typical ring main distribution pipework with minimum 4 number of valves) or alternative equipment (3 sets of 3-way ball valve) for consent of the Supervising Officer and operator of Existing Facilities.
- (l) The Contractor shall provide and install the on-line total solid sensor with associated instrument in pipework to monitor the real-time of total solid content of transferring Pre-treated Food Waste to digesters. The total solid content shall be recorded and tracked in SCADA system.

The inline type solids content sensor shall have the following features:-

- The total solids content meter shall be suitable for measuring the solid content of Pre-treated Food Waste.
- The solids content meter shall consist of ONE inline flow through sensor and ONE transmitter.
- The total solids content meter shall adopt microwave technology, which allows it to continuously measure total solids content, unaffected by flow rate or colour of the process stream.

2.21.3 Transfer pump

- (a) The Pre-treated Food Waste/organic slurry shall be pumped to the digesters using progressive cavity pumps. Due consideration shall be given on the dry solids content and viscosity of the Pre-treated Food Waste when designing all transfer pumps.
- (b) The pre-treated food waste pipe connects to the buffer tanks and the digesters should be flushed by process water for at least one minute after each pumping. The drainage water is not allowed going to any one of digesters.

- (c) An electromagnetic flowmeter shall be installed in transfer pumping discharge pipework to digester. The real time flowrate and accumulated volume transferred shall be displaced and recorded in SCADA System. The electromagnetic flowmeter shall be in accordance with Clause 4.5.1 of the GSEMSFI.
- (d) The Contractor shall provide and install at least one unit of standby transfer pump for delivery of Pre-treated Food Waste/organic slurry to digesters. The standby unit would be operated simultaneously while the duty unit of transfer pump shuttled down. The capacity of standby transfer pump shall empty the buffer tank of Pre-treated Food Waste/organic slurry from full tank within two hours.

2.22 Land Transport

2.22.1 General

- (a) Upon the instruction by the Supervising Officer, which shall be given to the Contractor at least two weeks prior to the commencement of the Operation Period, the Contractor shall provide land transport for exclusive use of the Employer from the date of commencement of the Operation Period until the expiry of the Contract unless instructed otherwise by the Employer. The land transport shall include one (1) non mini-bus type 5-door vehicle, as approved by the Supervising Officer, with a petrol-electricity hybrid engine of capacity not less than 1,900 c.c., with environmental-friendly petrol engines of type approved by EPD or with the “Environment-friendly Private Car Certificate” issued by EPD. The vehicles shall have double electrical sliding doors, ion air cleansing and a seating capacity of 6 passengers (excluding the driver). The vehicle shall be in white colour.
- (b) Unless otherwise agreed by the Supervising Officer, the vehicle stated above shall be able to be driven on public roads and the access to the Site defined in Clause 1.1.3B of the Employer's Requirements.
- (c) Each vehicle stated in Clauses 2.22.1 (a) of the Employer's Requirements shall be fitted with an effective air-conditioning system and seat belts for consent of the Supervising Officer. The Contractor shall provide one mobile phone with hand-free device and with telephone services provided by a service provider for the use of the driver in the vehicle for the communication between the Employer or his staff and the driver of the vehicle. The mobile phone shall be approved by the Supervising Officer, and with one charger, one additional battery or power bank which is not less than 10000 mAh, and blue-tooth hand-free ear phone set. The Contractor shall meet all charges necessary for the operation and maintenance of the mobile telephone.
- (d) The vehicles shall be kept available for use at all times during the following periods: -
 - (i) normal working hours and such other times when the Contractor is working; and
 - (ii) when requested by the Employer for emergency situations, or for the discharge of their duties outside the period stated in the previous subparagraph.
- (e) The Contractor shall not use the vehicle supplied under Clause 2.22.1 (a) of the Employer's Requirements for his own purposes and he shall ensure that the vehicle are not used by any person outside the specified periods.
- (f) The Contractor shall provide the services of a competent English and Cantonese speaking driver for each vehicle acceptable to the Employer but he shall nevertheless permit the vehicles to be driven by any other qualified driver permitted by the Employer.

- (g) The Contractor shall ensure that the driver institute and maintain a record of the use of the vehicle. Such a record shall include, inter alia, details, times and purpose of journeys together with appropriate odometer readings and distances travelled. The person using the vehicle or authorizing the journey shall be required to sign his name and title against the entries. The Contractor shall provide appropriate log books for this purpose. The driver shall present current log books for inspection when so required by the Employer.
- (h) The vehicles shall be covered by a fully comprehensive insurance which includes passenger liability and allows it to be driven by any driver, and includes for use at the Site and public highways in Hong Kong.
- (i) The Contractor shall maintain, repair, tax, insure and license the vehicle and provide all necessary fuel and oils, tunnel and highway tolls, and parking fees.
- (j) The vehicle shall revert to the Contractor on the expiry of the Operation Period or 60 days after early termination of the Contract in accordance with Clause 105 of the Conditions of Contract or at such earlier date as the Employer may notify in writing.
- (k) The Contractor shall make available similar alternative transport when the vehicle provided is unavailable for any reason.
- (l) The Employer's vehicle shall be replaced by a new vehicle similar to the respective vehicle specified when the mileage of the respective vehicle has exceeded 150,000 km. The old vehicle shall revert to the Contractor.

2.23 Process, Electrical and Mechanical Design Submission Requirements

2.23.1 General

- (a) The Contractor shall provide all the necessary and complete details and information in his design submissions to facilitate the Supervising Officer's consent. No cost and time claims shall be entitled in case a delay happens as a result of the fact that the Contractor fails to provide the necessary information to facilitate the Supervising Officer's consent.

2.23.2 Process, electrical and mechanical equipment/ process system design calculations

- (a) Such calculations shall include, but not limited to the following systems: -
 - (i) Reception System;
 - (ii) Food Waste Pre-treatment System;
 - (iii) Food Waste Conveyance System;
 - (iv) Pre-treated Food Waste conveyance system;
 - (v) Deodorisation System;
 - (vi) Pumping and piping systems;
 - (vii) Lifting appliances;
 - (viii) Pipework supporting system;
 - (ix) Electrical works and electrical system analysis;
 - (x) Sewage collection and discharge;
 - (xi) Wastewater collection and discharge;
 - (xii) Building services works; and

- (xiii) Any other design calculations in relation to the Facility's electrical and mechanical works as required by the Design Checker and/or Supervising Officer to facilitate their certification and consent process.
- (b) These calculations shall include all aspects in relation to the Contractor's electrical and mechanical equipment/ system design, selection, sizing, settings requirement and relevant analysis.

2.23.3 Process, electrical and mechanical equipment/ system technical information

- (a) Technical information on the proposed process, electrical and mechanical works submitted shall include, but not limited to the following: -
 - (i) Relevant catalogue cuts complete with highlights of the proposed models and features;
 - (ii) All proposed options and accessories to be provided;
 - (iii) Technical data sheet summarising all key information including but not limited to the following. General format and key information of this technical data sheet shall be submitted to Supervising Officer for consent prior to any formal equipment/ system submissions. Any delay, time and cost implications resulting from the Contractor's failure in submitting or failure in obtaining consent by the Supervising Officer of this technical data sheet shall be borne by the Contractor: -
 - (1) Equipment name;
 - (2) Duty and standby provisions;
 - (3) Equipment brand and model;
 - (4) Country of origin;
 - (5) Physical dimensions, static and dynamic load;
 - (6) List of materials of construction;
 - (7) Turn down ratio;
 - (8) Design duty point(s) and/or operating range;
 - (9) Electrically related information, rated power, voltage, rated current, supply frequency, power factor etc.;
 - (10) Applicable international standards of the proposed equipment covering at least the aspects of selection, design, installation and testing;
 - (11) Applicable Hong Kong legislation and regulations on the proposed equipment covering at the aspects from design, installation, testing, inspection, certification, approvals etc.;
 - (12) Specific remarks/ requirements/ criteria of the selection of this equipment; and
 - (13) Any other technical data as required by the Supervising Officer.
 - (iv) Equipment/ system characteristics curves, pump curves etc.;
 - (v) Equipment/ system allowable vibration;
 - (vi) Equipment/ system static and dynamic loads;

- (vii) Painting or coating system, including surface preparation, primer, number of coats, respective dry film thickness etc.;
- (viii) Installation requirements;
- (ix) Schedules/ lists of process, electrical and mechanical works to facilitate the Supervising Officer's consent, which include, but not limited to the following shall be submitted by the Contractor: -
 - (1) Major process, electrical and mechanical equipment/ system within the Facility;
 - (2) Mobile Plant; and
 - (3) Any other details considered to be necessary by the Supervising Officer.
- (x) Schedules/ list of process equipment of a system shall include but not limited to the following technical details: -
 - (1) Tag number/ identification number;
 - (2) Equipment name;
 - (3) Equipment brand and model;
 - (4) Equipment power rating;
 - (5) Type of power used shall include but not limited to electrically powered including but not limited to voltage HV/LV/DC, rating, start up method and etc.; hydraulically powered including but not limited to fluid type, model, working pressure etc. and pneumatically powered including but not limited to model, working pressure, process air quality requirement and etc.
 - (6) Noise level;
 - (7) Materials of construction for equipment and its major components;
 - (8) Hazardous area installation required and to which zone as per BS EN 60079;
- (xi) Various schedules shall include but not limited to the following: -
 - (1) Facility labels and signs;
 - (2) System pipework, identification and colour codes;
 - (3) Fieldbus communication, analogue and digital input/ output (I/Os);
 - (4) Power and control cable schedules;
 - (5) Cable tray/ ladder/ support system;
 - (6) Pipework and valves (type, size, standards, pressure rating and etc.); and
 - (7) Pipework installation (connection methods, loads, supporting system, lagging system and etc.)
- (xii) Power and control cable schedules;
- (xiii) Any special requirements in relation to design considerations and provisions to facilitate the Construction works installation, testing and commissioning work;
- (xiv) Recommended spare parts and special tools lists for each equipment item sufficient for 1-year normal operation and maintenance use;

- (xv) Material and colour samples (including any relevant on site or off site sample demonstration test) that the Contractor considers to be necessary or as required by the Supervising Officer to facilitate their certification and consent process; and
- (xvi) Any other equipment/ system technical information in relation to the Facility's electrical and mechanical works required by the Design Checker and/or Supervising Officer to facilitate their certification and consent process.
- (b) A mere collection of catalogue cuts alone as design submission shall not be accepted.
- (c) Unless otherwise consented by the Supervising Officer, materials of construction used for the following shall be consistent throughout the Facility as practically as possible.
 - (i) Pipework (inclusive of instrument tubing), pipe supports, pipe ladder, pipe straps/ bolts, lagging system etc.;
 - (ii) Cables cleats, supports, trays, conduits, trunking and ladder;
 - (iii) Ductwork and their supports;
 - (iv) Various building services installations; and
 - (v) Any other items as considered to be necessary by the Supervising Officer.
- (d) The Contractor shall clearly indicate their proposed materials of construction in the schedules/ lists of electrical and mechanical works, complete with details and information on applicable standards for design, installation, and testing, and submit for the Supervising Officer's consent, with clear substantiation upon request. Any items installed onsite failing to adhere to the consented schedule/ list of electrical and mechanical works shall require to be removed from site and re-provided at the Contractor's own time and cost.

2.23.4 Drawing information

- (a) Drawing information shall include but not limited to the following: -
 - (i) Equipment and system shop drawings;
 - (ii) General arrangement/ sections drawings;
 - (iii) Schematic diagrams;
 - (iv) Process flow diagrams;
 - (v) Piping & instrumentation diagrams (P&ID);
 - (vi) Electrical and control wiring diagrams;
 - (vii) Control/Instrument loop diagrams;
 - (viii) Electrical system single line diagrams;
 - (ix) Civil requirements drawings;
 - (x) Electrical and mechanical installation drawings (single line pipework diagrams as installation drawings shall not be accepted);
 - (xi) Electrical and mechanical combined services installation drawings;
 - (xii) Any special requirements in relation to design considerations and provisions to facilitate installation, testing and commissioning work; and

- (xiii) Any other drawing information in relation the Facility's electrical and mechanical works required by the Supervising Officer to facilitate their certification and consent process.

2.24 Testing of the Facility

2.24.1 General

- (a) The Contractor shall carry out the testing for the Facility with the sequence as follows: -
- (i) Factory acceptance tests (FATs);
 - (ii) Site acceptance tests (SATs); and
 - (iii) System acceptance tests.
- (b) The Contractor's attention is drawn on the following regarding the necessary liaisons, coordination and arrangement with the relevant parties before, during and after (as necessary) the testing of the Facility: -
- (i) Utilities companies, parties, government departments etc. on power and water supply; and
 - (ii) Any other relevant government departments, parties, authorities etc. on relevant and related matters.
- (c) The Contractor shall be responsible for all the associated costs, including labour and materials to cater for all activities including shutdowns, start-ups and restart-ups required, for the entire testing period.
- (d) As for minimum, the Contractor shall engage the following equipment/ system manufacturer's representatives of the following for testing activities or even earlier.
- (i) The Food Waste Pre-treatment Technology Specialist shall be present onsite during testing of the Facility and shall be available at on-call duty during the Post-commissioning Stage.
- (e) The manufacturer's representatives shall be of the manufacturer's direct staff or endorsed personnel and shall have at least 5 years of field testing and commissioning experience of similar (or larger) order of size of the equipment/ system which are supplied and installed. Curriculum vitae showing his experience and competence shall be submitted for the Supervising Officer's consent.

2.24.2 Factory Acceptance Tests (FATs)

- (a) The FAT plans including test procedures and form for all the electrical and mechanical equipment/ system shall be submitted for the Supervising Officer's consent at least 60 calendar days before the proposed date of the FAT of the equipment/ systems.
- (b) The testing procedures included in the FAT plans shall not only be limited to the manufacturers' own quality assurance requirements but shall also include the tests to show the manufactured equipment's compliance with the Contract requirements and to meet all the requirements as per the consented Contractor's design submissions.
- (c) Any equipment tested and delivered to the Site without following FAT plan consented by Supervising Officer, shall be subject to rejection and removal from the Site at the cost of the Contractor.
- (d) The electric motor used for driving equipment during FATs shall, wherever possible, be the service motor for that item.

- (e) Where applicable, performance certificates for the motors used shall be included in the factory certification produced for the tested equipment for the Supervising Officer's consent.
- (f) As for minimum, the following equipment/ systems shall be included in the FATs: -
 - (i) Metering bunker;
 - (ii) Separation Mill;
 - (iii) Macerator;
 - (iv) SCADA System; and
 - (v) Low voltage switchboards and motor control centres.
- (g) On-line witness of the FATs should be arranged by the Contractor if required by the Employer.
- (h) Written notifications shall be submitted by the Contractor at least 60 calendar days before the commencement of FATs requiring the witness by the Supervising Officer at the manufacturers' factories.
- (i) The results of all factory tests and other pre-installation tests conducted shall be certified by the manufacturer.
- (j) The FAT report shall include but not limited to: -
 - (i) A description of the work or materials that have been tested;
 - (ii) A description of the tests undertaken with details of the testing rig and instrument accuracy where appropriate;
 - (iii) The criteria achieved during each test with acceptable tolerances;
 - (iv) Material certificates;
 - (v) Welding procedures;
 - (vi) Test and inspection reports and certificates etc. for each item of equipment; and
 - (vii) Remedial actions for defects/deficiencies identified.
- (k) The FAT report/ factory certificate shall be submitted within 14 calendar days after the successful completion of the FAT for the consent of the Supervising Officer. Shipment of the equipment/ system shall only be allowed by the Contractor upon the receipt of the Supervising Officer's consent. Any shipment and/ or delivery of the equipment/ system without the Supervising Officer's consent may be subject to rejection and removal from Site and that shall be at the cost of the Contractor.
- (l) Pressure/ hydrostatic tests
 - (i) All items subjected in service to internal pressure or vacuum shall be designed, manufactured, installed, tested and certified in compliance with the requirements of the Labour Department - Boilers and Pressure Vessels Ordinance (Cap.56), appropriate standards, namely, BS EN 12952, BS EN 13445, Pressure Equipment Regulations (Directive 2014/68/EU) etc.
 - (ii) Unless otherwise consented by the Supervising Officer, the following shall be conducted by the Contractor at the manufacturer's factory: -
 - (1) Pressure and hydrostatic testing shall be carried out prior to any internal or external coating; and

- (2) Where impractical and unless otherwise consented by the Supervising Officer, vacuum containment items shall be vacuum-tested.
- (iii) For hydrostatic testing of equipment, the Contractor shall consider but not limited to the following: -
- (1) Lubricating oil shall be used as the test fluid for lubricating and seal oil piping systems, and hydraulic oil as the test fluid for hydraulic systems;
 - (2) For all other systems, water shall be used as the testing medium unless otherwise agreed, and the test pressures shall be in accordance with the applicable construction standard;
 - (3) Unless otherwise specified, the test pressure shall be 1.5 times of the design pressure but not less than 3.5 bar gauge;
 - (4) Test pressure of vacuum containment equipment shall be based on the consent of the Supervising Officer;
 - (5) The test pressure shall be maintained for the time specified in the relevant standards or at least 8 hours;
 - (6) The pressure shall then be reduced to the design pressure and maintained for sufficient time to permit complete visual examination of all surfaces and joints and in no case less than specified in the applicable international standard or code of practice;
 - (7) Precautions shall be taken to avoid damage to expansion bellows and other fittings during testing; and
 - (8) Adequate drying and cleaning of items to prevent deterioration shall be made in appropriate cases following the testing.
- (iv) For pneumatic testing of equipment, the Contractor shall consider but not limited to the following: -
- (1) Pneumatic testing shall only be proposed in cases where hydrostatic testing is impractical, dangerous or not recommended by the manufacturer for whatever reason;
 - (2) Safety precautions, test pressures/ duration and degree of prior non-destructive examination of the subject items shall be consented by the Supervising Officer; and
 - (3) Pneumatic or gas leak testing supplementary to hydraulic testing shall be applied in appropriate cases where specified by the applicable construction standard.
- (v) Alternative methods to hydraulic or pneumatic testing for proving the integrity of pressure and vacuum containment equipment shall be subject to the consent of the Supervising Officer.
- (m) Rotating machine tests
- (i) Mechanisms which include rotating components, such as compressors, pumps and fans, shall undergo and successfully complete suitable performance tests to the satisfaction of the Supervising Officer.
 - (ii) All rotating units shall undergo suitable static and dynamic balancing of rotating components.

- (iii) All rotating machine shafts shall be dynamically balanced based on the requirement as per the relevant requirements of ISO 1940, VDI 2060 or other equivalent as consented by the Supervising Officer.
- (iv) All pumps and fans shall be factory tested, and issued with certified flow/head, flow/power absorbed, flow/efficiency, flow/net positive suction head (NPSH) documentation.
- (n) Pump tests
 - (i) Running tests and performance tests shall be conducted on all feed water pumps, main condensate extraction and return pumps and fire services pumps.
 - (ii) Performance tests shall be carried out on all of the above pumps in compliance with BS EN ISO 9906: Rotodynamic pumps. Hydraulic performance acceptance tests. Grades 1 and 2. The pumps shall be tested to Grade 1 if design pressure is above 5 bar.
 - (iii) The performance test shall be conducted through the full operating range (flow/head) of the pump to closed valve conditions.
 - (iv) Graphs indicating flow/head, flow/power absorbed, flow/efficiency, flow/NPSH shall be provided for each pump.
- (o) Electrical equipment tests
 - (i) Electrical equipment and tools shall be tested in accordance with the requirements as per relevant clauses in Part 3 of the Employer's Requirements and/or other relevant specifications/standard publications listed in Part 2 of the Employer's Requirements.
 - (ii) All electrical switchboards, switchgears, control gears, panels and transformers shall undergo full factory acceptance tests, including ensuring the earthing arrangement is suitable for the Facility, and using simulated inputs for correct functionality at the manufacturer's facility before dispatch to site.
- (p) Operation management system and instrumentation tests
 - (i) All of the operation management system's operation subsystems and various major automated control systems of the Facility shall undergo full FAT using simulated inputs for correct functionality at the manufacturer's works before dispatch to site.
 - (ii) The operation management system shall include all the operation subsystems as specified in Part 4 of the Employer's Requirements. All major equipment/system/ plant automated control systems including the Food Waste Reception System, Food Waste Conveyance System, Pre-treated Food Waste Conveyance System and Deodourisation System shall be integrated with the SCADA System.
 - (iii) The Contractor shall be responsible for ensuring that suitable simulation for correct functionality of the control loop, testing and approval by the respective manufacturers and the system integrator that the FAT have been satisfactory completed prior to delivery to site for installation, so as to minimise the time spent onsite for debugging and troubleshooting of the integration of the entire operation management system as a whole. Clear details of the plan in conducting the aforesaid shall be submitted as part of the FAT plan for the operation management system and instrumentation.

- (iv) The Contractor shall submit a comprehensive description of each test in the FAT plan for the operation management system and instrumentation. The Contractor shall ensure that calibration tests of all instruments and equipment by the manufacturers have been carried out prior to shipping to site. Calibration certificates shall also be submitted for Supervising Officer's consent as part of the FAT reports and certificates.
- (v) The Supervising Officer shall reserve the right to demand recalibration of any instruments and equipment at the Contractor's cost, should in the opinion that the Supervising Officer has his reasons to suspect the accuracy of that instrument(s) or equipment.

2.24.3 Site Acceptance Tests (SATs)

- (a) During the site acceptance tests (SATs), the Contractor shall demonstrate to the Supervising Officer the proper installation, functionality, materials of construction, arrangement, workmanship and performance of the installed equipment as per the Registered Design. SAT shall include, but not limited to the following: -
 - (i) Installation alignment and level checks;
 - (ii) Welding tests;
 - (iii) Installation checks;
 - (iv) Earthing checks;
 - (v) Cable checks;
 - (vi) Pipework and vessels pressure (including equipment subject to vacuum) tests under conditions as specified in Clause 2.24.2(l) of the Employer's Requirements;
 - (vii) Temperature tests;
 - (viii) Vibration tests;
 - (ix) Noise level tests;
 - (x) Safety equipment tests;
 - (xi) Voltage and current tests;
 - (xii) Functional tests and site tests of all electrical equipment including switchboards, switchgears, motor control centres, control panels, transformers and gensets;
 - (xiii) Equipment protection interlock checks;
 - (xiv) Motor rotation direction and electrical tests;
 - (xv) Control and functional checks of the operation management system and all equipment/systems/plants automated control systems;
 - (xvi) Local, remote, automatic manual checks;
 - (xvii) Control / Instrument loop checks;
 - (xviii) Instrument calibration checks;
 - (xix) Equipment performance test; and
 - (xx) Any other relevant test/ check/ inspection of the equipment/ system considered to be necessary by the Supervising Officer.

- (b) All SAT plans including procedures and forms shall be submitted for the Supervising Officer's consent at least 60 calendar days prior to commencement of the tests. This plan shall include details of any temporary works required for the onsite testing of equipment/system.
- (c) The Contractor shall submit notification/ request with 7 calendar days advance notice to the Supervising Officer for their witness and/ or inspection of the SAT work.
- (d) The Contractor shall return the individual completed SAT forms/ reports for the Supervising Officer's consent within 5 calendar days upon completion of the test. The Contractor shall obtain documentations and/ or certifications and/ or endorsement from the manufacturers on the satisfactory site installations and testing of their equipment/system as part of the SAT forms/ reports.
- (e) The Contractor shall also be responsible to ensure all the necessary tests, inspections, examination, certifications, approval etc. under the requirements of all current Hong Kong applicable ordinances, regulatory requirements etc. are satisfactory achieved by the end completion of the SAT, so that all the relevant equipment/ systems are safe in working order and can be used legally, and ready for the subsequent system acceptance tests. Copy of these certifications, approval etc. shall be submitted to the Supervising Officer for record. Such certification, approval etc., shall include but not limited to the following: -
 - (i) Certificates of fitness under the Boilers and Pressure Vessels Ordinance Cap 56;
 - (ii) Certificates (approved forms) after "test and thorough examination" under Lifting Appliances and Lifting Gear Regulations issued under the Factories and Industrial Undertakings Ordinance Cap 59; and
 - (iii) Work completion certificate – Form WR1A and Form WR1 under the Electricity Ordinance (Chapter 406) Electricity (Wiring) Regulations.
- (f) The Contractor shall be responsible for all the associated costs, labour and materials, inclusive of any temporary works/ installations, testing equipment, testing media etc. related to the SATs.

2.24.4 System Acceptance Tests

- (a) Upon the completion of the FATs (if any) and the necessary SATs of the equipment/systems to the satisfaction of the Supervising Officer, the Contractor may then proceed to the system acceptance tests upon the consent of the Supervising Officer. The Contractor shall submit, at least 14 calendar days in advance, a written notification to the Supervising Officer for his consent for the commencement of each system's system acceptance tests work.
- (b) During system acceptance tests, the Contractor shall demonstrate and/or verify to the Supervising Officer the proper functioning and performance of each system when operated at its maximum designed capacity (unless otherwise specified or consented by the Supervising Officer) continuously over the duration as specified. The system acceptance tests for all the systems shall be carefully planned, coordinated, organised and scheduled in a systematic manner with an objective to ready the entire Facility for subsequent plant commissioning test. For the avoidance of doubt, a system's maximum designed capacity shall refer to the maximum capacity or throughput of which it is designed to deliver, process, operate, treat etc. continuously.

- (c) Unless otherwise specified or as consented by the Supervising Officer, the minimum continuous duration shall be 14 calendar days for each system during normal working hours for the Works. All modes of system control available via the respective operation subsystem of the operation management system, in automatic and manual control (where applicable) shall be demonstrated during the system acceptance tests of each system.
- (d) Unless otherwise consented by the Supervising Officer, the following shall not be permitted during the system acceptance tests. For the avoidance of doubt, the Contractor shall be responsible for the supply and disposal (if required) of the testing media.
 - (i) Use of alternative testing media; or
 - (ii) Change of testing capacity to a range below the maximum designed capacity of any system.
- (e) The system acceptance tests plan for each system shall include procedures and forms, and the system acceptance tests plan shall be submitted for the consent by the Supervising Officer at least 90 calendar days prior to commencement of any system acceptance tests. The system acceptance tests plan shall include, but not limited to the following: -
 - (i) System acceptance tests works overall main programme;
 - (ii) Sub-programmes for each individual system;
 - (iii) The main programme shall indicate Food Waste delivery and Residues disposal requirements (The Contractor shall liaise with the Employer prior drafting this programme);
 - (iv) Unless otherwise specified or as consented by the Supervising Officer, for each system shall include but not limited to the following: -
 - (1) Checklist of pre-requisites and pre-checks of different Plant, Mobile Plant, equipment and system (including all related and supporting auxiliary systems and subsystems), namely for example equipment test records, instrument calibration certificates, settings manual etc.;
 - (2) Pre-start-up checklist;
 - (3) Start-up and test procedures;
 - (4) Operation team and rosters;
 - (5) Safety, emergency and contingency plan, including any fire/ safety drills;
 - (6) Testing / monitoring parameters;
 - (7) Sampling and testing schedule;
 - (8) Appointed Hong Kong Laboratory Accreditation Scheme (HOKLAS) laboratory;
 - (9) Test forms and daily reports format, which can be of written format or in form of reports generated from the operation management system, where appropriate. Samples shall be submitted for the Supervising Officer's consent;
 - (10) Estimation of quantity of testing media required;
 - (11) Estimation of quantity of any discharge from the system including method of the handling and disposal requirements, if required;

- (12) System acceptance tests daily activity logbook to be manually filled in and signed by the Contractor, which shall be immediately available for inspection when requested by the Supervising Officer before, during and after the system acceptance tests.
- (13) Modifications to the Facility, if required;
- (14) Anticipated temporary interruptions and/ or disruption to the Sha Tin Sewage Treatment Works, if any;
- (15) Flow diversions required to facilitate the system acceptance tests work; and
- (16) Any other items considered to be necessary by the Supervising Officer.
- (v) Any other details considered to be necessary by the Contractor and/ or the Supervising Officer (To be confirmed before the plant commissioning test of the Facility starts).
- (f) During the course of the specified continuous test duration, the occurrence of any of the following may constitute to a failure of the system acceptance tests subject to the opinion of the Supervising Officer and shall require re-start the system acceptance test of that system: -
 - (i) Any failure of the monitoring and control system;
 - (ii) Any failure of major equipment (including pipework, ductwork, tanks, vessels etc.) without a standby available;
 - (iii) Any repetitive failure of the associated instruments, equipment or systems;
 - (iv) Any failure of the system to achieve the designed throughput, capacity and/ or process requirements in a continuous manner throughout the specified continuous test duration;
 - (v) Any unstable, erratic and unsafe equipment or system operation;
 - (vi) Any other functions and performance as revealed and considered to be unsatisfactory by the Supervising Officer; or
 - (vii) Any failure to comply with the Contract requirements.
- (g) The Contractor shall return all completed test forms and reports for the consent of the Supervising Officer within 14 calendar days upon successful completion of the system acceptance tests.
- (h) The Contractor shall be responsible for all the associated costs, labour and materials, in related to system acceptance tests, including any temporary works/ installations and restarts of the required system acceptance tests activities upon failure.
- (i) During system acceptance tests, the Contractor shall fine tune the system process and settings of equipment, instrument and control as far as practical for preparation of the subsequent plant commissioning test.

APPENDIX 2.01 SPECIFICATION OF PLASTIC LINER BAG

(Clause 2.19.1(a) of the Employer's Requirements refers)

Item	Details
Capacity	<p>Suitable for lining 120 L mobile plastic waste containers with dimensions specified below: -</p> <p>[Width 915 mm ($\pm 5\%$)] x [Overall length 1,220 mm ($\pm 5\%$)] x [Thickness 0.15 mm ($\pm 10\%$)*]</p> <p>*Thickness is an optional feature which is subject to its capability to meet the minimum load in strength below</p>
Strength	Capable for holding a load of 40 kg food waste in 120 L mobile plastic food waste containers
Colour	Transparent / Semi-Transparent

PART 3 ELECTRICAL

3.1 Introduction

3.1.1S Scope of Specification

GS Clause 3.1.1(a) is deleted and replaced by the following: -

- (a) This Part specifies the requirements of the electrical installations specific to the Facility. Electrical works including power supply from switchboard in the sludge thickening house of the Existing Facilities.

The following clauses are inserted after GS Clause 3.1.1(b): -

- (c) It would be approximate an 800A at 380V power source from the sludge thickening house of the Existing Facilities to be reserved for Food Waste Pre-treatment Facilities. The actual electrical terminal of switchboard in existing sludge thickening house shall be determined on site and consented by DSD.
- (d) Electrical power meter shall be provided and installed in the switchboard of Food Waste Pre-treatment Facilities to monitor the power consumption from the existing sludge thickening house. The readings (voltages, currents and power consumptions) measured from the power meter shall be recorded and tracking by SCADA. The provision of power meter shall be in compliance with digital power analyser General Specification for Electrical Installation (GSEI) Clause C 5.24.
- (e) The Contractor shall be responsible to provide any additional electrical power source if the power demand of Food Waste Pre-treatment Facilities is over the power supply specified in Clause of 3.1.1S (c) of the Employer's Requirement. Any cost or expense due to this arrangement shall be borne by the Contractor.
- (f) The design of cable routing and cable works from power source of sludge thickening house to site boundary shall be consented by DSD and Supervising Officer before conducting any installation works.
- (g) Local control switchrooms, complete with all the necessary local control switchboard/motor control centres, control system and telemetry equipment for the power supply, control, automation and data transfer of the equipment/ systems, shall be logically designed and layout around the Facility and the necessary operational requirements. All local control switchrooms shall be air conditioned and maintained at a slight positive pressure to minimise ingress of odour and dust. No matter whether the Contractor using cable trench, cable basement etc. to accommodate the cables, the Contractor shall follow the guideline as quoted in EMSD's Code of Practice for the Electricity (Wiring) Regulations and allow sufficient space for further maintenance.
- (h) Due considerations and provisions shall be made during the design of all the switchboards arrangement to ensure operation flexibility and also to avoid complete outage during maintenance or fault.
- (i) The harmonic current spectrum of each frequency converter generated at the point of common coupling with the electrical system shall not exceed their permitted limits as per IEEE 519 or other equivalent as consented by the Supervising Officer. The Contractor shall not exceed the limits as specified in the "Code of Practice for Energy Efficiency in Electrical Installation". Otherwise, harmonic filter shall be provided to reduce the harmonic contents.

- (j) All electrical installation design at classified hazardous area shall comply with BS EN 60079-14. The Contractor shall provide the appropriate types of electrical equipment which will be installed in the specified explosive atmospheres and comply with the current Standard. General requirements for electrical equipment located under potentially explosive atmospheres shall comply with BS EN 60079-0:2012+A11:2013. Electrical equipment used shall be certified by British Approvals Service for Electrical Equipment in Flammable atmospheres (BASEEFA)/ Appareils destinés à être utilisés en Atmosphères Explosibles (ATEX) International Electrotechnical Commission - System for Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEx) or other approved equivalent as consented by the Supervising Officer.
- (k) Surge arresters shall be designed and installed at appropriate locations to protect the power supply installations.
- (l) All electrical equipment shall be designed to withstand the maximum available fault current.
- (m) Electrical and mechanical interlocks shall be applied where appropriate to circuit breakers to ensure safe and reliable operation.
- (n) Electrical equipment and machinery shall be designed to have ride-through capability which complied with IEC 61000-4-11 and IEC 61000-4-34.
- (o) The Contractor shall prepare an electricity protection scheme for the Facility. The philosophy of protection is to ensure that in the event of a fault, the faulted section is disconnected from the system and the fault is cleared as to prevent further damage to the power network components and equipment. Back-up protection system shall be provided such that no single failure of a protection system should result in the failure to clear a primary system fault. In addition, proper protection discrimination of protection devices shall be considered so that during the clearing of a fault the power supply stability to the healthy circuits can be maintained and no unwanted tripping in the healthy circuits.
- (p) The Contractor shall be responsible to design, supply and install the power cables for obtaining power supply from switchboard of the existing sludge thickening house of the Existing Facilities. The schematic arrangement for power cable is shown on Employer's Drawing No. 60634312/EP/1003 for information only. The Contractor shall carry out all relevant modification works at the switchboard of the existing sludge thickening house of the Existing Facilities. The Contractor shall obtain the consent from the operator of the Existing Facilities on the design of electrical modification works before commencement of any relevant works.
- (q) All electrical works shall only be carried out by registered electrical contractors/workers with proper electrical work grade as per the Cap 406 Electricity Ordinance.
- (r) The electrical system for the Facility shall be designed with redundancy to ensure normal operation of the plant shall be maintained during maintenance of individual electrical equipment of periodic inspection and testing as per the Cap 406 Electricity Ordinance.

- (s) A power system safe management protocol shall be in place to ensure the safe control, operation, switching and maintenance of the electrical system of the Facility and shall be submitted for the Supervising Officer's consent. This protocol shall include but not limited to safety rules for electrical works, procedures for power system control, procedures for operations on switchgears, maintenance procedures, permit-to-work system, authorization of competent persons, training of competent persons, training of competent persons and etc.
- (t) After the completion and satisfactory site testing of the fixed electrical installation, WR-1 Form signed by an EMSD registered electrical contractor and electrician with proper electrical work grade shall be issued as per Cap 406 Electricity Ordinance to certify the satisfactory completion of an electrical installation. The Contractor shall submit all evidence of the satisfactory completion of site tests of the installations and copy of the filled and signed WR-1 forms for the Supervising Officer's record prior to any energization work.

3.5.6 Uninterruptible Power Supply

The following clauses are inserted after GS Clause 3.5.6(g): -

- (h) The uninterruptible power supply shall be packaged type complete with self-checking monitoring function. All batteries shall be installed in a suitably designed cabinet enclosure. The battery shall be of maintenance-free and sealed nickel cadmium type rechargeable batteries to IEC/BS EN 60623. Subject to the number of battery cells or as considered necessary by the Supervising Officer, the battery cells shall be installed in storage racks inside a dedicated battery room with good ventilation design.
- (i) All UPS shall be of true online double conversion type with no break output supply upon a power failure. UPS shall comply with BS EN 62040-3 or equivalent.
- (j) Unless otherwise specified, UPS shall be capable in providing no less than 2 hours continuous operation time of the supplying equipment upon failure of the mains supply.

PART 4 CONTROL AND INSTRUMENTATION

4.1S Introduction

GS Clause 4.1(a) is deleted and replaced by the following: -

- (a) This Part specifies the requirements of the control and instrumentation installations specific to the Facility.

The following clauses are inserted after GS Clause 4.1(b): -

- (c) The Contractor shall provide an operation management system for the overall operation and maintenance of the Facility, operating 24 hours a day, 7 calendar days a week with unlimited authorised users and their access. The operation management system shall be an integrated system which comprises of but not limited to the following major operation subsystems: -
- (i) Supervisory control and data acquisition system (SCADA System);
 - (ii) Other necessary computer system for operation and maintenance for the Facility.
- (d) The Contractor shall be responsible, but not limited to the following, to make up a complete, stable, functional, operable and maintainable operation management system: -
- (i) Provision of the necessary workstations and server hardware and associated peripheral equipment necessary to make up a complete operation management system;
 - (ii) Provision of all the required system software and associated peripheral software, including all necessary to make up a complete operation management system;
 - (iii) Operation management system database format and its formation;
 - (iv) Preparation of the operation management system implementation plan with methodology and also the execution of the plan;
 - (v) Design, provision and configuration of hardware and software, including any customization necessary for the proper operation of the operation management system as a whole;
 - (vi) Design of the necessary forms, reports etc. to suit the Facility operation needs and also to the satisfaction of the Supervising Officer and/ or the Employer;
 - (vii) Training of the Contractor's staff and the Employer's staff;
 - (viii) Testing and commissioning;
 - (ix) Provision of security software against ransomware and malware attacks, including software and hardware firewall or equivalent technique to restrict unauthorised access from external user to the operation management system.
- (e) Each operation subsystem shall be provided with spare capacity of at least 10% of the input points, output points, chassis, mounting slots, spare memory, logic capacity, and other required software/hardware to facilitate any future expansion use.
- (f) Data transfer and communication links of ethernet dual fibre optic ring topology shall be adopted for all of the operation subsystems of the operation management system. Ethernet communication shall comply with IEEE802.3 Standard. While the ring technology shall comply with IEEE802.5 Standard.

- (g) Unless otherwise consented by the Supervising Officer, all software used for operation management system's operation subsystems shall be of open connectivity (OPC) type to facilitate future integration and modification work. All software shall also be Open Database Connectivity compliant for ease of database maintenance and management. The entire operation management system shall be Microsoft Windows based.
- (h) System control philosophy, system architecture diagrams, functional design specification and mimic graphics of the operation management system (inclusive of all the operation subsystems) shall be included in the design submissions and submitted for the Supervising Officer's consent.
- (i) All operation and maintenance data shall be stored at the data servers independent of the various master workstations and capable of allowing instant online access of at least the previous 5 years operation data. The Contractor shall provide an automatic and secure data archiving/ backup system to handle and to provide easy access of all the operation data throughout the Operation Period.
- (j) The operation management system shall be a secured system; all items stored in the database shall not be editable and erasable. Only upon the Employer's approval, should the Contractor be allowed to carry out any erase, edit, replace, revise or any form of alterations of any existing items data stored in the operation management system. All items in the database shall be readily available upon request by the Employer.
- (k) All aspects of the operation management system shall remain confidential. Information shall only be published or disclosed upon explicit permission. The system shall be developed and implemented with security measures and controls to ensure confidentiality, integrity and availability of the information kept. The Contractor shall comply with the following regulations and policy: IT Security Guidelines (G3), Baseline IT Security Policy (S17), Information Security Incident Handling Guidelines (G54), Security Risk Assessment & Audit Guidelines (G51), relevant and applicable guidelines on information security under the Office of Government Chief Information Officer (OGCIO) of the Government and all the prevailing terms and conditions of the Contract. The operation management system together with all the associated servers and endpoint workstations shall also be equipped with security software against ransomware and malware attacks. The operation management system shall include security features to enable the system administrator to assign different rights (including read, write, delete, or register) to different users or groups of users to work on different files or different folders of files.
- (l) All the information, data, operation and maintenance data throughout the Operation Period of the Facility are the properties of the Employer. The operation and maintenance data shall be managed and safely kept by the Contractor within the Facility throughout the entire Operation Period. The Contractor shall require to handover these operation and maintenance data to the Employer upon the end of the Operation Period. Any use or remote access of operation and maintenance data outside of the Facility or transfer to any other parties shall not be allowed without prior approval by the Employer.
- (m) Software including appropriate numbers of user licences shall be provided for the operation management system as a whole. At least one development licence shall be provided for the HMI software for each of the operation subsystems.

- (n) All information technology (IT) hardware and software for the operation management system shall be of the latest available model or versions, suitable for the application, and complete with all the necessary accessories and modules to make up a complete and functional operating system. All IT software shall be complete with appropriate numbers of user licenses. Number and details of user licenses shall be included in the design submissions. All display monitors shall be of minimum 22" Liquid Crystal Display (LCD) type, resolution 1920 x 1080 pixels with brightness level of 300 Cd/m² for each workstation. A complete list of the hardware and software with specification details shall be submitted for the Supervising Officer's consent.
- (o) The Contractor shall be responsible for the provisions of the workstations and layout design to accommodate including but not limited to the following as minimum, within the control room and all the necessary and associated server hardware in the server rooms: -
 - (i) 1 no. of SCADA master workstations;
 - (vi) The necessary engineering workstations serving the above operation subsystems including for the maintenance and management of the data servers; and
 - (vii) The various associated servers and peripheral devices, including but not limited to, communication devices, printers etc. making up a complete and functional operation management system.
- (p) The Contractor shall be responsible for the provision of all necessary furniture for the workstations and peripheral devices. The furniture for the workstations shall be robust, functional, and practical, and of type specifically designed for IT equipment/ sever room/ computer room use. Details of this furniture shall be consented by the Supervising Officer.
- (q) All electronic equipment of the operation management system which are sensitive to electrical surge, harmonics, lightning, power interruption etc. including, but not limited to master workstations, programmable logic controllers (PLCs), touch panels, computer system, CCTV systems etc., shall be properly isolated from the main power sources and/or protected by appropriate protective devices.
- (r) The Contractor shall manage, maintain and update the operation management system and its database throughout the Operation Period. The Contractor shall also provide the necessary tools (hardware and software) to ensure the proper maintenance and up keeping of the operation management system.

4.2 Supervisory Control and Data Acquisition System (SCADA System)

4.2.1 Introduction

The following clauses are inserted after GS Clause 4.2.1(k): -

- (l) Operation of the Facility including the Food Waste Reception System, Food Waste Conveyance System, Pre-treated Food Waste Conveyance System and the Deodorisation System shall be fully automated using the SCADA System, 24 hours a day and 7 calendar days a week. The Facility shall be controlled from a control room. All process, electrical and mechanical equipment/ systems shall be fully integrated with the SCADA System to provide full automated control, operation data acquisition and monitoring capabilities, requiring a minimum number of operation staff.
- (m) The SCADA System shall be safe, secure, reliable, flexible, expandable, and easy to operate with high degree of system automation and integrity.

- (n) The SCADA System shall comprise PLCs with 100% central processing unit (CPU) and power supply redundancy, and all other necessary accessories to attain the required control functions. The PLC system and its redundancy shall be a true hot-swap standby system. In case of failure of the duty CPU unit, the PLC shall switch to the standby CPU unit automatically without any interruption to the operation of the Facility.
- (o) The SCADA System shall comprise HMI software, which shall be Microsoft Windows based and proven in the process control and automation industry.
- (p) The SCADA System and its components including but not limited to, SCADA workstations, PLCs, telemetry equipment, data and control communication, data server etc., shall be designed with sufficient redundancy capacity to ensure that there is no deterioration, stability issues and flexibility for expansion of its overall performance over time.
- (q) The Contractor shall submit a complete summary list of all the SCADA workstations and/ or HMI touch panels (including all necessary peripheral devices) to be provided in the design submissions. The summary list shall include, but not limited to the following: -
 - (i) Brief notes on the specification of each individual workstation and HMI touch panel;
 - (ii) Peripherals of each individual workstation and HMI touch panel;
 - (iii) Location of each workstation and HMI touch panel; and
 - (iv) Details of all software and licences of each workstation and HMI touch panel
- (r) Industrial type network fieldbus based on IEC 61158 standard shall be used as the communication protocol between the PLCs and all of the connected field-mounted sensors, transmitters, indicating transmitters, actuators, switches etc. as far as practicable.
- (s) The detailed design of the SCADA System including the details of the input/output (I/O) points provision (including spare capacity) shall be consented by the Supervising Officer before ordering and fabrication of the SCADA System.
- (t) The Contractor shall provide a training and technical support for operators of Existing Facilities to retrieve and generate the data records of the parameters in Clause 4.2.1 (t). The training material shall be prepared and provided by the Contractor at his own cost.

4.2.2S Performance

The following clause is inserted after GS Clause 4.2.2(a)(iv)

- (v) Provide control and monitor the operation status for the Food Waste Reception System, Food Waste Pre-treatment System, Food Waste Conveyance System, Food Waste Conveyance System and Deodorisation System.
- (vi) Provide control and monitor the essential accessories in the Facility to cater for the building management system in Clause 5.9 of the Employer's Requirements.

GS Clause 4.2.2(b)(i) is deleted and replaced by the following: -

- (i) Record and store operating data, including but not limited to the following: -

- (1) The Facility's process, electrical and mechanical equipment/system operation data, status/events, measurements, warnings, alarms, operation modes, operation figures (including but not limited to daily tonnage of Food Waste received at the metering bunker), all complete with date and time signatures etc.;
- (2) Historic alarms and events of equipment/ systems complete with relevant information including but not limited to, date, time, alarm acknowledgements and alarm resets;
- (3) Online instruments measurements, operation status/ events, and warning and alarm annunciations;
- (4) Process warnings and alarms;
- (5) Power use information (including but not limited to hourly power consumption);
- (6) Usage of chemicals and storage levels including operation status/ events;
- (7) Water use information (including but not limited to daily potable water consumption);
- (8) Others including fire alarm, fire system fault, hazardous gas detection system alarms etc.; and
- (9) Any other requirements considered to be necessary by the Supervising Officer and/ or the Employer.
- (10) The following real time parameters shall be shared with operators of Existing Facilities via internet-cloud sharing. The Contractor shall provide a notebook or desktop computer (including monitor, keyboard and mouse) and associated software in control room of Existing Facilities during Operation Period to retrieve and generate data records of those parameters sharing through the internet-cloud. The sharing parameters shall be included but not limited to as follows :-
 - i. Flow rate of Pre-treated Food Waste conveyed to the designated anaerobic digesters in the Existing Facilities;
 - ii. Accumulated volume of Pre-treated Food Waste conveyed to the designated anaerobic digesters in the Existing Facilities;
 - iii. pH of Pre-treated Food Waste conveyed to the designated anaerobic digesters in the Existing Facilities;
 - iv. Electricity consumption of Facility;
 - v. Wastewater flow to Existing Facilities; and
 - vi. Other operational information possessed by the Contractor as required by the operator of Existing Facilities or the Supervising Officer during Operation Period.

GS Clause 4.2.2(b)(ii) is deleted and replaced by the following: -

- (ii) Provide displays and summary reports for operator's use. Necessary softwares for the display, compile and printing of reports shall be included in the Contract with licence. The number of softwares and/or licence shall be appropriate for reliable and efficient operation.

4.2.2A Control Requirements

- (a) The Contractor shall clearly define the control availability of various layers of control so as to ensure operation safety and integrity of the process, electrical and mechanical equipment/ systems of the Facility.
- (b) Mode of process, electrical and mechanical equipment/ systems control available shall be provided and shall be classified as a minimum of three levels: -

Level of Hierarchy (Location of Control Available)	Description	Mode of Operation/ Control Available
Level 1 (Field)	Equipment / system field control located in the field, namely local start/stop/ emergency stop, equipment/ system control panel etc.	Manual
Level 2 (Local control switchroom)	Remote control panel control, Motor Control Centre Or SCADA local control workstation (within the local switchroom)	Manual (automatic/ manual selectable, where appropriate and necessary)
Level 3 (Control room)	SCADA control via the SCADA master workstation (in the control room)	Automatic/ manual selectable

- (c) The automated control shall be designed to stop the operating equipment upon depressing the emergency stop button either at the field or at local switchboard. Emergency alarm shall only be reset upon the release of the emergency stop button and the resetting of the alarm at its respective local switchboard.
- (d) The minimum password protected levels of security for SCADA System access shall be as follows: -

Security Level	Permission	Access Available
Level 1 (Operator / Supervisor Level - Password protected)	Control and monitoring	SCADA master workstations SCADA local workstation
Level 2 (Plant Manager / Engineer Level - Password protected)	Control and monitoring configuration of the SCADA System	SCADA master workstations

4.2.2B Monitoring Requirements

- (a) The operation monitoring of the process, electrical and mechanical equipment/ systems of the Facility, and pre-programmed calculated operation figures based on real time measurements, which shall be available at the HMI of the SCADA local workstations and/ or SCADA master workstation as necessary.

- (b) The data presentation, which includes, but not limited to the following, shall be displayed at both the SCADA master workstations and local workstations (or in a form of SCADA HMI touch panel). The Contractor shall submit samples of screen capture of the proposed HMI presentation (including “pop-ups” for indication and control function) in the design submissions: -
- (i) HMI Level 1 - Overview
 - (1) Process summarised in block diagram form showing the status of the main items of the outstation.
 - (ii) HMI Level 2 - Process Graphics
 - (1) Detailed graphics closely following the piping & instrumentation diagrams (P&ID) and the Facility layout. All process measurements of the local control station shall be of real time status.
 - (iii) HMI Level 3 - Data Pages
 - (1) Data in tabular form showing individual system and equipment operation data status.
 - (iv) HMI Level 4 - Trends
 - (1) Multiple parameters (up to 16 nos.) including real-time and historical data (up to 6 weeks) and combination of the both can be displayed in a single trends graph.
 - (v) Alarm and status
 - (1) A real time operation status/ events and alarm bar shall always be available at the bottom of the SCADA System HMI screen.

4.15 Not used

4.16 Not used

4.17 Explosive and Toxic Gas Detection and Monitoring System

- (a) A safe and reliable explosive and toxic gas detection and monitoring system shall be provided at locations where explosive gas and toxic gas may potentially form and accumulate as well as deficiency of oxygen, as minimum.
- (b) Special attention is drawn to the Contractor that explosive and toxic gas detection and monitoring system shall be provided: -
 - (i) For areas where biogas may present, methane detection shall be provided; and
 - (ii) For areas where closed inert gas storage areas are stored and used, oxygen deficiency detection shall be provided.
- (c) Audible and visual alarms shall be activated under the following conditions: -
 - (i) A methane concentration of 20% LEL is detected;
 - (ii) A H₂S concentration of 1 ppm is detected;
 - (iii) An oxygen deficiency level of 19.5 % by volume in air is detected; and
 - (iv) Any others considered necessary by the Contractor and the Supervising Officer.

- (d) The electrical installations design, selection and erection of the detectors shall comply with BS EN 60079-14 while the construction and testing shall comply with BS EN 60079-0. The detectors shall be certified by the BASEEFA or approved for use in hazardous zone 1 areas.
- (e) Gas alarm instrument shall comply with BS 60079-29-1.
- (f) The design of the methane gas detector, H₂S gas detector and oxygen deficiency detector shall comply with BS 60079-29-1.
- (g) All alarms triggered from the gas detection systems shall be repeated to the SCADA master workstation and SCADA HMI touch panels. Alarms shall be both visible and audible.
- (h) The design of this system including the locations of the sensors (of all types) shall be included in the design submissions.

4.18 Employer's Workstation

- (a) Two numbers of identical Employer's workstations shall be provided. The Employer's workstations shall be completed with all the necessary peripherals for the Employer's remote monitoring of the Facility's real time operation and database accessing and retrieval.
- (b) These Employer's workstations shall have the capability of full and unlimited 24 hours a day and 7 days a week access of real time operation and monitoring pages and their respective database historic data of each of the operation subsystems but limited to monitoring purpose only. Any form of remote control of equipment/ systems or online editing of settings and data shall not be required.
- (c) These Employer's workstations shall include but not limited to the following monitoring capabilities: -
 - (i) All SCADA System HMI pages;
 - (ii) Any other considered to be necessary by the Supervising Officer and/ or the Employer.
- (d) Apart from the full operation monitoring and data access, these Employer's workstations shall also be provided with dedicated easy-to-read summary pages and shall include but not limited to the following information display for the Employer's easy reading: -
 - (i) Time and date;
 - (ii) Food Waste received;
 - (iii) Food Waste pre-treated and pumped to anaerobic digester(s);
 - (iv) Residues extracted;
 - (v) Power related data;
 - (vi) Local weather condition;
 - (vii) The Facility operation summary page;
 - (viii) Any other as required by the Employer during Operation Period.
- (e) For the avoidance of doubt, information display requirements shall be finalised and agreed by the Employer and/ or consented by the Supervising Officer during design stage.

- (f) Access to the workstations shall be password protected. Unless otherwise specified, number of security levels required, if any, shall be confirmed by the Employer during the design stage.
- (g) The locations of the two identical workstations shall be as follows, final locations of these workstations shall be confirmed by the Employer during design stage: -
 - (i) 1 no. Employer's workstation at office in the Facility; and
 - (ii) 1 no. Employer's workstation at the EPD office, actual location to be confirmed by the Employer during design stage.
- (h) The Employer's workstations shall consist of, but not limited to the following: -
 - (i) Microsoft Windows based desktop workstation with specification to suit all the application and function as required;
 - (ii) Each with dual display monitors, each shall be minimum 24" LCD monitor display, resolution 1920 x 1080 pixels with brightness level of 300 Cd/m²;
 - (iii) Laser colour printer (including the supply of toner and paper);
 - (iv) All the necessary software licenses and subscription necessary for the required functions; and
 - (v) All other necessary hardware and software to suit the requirements.
- (i) Telemetry connections to the Employer's workstations shall be as follows: -
 - (i) Employer's office in the Facility – via the Facility secured internal Ethernet network; and
 - (ii) EPD office – via virtual private network (VPN) connection.

4.19 Reporting

- (a) Reports generation capabilities shall be available via the respective operation subsystems master workstations. Manual and automatic modes for report generation shall be available with requirements shall be as follows.
 - (i) Manual mode, report generation shall be via manual initiation, with the selection/ snapshots of data, measurements, trends, histograms, alarms, status, events, any specific time and date etc. as required by the user; and
 - (ii) Automatic mode, report generation shall be automatically initiated based on user pre-defined time schedule and contents. All automatically generated reports shall be simultaneously uploaded to the EDMS for immediately availability and record purpose.
- (b) All reports shall be available in printed hardcopy and softcopy formats, and selectable by the user. Softcopy format shall be available in pdf and raw data format compatible with Microsoft Office software.
- (c) Reports generated from the operation management system shall include, but not limited to the following major items. The Contractor shall include the report format and presentation in the design submissions for the Supervising Officer's consent.
 - (i) Traffic summary;
 - (ii) Food Waste received/ Food Waste treated / Residues/ Non-Permitted Waste summary status;
 - (iii) Onsite chemicals inventory;

- (iv) Analytical data on waste quality;
 - (v) Process instrument data;
 - (vi) Power and usage status;
 - (vii) Major equipment/ system/ process train status;
 - (viii) Summary of data;
 - (ix) Summary of alarms cleared and not yet cleared; and
- (d) For the avoidance of doubt, details of the reports contents, report types, scheduled reporting period/ duration not only shall be designed suit the Contractor's own operation and maintenance needs, but shall also be to the satisfaction of the Supervising Officer/ the Employer to suit his needs.
 - (e) "One Press Quick Report" shortcut soft key shall be made available on the Employer's workstations HMI for the ease of pre-set quick report/ snapshots generation from any of the operation subsystems, in the form of selection of data, measurements, trends, histograms, alarms, status, events, any specific time (down to second) and date etc. as required by the user. This shortcut soft key shall be designed to be as user friendly for ease of set up and initiation. Details and capabilities of this shortcut HMI soft key shall be submitted by the Contractor for the Supervising Officer's consent.
 - (f) The Contractor shall provide any other operation and process data, and other reports for monitoring purposes at no additional costs when deemed to be necessary by the Employer.

4.20 FATs and SATs for the Operation Management System

- (a) The Contractor shall submit for the Supervising Officer's consent, FAT and SAT test plans and procedures for operation management system the at least 12 calendar weeks before the commencement of any tests.
- (b) The FATs and SATs work for the operation management system shall be carried out to demonstrate and verify the following design aspects.
 - (i) Hardware requirements;
 - (1) Verifications of operating capacity, spare capacity etc.;
 - (ii) Software requirements;
 - (1) Set points adjustments, report generation, HMI interface, I/O correctness etc.
 - (iii) Operational and functional requirements;
 - (1) Demonstration of functions and features to ensure the full compliance with the functional requirements as per the consented design submission, namely, programmed logic functions, field I/O, control loop, interlocks, local operation, various master workstations, SCADA local workstations, touch panel, the Employer's workstations etc.;
 - (2) Conducting simulation tests on individual control loop check before carrying out tests with equipment/systems connected;
 - (3) Conducting tests on changeover of standby PLCs and other redundancy devices of the SCADA System; and

- (4) Testing of the responses of the SCADA System under different modes of operation and emergency situations;
- (iv) Reliability requirements;
 - (1) Continuous operation period to ensure system reliability, stability and assurance “bugs-free”;
- (v) Availability test
 - (1) Testing of the availability of the control system for a continuous period; and
- (vi) Any other tests considered to be necessary by the Supervising Officer.

4.21 Uninterruptible Power Supplies (UPS) for Instrumentation Equipment and SCADA System

- (a) The SCADA System, SCADA master and SCADA HMI touch panels, SCADA data server, local PLCs, PLC communication system and vital process monitoring instruments shall be backed up by UPS in order to maintain the SCADA monitoring capability of the Facility in case of the main power failure.
- (b) Not used
- (c) The UPS shall be packaged type complete with self-checking and monitoring function. All batteries shall be installed in a dedicated cabinet enclosure.
- (d) All UPS shall be of true online double conversion type with no break output supply upon a power failure. UPS shall comply with BS EN 62040-3 or equivalent.
- (e) Unless otherwise specified, UPS shall be capable in providing no less than 2 hours continuous operation time of the supplying equipment upon failure of the mains supply.

PART 5 BUILDING SERVICES

5.1S Introduction

GS Clause 5.1(a) is deleted and replaced by the following: -

- (a) This Part specifies the requirements of the building services installations specific to the Facility.

The following clauses are inserted after GS Clause 5.1(c): -

- (d) For the building services works of the Facility, the Contractor shall provide, but not limited to the following: -
- (i) All lighting system ;
 - (ii) All building electrical system;
 - (iii) All mechanical ventilation and air conditioning (MVAC) system;
 - (iv) All fire services installation (FSI) system;
 - (v) All plumbing and drainage system;
 - (vi) All lightning and earthing system
 - (vii) Access control;
 - (viii) Building management; and
 - (ix) Any other services to ensure the safe and proper operation of the Facility.
- (e) The Works shall fully comply with all HKSAR Government statutory obligations and regulations together with any amendments made required by the authorities (namely EPD, EMSD, FSD etc.) as the safe and satisfactory standards of the works to be carried out whether detailed on in the Employer's Requirements or not, unless otherwise indicated. The Contractor shall be responsible for all applications and submissions of all related to statutory inspections and certificates as appropriate and necessary.
- (f) Unless otherwise specified or certified by the consent of the Supervising Officer, all complete electrical installation shall be suitable for operation under the supply system with a nominal frequency at 50Hz, and nominal voltage of 380V, 3-phase or 220V, single phase.
- (g) The building services works shall fully comply with the Code of Practice for Energy Efficiency of Building Services Installation 2015 published by EMSD. Particular attention is also drawn to the Contractor to ensure compliance with the Building Energy Efficiency Ordinance (Cap 610) on his building services work.
- (h) The Contractor shall be responsible for obtaining approval from the Fire Services Department (FSD) for the safe occupation of the Food Waste Pre-treatment Facilities. All costs and fees associated with design, supply, submissions to the FSD, testing, commissioning and maintenance of new fire services installation. For avoidance of doubts, the costs shall include employment of Authorized Person and Registered Fire Service Installation Contractor.

- (i) The Contractor shall be responsible to coordinate between all the building services installation with works of all other discipline to ensure the installation is free from conflict. The Contractor shall also be responsible to ensure all building services work furnished are well coordinated to ensure consistency of design, international standards used, materials of construction used, workmanship, and etc., between the various locations of the Facility.
- (j) All electrical installation design at classified hazardous areas shall comply with BS EN 60079 General requirements for electrical apparatus for potentially explosive atmospheres. Electrical equipment used in hazardous areas shall be certified by British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA)/ Appareils destinés à être utilisés en Atmosphères Explosibles (ATEX)/ International Electrotechnical Commission - System For Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEx) or equivalent as certified by the consent of the Supervising Officer. All electrical works shall comply with the latest edition of Code of Practice for the Electricity (Wiring) Regulations.
- (k) Water meter and wastewater flowmeter shall be provided and installed in the water main supplied for Pre-treatment food waste facilities and wastewater discharged to sewer respectively. The reading of accumulated water consumption and wastewater discharged shall be shown/ indicated in the meter continuously. Contractor shall not reset the meter's reading without Supervising Officer's consent. The flowmeter data (real-time flowrate and accumulated discharged volume) shall be indicated and recorded in SCADA.
- (l) Fire alarm indication signal shall be sent by the Fire Alarm Control Panel to the Fire Services Communication Centre via a direct telemetry link of telephone company. The Contractor shall be responsible for the application and arrangement of the direct link. The Contractor shall be responsible for the construction of the direct link within the boundary of Existing Facilities.
- (m) The Contractor shall be responsible for making application to the telephone company on behalf of the Employer. The Contractor shall also be responsible for the all costs and fees concerned until the Operation Period completed.
- (n) The Contractor may consider to modify the existing FSI's water supply main in Existing Facilities as the water supply source for FSI of Facility under the advice of Authorized Person (AP) and acceptance by FSD and WSD. The preliminary location of tee-off water supply from existing fire hydrant pipework as shown on Employer's Drawing No. 60634312/EP/1010 is indicative only. The modification of existing FSI's water supply main shall be consented by the operator of Existing Facilities before processing the FSI application from FSD.
- (o) In the event that the Contractor modify/amend the FSI's water supply main of the Existing Facilities, the Contractor shall review the existing FSI system of the Existing Facilities including but not limited to capacity of FSI's water supply main, installed water pipework dimension, number of host reel, FSI's pumps/booster pumps, number of fire hydrant, and provide any other equipment or facilities for existing FSI system such that the FSI system of the Existing Facilities would fulfil the FSD's regulations and requirement.
- (p) In the event that the modification of FSI system of Existing Facilities proposed by the Contractor does not comply with FSD's regulations and requirement, the Contractor shall apply, design and construct a separate water supply main from WSD for FSI of the Facility.

- (q) The Contractor shall apply, design and construct a separate water supply main from WSD for FSI of the Facility if modification of existing FSI's water supply main is not accepted by FSD and WSD or the Facility is not identified as part of facilities of the Existing Facilities by FSD.
- (r) For avoidance of doubt, the Contractor shall be responsible for all costs and time induced by the modification of existing water supply main and construction and design of separate water supply main.
- (s) The Contractor may repeat the fire alarm signal from his Fire Alarm Control Panel to the existing fire alarm control panel of the Existing Facilities such that the fire alarm signal would be sent to Fire Services Communication Centre via existing 'fire' direct telemetry link of the Existing Facilities. The hardware connection/cabling and modification of existing fire alarm control panel of the Existing Facilities shall be consented by DSD. The Contractor shall confirm with the operator of Existing Facilities of the exact location of existing Fire Alarm Control.
- (t) The Contractor shall design and construct all civil works including but not limited to underground cable duct and cable draw pits for cable installation and termination from the Fire Alarm Control Panel of the Facility to DSD delegated existing fire alarm control panel. The schematic layout of the cable routing of fire alarm signal as shown in Employer's Drawing No. 60634312/EP/1010 is indicative only. The design of the fire alarm signal and exact location of connection to fire alarm control panel in the Existing Facilities shall be submitted and agreed with the Supervising Officer and the operators of Existing Facilities on Site.
- (u) The fire alarm signal generated from the Fire Alarm Control Panel of the Facility shall be repeated to control room in Power House of the Existing Facilities, if the Contractor engages a separate telemetry link to communicate with Fire Services Communication Centre.
- (v) Fire alarm indication signal in the Fire Alarm Control Panel of Facility shall be repeated to control room in Power House of Existing Facilities once a separate telemetry link engaged to communicate with Fire Services Communication Centre. The Contractor shall provide and install a panel including associated facilities and cabling so that the panel in control room of Power House can indicate the fire alarm activated within the Facility. The panel shall accommodate with visual alarm, audio alarm, and acknowledged/mute button. The audio alarm would be muted once the acknowledged/mute button pressed. The visual alarm would be resumed to be off/normal until the fire alarm to be reset in the Fire Alarm Control Panel of the Facility. Alternative facilities for signal repeated to control room shall be consented by the operators of the Existing Facilities and Supervising Officer.
- (w) The Contractor shall be responsible to renew the necessary parts of certificate of FSI of the Existing Facilities either modification of existing FSI's water supply main or integration of fire alarm signal into existing fire alarm control panel of the Existing Facilities. The Contractor shall assist the operator of Existing Facilities to carry out the inspection and maintenance of existing FSI of the Existing Facilities upon the request of Supervising Officer or the operator of Existing Facilities.
- (x) The Contractor shall provide sufficient lighting and illuminance for the indoor area, outdoor area and perimeter for the Facility.

5.7 Access Control

5.7.1 General

- (a) The Contractor shall provide access control facilities serving the following locations as minimum: -
 - (i) Administration block; and
 - (ii) Process block(s).
- (b) The Contractor shall provide following systems comprising of: -
 - (i) CCTV system;
- (c) All data logged shall be stored in a database system for central storage and access situated in the control room.
- (d) The operation status indication and alarms annunciation of the CCTV system shall be available at the SCADA System.

5.7.2 Closed Circuit (CCTV) System

- (a) A CCTV system shall be provided for security and general surveillance purposes of the Facility. The CCTV system shall generally follow the relevant clauses of the Specification No. ESG14 – General Technical Specification for Monochrome and Colour Closed Circuit Television Systems published by EMSD.
- (b) All indoor CCTV cameras shall be of at least IP42 enclosure protection. All other CCTV cameras shall be of at least IP 65 enclosure protection and shall be of materials of construction capable of withstanding the outdoor weather elements.
- (c) CCTV minimum requirements include: -
 - (i) Colour CCD camera;
 - (ii) Full high definition (HD) video resolution @ 1080p (1920 x 1080) or better;
 - (iii) F1.4, 20X zoom, auto focus lens or better;
 - (iv) Low light and zero light vision capability;
 - (v) Pan travel: 360 degree;
 - (vi) Tilt travel: 90 degree;
 - (vii) Fan and heater;
 - (viii) Wiper; and
 - (ix) Lens cleaning system.
- (d) The CCTV camera shall be equipped with night vision function. Cameras integrated with night time illumination or infrared type shall both be acceptable.
- (e) Digital video recorder capable of storing HD pictures from any CCTV cameras at least 60 days capacity for HD image recording shall be provided.
- (f) Automatic control and remote manual control of the CCTV cameras shall be available at the SCADA workstation, with remote manual functions, including but not limited to, tilting, panning, zooming, camera illumination and wiper operation etc.

- (g) The installation of the CCTV system shall comply with the guideline Guidance on CCTV Surveillance and Use of Drones (March 2015 Edition) issued by the Office of the Privacy Commissioner for Personal Data.

5.7.3 Uninterruptible Power Supplies (UPS) for Access Control System

- (a) CCTV system, and their relevant components shall be backed up by UPS in case of main power failure.
- (b) The UPS shall be packaged type complete with self-checking and monitoring function. All batteries shall be installed in a dedicated cabinet enclosure.
- (c) All UPS shall be capable of providing not less than 2 hours continuous operation of the supplying equipment upon failure of the main supply.

5.8 Laboratory

- (a) The laboratory shall be equipped to safely undertake the necessary daily testing of samples which are collected from the Facility outputs and which shall include but not limited to: -
 - (i) Pre-treated Food Waste.
- (b) The Contractor shall provide design submissions on procurement of laboratory equipment and appliances.
- (c) Major laboratory equipment and instrument schedule shall be submitted by the Contractor for the Supervising Officer's consent. The schedule shall include clear details of the equipment/ instrument, but not limited to the following: -
 - (i) Description and purpose of the equipment/ instrument;
 - (ii) Nos. of the equipment/ instrument;
 - (iii) Brand and model; and
 - (iv) Power requirement.
 - (v) Chemicals and consumables schedule, complete with details of storage quantity, any chemicals classified as dangerous goods by FSD, whether the quantity is sufficient to requiring Dangerous Goods License from FSD or not, shall be clearly stated.
 - (vi) Any other details and information as required by the Supervising Officer regarding the Laboratory for his consent.

5.9 Building Management

5.9.1 General

- (a) The operating information, and visual and audible alarm of equipment/ instruments/ system of the various building services equipment of the Facility, which include, but not limited to the following: -
 - (i) Power consumption information;
 - (vi) Others including fire alarm, fire system fault, burglar alarm etc.; and
 - (vii) Any other operation information and alarms considered to be necessary by the Supervising Officer.

- (b) The operating information as stated in Clause 5.9.1 (a) of the Facility shall be designed, developed and integrated with the SCADA System.
- (c) The SCADA system shall be able to log the operation data and present them in the form of raw data or trend curves. The operation data shall include, but not limited to the following: -
 - (i) Area power consumption;
 - (ii) Equipment running hours, current, voltage etc.;
 - (iii) General alarm and monitoring page for the alarm of all fire services installations, uninterruptible power supplies and burglar alarms;
 - (iv) Historic alarms and events of equipment/ systems complete with relevant information including but not limited to, date, time, alarm acknowledgements and alarm resets;
 - (v) Instruments measurements historic data; and
 - (vi) Any other operation information/ status and alarms considered to be necessary by the Supervising Officer.

PART 6 OPERATION AND MAINTENANCE

6.1 General

6.1.1 The Operation

- (a) The Contractor shall from the date for commencement of the Operation and until expiry of the Operation Period carry out the Operation in strict accordance with the Registered Design, the Contractor's Plan and the programme consented by the Employer and/or the Supervising Officer, and the provisions of the Contract. The Contractor shall provide all necessary Mobile Plant, Plant, equipment, consumables, spares, technical resources, staff, labour etc. to ensure the continuous, safe, reliable, efficient and secure Operation.
- (b) As set out in Clause 61A of the Conditions of Contracts, the Operation Period consists of both Proving Stage and Post-commissioning Stage. The Contractor shall carry out the Operation during both stages, for which the major scope of works shall include but not limited to the following, in accordance with the Contract requirements: -
 - (i) to conduct plant commissioning test in Proving stage;
 - (ii) to take reception of Food Waste from others appointed by the Employer;
 - (iii) to pre-treat Food Waste at the Site;
 - (iv) to convey Pre-treated Food Waste to designated anaerobic digesters at Existing Facilities for co-digestion;
 - (v) to handle, store and deliver Residues, and dispose of all Residues at the Designated Landfill or other locations as instructed by the Employer;
 - (vi) to convey Food Waste at the Site to Designated Food Waste Treatment Facility or other locations as instructed by the Employer;
 - (vii) to liaise and coordinate with the Employer, operators of the Existing Facilities and other relevant parties for the Operation of the Facility.
 - (viii) to implement and maintain measures to mitigate environmental impacts, such as air quality impacts, noise impacts and waste impacts;
 - (ix) to operate and maintain the Mobile Plant, Plant, passenger vehicles which are supplied under the Contract, including to obtain and renew any necessary licenses, permits and certificates, where applicable;
 - (x) to manage and maintain the civil works of the Facility, including but not limited to roads, underground and above ground utilities, structures, buildings (interior and exterior) and the Facility itself;
 - (xi) to implement health and safety management, asset management, quality system and environmental management system;
 - (xii) to prepare, maintain, submit and update all operation, maintenance, health and safety, incidents/ accidents and laboratory related records and reports, inclusive of those as stated in the Contractor's Plans and as required by the Employer;
 - (xiii) to upkeep the Site and its surroundings in clean, hygienic, tidy and safe conditions at all times and in a consistent manner;
 - (xiv) to impose and maintain security control and management of the Site;
 - (xv) to conduct all required samplings, tests and laboratory analysis;
 - (xvi) to conduct all required audits, Performance Tests and Condition Surveys;

- (xvii) to carry out renewal and replacement of Plant and Mobile Plant, where necessary and required;
 - (xviii) to conduct all the required environmental monitoring work;
 - (xix) to review and update the Contractor's Plans as per Clause 6.1.2 of the Employer's Requirements or as required by the Employer;
 - (xx) to prepare submissions to the Employer, utility companies, government departments and authorities;
 - (xxi) to conduct safety, operation and maintenance trainings, and safety, fire and emergency drills for Contractor's staff and Employer's staff;
 - (xxii) to hand back all assets and the Site to the Employer or the follow-on contractor at the end of the Operation Period as instructed by the Employer;
 - (xxiii) to carry out reinstatement of the Site as instructed by the Employer;
 - (xxiv) to handle and resolve complaints of public to the satisfaction of the Employer;
 - (xxv) to attend all meetings as instructed by the Employer;
 - (xxvi) to record the consumption of electricity and water of the Facility and work out the utility bills for price adjustment in the monthly interim payment;
 - (xxvii) all other operation and maintenance activities set out in the Employer's Requirements;
 - (xxviii) any other items that facilitate the safe, reliable and smooth operation and maintenance and are considered to be necessary by the Employer; and
 - (xxix) all other liabilities, obligations set forth and reasonably implied in the Contract.
- (c) The Contractor shall operate and maintain the Facility in full compliance with the requirements as specified in the Employer's Requirements. In the event that the Employer certifies non-compliances with these requirements under Clauses 62 or 69 of the Conditions of Contract, the payment of the Operation Fees shall be reduced, without prejudice to other provisions in the Contract, in accordance with Clause 72 of the Conditions of Contract. Non-compliance points are allocated as specified in Clause 1.30 of the Employer's Requirements.
- (d) The Contractor shall apply for and maintain all licences, permits and certificates in respect of the legislative requirements necessary for the Operation. Whenever there is an alteration or modification of requirements of the said licences, permits or certificates, the Contractor shall propose the necessary changes to the Registered Design, the programme and/or relevant parts of the Contractor's Plans for the approval by the Employer.
- (e) The Contractor shall supervise and control the actions of all Plant, Mobile Plant and personnel on the Site to ensure the safe, efficient and secure Operation. The Contractor shall maintain all areas in a clean and orderly condition at all times and shall ensure the correct and proper operation and handling of all equipment and materials. In particular, the Contractor shall comply with the approved operation and maintenance procedures for all plant and equipment and shall ensure that the safety systems are fully operative at all times.
- (f) All operation and maintenance data/ records and information/ details regarding the Facility shall be of the Employer's property. Unless otherwise approved by the Employer in advance, all data, records, information and details of the Facility shall: -

- (i) not be in any way to be tampered with, including any deletion or editing of past data/ records;
- (i) only be limited to access using the Facility's own workstations (password protected with levels of restricted access) within the Facility or external workstation in the Employer's Office. Access by devices other than those of the Facility's (whether from within or outside the Facility) shall strictly be prohibited; and
- (iii) not allow to be exported, emailed, transferred or copied to any portable external storage devices or to web/ cloud based storage media.
- (g) Unless otherwise approved by the Employer, any form of remote site operation control and monitoring of any equipment, systems or part of the Facility using any devices shall not be allowed.
- (h) Any cost incurred due to the Contractor's fault or default shall be borne by the Contractor.
- (i) The Contractor shall operate and maintain the Facility to avoid all kinds of operational problems, which include but not limited to erosion, corrosion, fouling, insufficient availability, and extensive repair and maintenance, throughout the Operation Period.
- (j) Without the prior written consent of the Employer, the Contractor shall not erect nor bring on to the Site any additional structures, Plant, Mobile Plant, equipment, materials or accommodation, other than those in the Registered Design or Contractor's Plans approved by the Employer.
- (k) Without the instruction of the Employer, the Contractor shall not use the Site, including but not limited to all Plant and Mobile Plant for any activities other than for the Operation under provisions of the Contract.
- (l) During the Operation Period, the Contractor shall carry out maintenance, repair, rehabilitation and replacement work to ensure safe and effective operation of the Facility in accordance with the requirements stipulated in the Employer's Requirements. The specific requirements are provided in Part 6 of the Employer's Requirements.
- (m) On the expiry of the Operation Period, the Site shall be handed over to the Employer in a reinstated condition for the Employer in accordance with Clause 47 of the Conditions of Contract and Clause 6.7 of the Employer's Requirements.
- (n) The colour of any paintwork and external finishes of buildings and structures, including any architectural finishes or the Registered Design shall not be changed without the prior consent in writing of the Employer. The Contractor shall inspect all paintwork and external finishes of buildings and structures at least once every year and shall carry out repainting or remedial works as necessary to the satisfaction of the Employer.

6.1.2 The Contractor's Plan

- (a) The requirements for the Contractor's Plans are specified in Clause 1.27 of the Employer's Requirements. The following plans in the Contractor's Plan are relevant to the Operation and shall be updated and maintained throughout the Operation: -
 - (i) Project Management and Technical Resources Plan; and
 - (ii) Operation Plan.

- (b) The Contractor shall submit a draft Operation Plan to the Supervising Officer for consent pursuant to Clause 1.27.3 of the Employer's Requirements. The requirements for the Operation Plan are set out in Clause 1.27.3 of the Employer's Requirements.
- (c) The Contractor shall obtain the Supervising Officer's consent on the draft Operation Plan, which will then be construed as the Operation Plan.
- (d) The Contractor shall review, update and submit, plans as specified in Clause 6.1.2 (a) (i) to (ii) of the Employer's Requirements annually during the Operation Period. In case there is no change to the previous plan(s), the Contractor shall declare such status in writing to the Employer instead of submitting the same plan(s).
- (e) Without prejudice to Clause 6.1.2 (a) of the Employer's Requirements, the Contractor shall review, update or/ and amend the Operation Plan on a regular basis, whenever the need to do so becomes apparent or at the request of the Employer, which may include but not limited to the following: -
 - (1) Enhancement and/ or change in operational arrangement or alike resulting from operation, maintenance or performance optimisation over time;
 - (2) A change ordered by the Employer in accordance with Clause 42 of the Conditions of Contract;
 - (3) Implementation of new or emerging technologies, techniques and methods related to the Operation that is more efficient or effective;
 - (4) Any change in the procedures and arrangement of Food Waste reception as a result of liaison with relevant parties;
 - (5) Any change in the procedures and arrangement of Food Waste, Residues and/ or inert materials disposal as a result of liaison with relevant parties; and
 - (6) Any change required due to additions, amendments to current enactment, regulations, bye-laws or rules, or new enactments, regulations, bye-laws or rules made during the continuance of the Operation.
- (f) The Contractor shall submit the updated Operation Plan to the Employer for consent in a timely manner or within a time frame as requested by the Employer so as not to interfere with the Operation. Submission of revision or update shall not relieve the Contractor from any of his liability or obligation under the Contract.
- (g) Throughout the Operation Period, the Contractor shall operate in accordance with the latest approved Operation Plan.
- (h) If the Employer is of the opinion that any of the plans does not meet the requirements of the Contract, the Contractor shall revise or update the relevant plans and submit to the Employer for consent within 14 days of the date of notice served by the Employer.

6.1.3 Safety and Health

- (a) The Contractor shall ensure that all work and operations comply at all time with the relevant safety and health requirements of the Contract and relevant statutory obligations. The Contractor shall be responsible for the safety and health of all persons on the Site.
- (b) The Contractor shall observe and ensure compliance with the various provisions under the Factories and Industrial Undertakings Ordinance and the Public Health and Municipal Services Ordinance, inter alias, other health and safety regulations in Hong Kong.

- (c) The Contractor shall as part of the Operation Plan set up a Health and Safety Management System for the Operation based on the Code of Practice on Safety Management issued by the Hong Kong Labour Department. The Contractor shall also accordingly incorporate further health and safety requirements, where necessary or as considered to be necessary by the Supervising Officer/ the Employer, to suit the operation nature.
- (d) The Contractor shall take all reasonable measures necessary to ensure that all items within the Site are safely secured during typhoons and all other inclement weather conditions. The measures taken shall prevent items from causing damage to personnel and/or equipment either employed by the Contractor or by others using the Facility.
- (e) Safety measures shall be carried out when operating and inspecting to avoid any hazards. The Contractor shall monitor the situation and provide and implement appropriate safety precautions. The Contractor shall have due considerations on the potential hazards arise from Food Waste handling.
- (f) The Contractor shall ensure that the Site is adequately illuminated at all times, the level of illumination of each part shall be consistent with the safe and effective functioning of that part and for security purposes at other times. The Contractor shall provide emergency lighting in accordance with Clause 5.2.2 of GS.
- (g) The Contractor shall operate and maintain the fire services installations for fire detection and firefighting. Fire services installations shall be approved by the Fire Services Department as appropriate.
- (h) The Contractor shall display guidelines on personnel health precautions to be taken by all employees and users of the Facility, including those guidelines concerned with the risk of Leptospirosis (Weils Disease) at locations agreed by the Employer. Due considerations shall also be taken by the Contractor with respect to Labour Department's Legislation requirements of the Occupational Safety and Health Ordinance (Cap 509) and its regulations, and "A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment" issued by the Labour Department.
- (i) The Contractor shall develop site specific safety training for all personnel, including the Employer's staff stationed on the Site in accordance with Clause 1.23S of the Employer's Requirements. All the Contractor's employees or sub-contractors used by the Contractor for the operation or maintenance shall receive trainings in health and safety matters, including but not limited to the requirements as laid down by the Labour Department, Occupational Safety and Health Council and those relevant and specific for special operation requirements. Management shall be trained to qualify in safety management. All details of the trainings shall be prepared and provided by the Contractor.
- (j) The Contractor shall keep records on all safety and health matters. Such records shall be updated daily and be available at all time for inspection by the Employer. The safety and health records shall include as a minimum the following information:-
 - (i) A record of all employees and sub-contractor's staff on the Site;
 - (ii) Dates and times of employees and sub-contractor's staff having completed site orientation/safety training courses/drill exercises;
 - (iii) List of safety and health equipment issued and maintenance records;
 - (iv) Safety and health inspections carried out under the supervision of the Safety Manager and Labour Department, if any;
 - (v) Safety and health instructions issued to employees and sub-contractor's staff;

- (vi) Safety and health incidents/accidents and actions taken; and
- (vii) Safety and health prosecutions, non-compliances or observations notified by the Employer, Labour Departments or other authorities, and actions taken.
- (k) The Contractor shall formulate and implement strategies to promote good air quality and prevent indoor air pollution problems for buildings or any part of the building which is totally enclosed and served with mechanical ventilation and air conditioning system for human comfort, such as the administration block, offices and control rooms. The Contractor shall follow the Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places (GNAIQ) promulgated by the Indoor Air Quality Management Group of the Government. Legal provisions on ventilation and certain other factors affecting indoor air quality in buildings are contained in ordinances and regulations listed in GNAIQ.
- (l) The Contractor shall conduct fire and emergency drills at least 2 times each year during the Operation Period in enabling his staff and all personnel working in the Facility to familiarise with the proper response to fire incidents and emergency situations. The drill plans shall be included in the Operation Plan for consent and the drill records shall be submitted to the Employer.
- (m) The Contractor shall provide and maintain first aid kits at readily accessible locations which shall be designed, provided, equipped and maintained by the Contractor. The medical/ first aid kits shall be accordingly equipped with those as required in the First Aid at Work issued by the Occupational Safety and Health Council and those as recommended by the Contractor given in view of work nature and operation conditions. As for minimum, at least one trained and qualified first aider shall be present at all time.
- (n) The Contractor shall provide and maintain emergency showers and eye wash stations at locations where chemical hazards may be presented.
- (o) The Contractor shall be responsible for all the personal safety gears for all employees, sub-contractors and visitors. The Contractor shall equip the Site with all necessary rescue gears and equipment to allow for basic rescue during emergency situations which shall be carried out by trained and qualified personnel.
- (p) Safety equipment and procedures shall be reviewed and updated at regular intervals during the Operation Period to take advantage of technological improvements and comply with prevailing good practice.
- (q) The Contractor shall have due considerations in the Operation to ensure compliance with the Labour Department's Legislation requirements of the Occupational Safety and Health Ordinance (Cap 509) and its regulations, including but not limited to "A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment" and "Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace". Studies as per the Labour Department's "A Reference Note on Occupational Exposure Limits for Chemical Substances in the Work Environment" shall be conducted by the Contractor as per Clause 2.1.1S of the Employer's Requirements.
- (r) The Contractor is reminded that there is a high risk of accident and injury from the use of the heavy duty machinery in particular for the Pre-treatment. The Contractor must effectively guard dangerous parts of every piece of machinery and plant which is driven by mechanical power. The Contractor shall observe and implement the various safety precautionary measures under the Handbook on Guarding and Operation of Machinery published by the Labour Department and other health and safety regulations in Hong Kong.

- (s) When working in confined spaces, adequate safety equipment shall be provided and maintained to the satisfaction of the Employer. The Contractor shall comply with the requirements contained in the current edition of the document "Code of Practice on Safety and Health at Work in Confined Spaces" issued by Labour Department, HKSAR, and the certified and consented safety and health management and measures section of the Contractor's Plans as per Clause 1.27.3 of the Employer's Requirements.

6.1.4 Environmental Management and Quality Assurance

- (a) The Contractor shall be responsible for taking mitigation measures to reduce environmental impacts and nuisances arising from the Operation. The Contractor shall ensure all relevant requirements in Hong Kong are strictly followed to achieve the best practicable environmental performance.
- (b) The Contractor shall be responsible for providing environmental awareness training to his employees and sub-contractors and ensure they are fully aware of the potential environmental impacts and the corresponding mitigation measures.
- (c) Further to Clause 9.7 of the Conditions of Contract and Clause 1.27.3 of the Employer's Requirements, the Contractor shall implement an Environmental Management System in accordance with the requirements of ISO 14000 series standard in the Operation Plan. The Contractor shall review and update the Environmental Management System in accordance with Clause 6.1.2 of the Employer's Requirements.
- (d) The environmental management section of the Operation Plan shall include measures to mitigate the potential environmental impacts during the Operation, such as but not limited to light, noise, dust, flora & fauna, water, emission to air and litter.
- (e) A daily inspection shall be carried out to check for environmental impacts and tidiness such as odour and litter. Inspection results and descriptions of the mitigation measures applied shall be submitted with the monthly report.
- (f) The Contractor shall maintain proper function of the ventilation and deodorisation/deodorisation systems for the Operation, or implement any necessary measures, to prevent any leakage of odour. The filter media / scrubbing chemicals used in the deodorisation/deodorisation systems shall be tested at intervals of not greater than six months. A representative sample of filter media / scrubbing chemicals shall be taken from each of the deodorizing units and analysed in accordance with the manufacturer's recommendations to determine the quantity of active chemical agent and/or absorption capacity that remains. The results shall be compared to the manufacturer's recommendations and the filter media shall be replaced as required.
- (g) Further to Clause 9.7 of the Conditions of Contract, and Clause 1.27.3 of the Employer's Requirements, the Contractor shall implement a Quality Assurance System in accordance with the requirements of ISO 9000 series as part of the Operation Plan. The Contractor shall review and update the Operation Plan in accordance with Clause 6.1.2 of the Employer's Requirements.
- (h) The Contractor shall establish an asset management system in accordance with the requirements of ISO 55000 series to manage the use of physical assets, inclusive of Plants, Mobile Plants, equipment, etc. Details of the asset management system shall be included in the Operation Plan.

6.1.5 Cleanliness

- (a) The Contractor shall all the times keep the Facility in a clean, tidy and hygienic condition to ensure that efficient operation is maintained and appropriate environmental standards are complied with during the Operation Period.
- (b) The Contractor shall detail his proposal for control and maintenance of the cleanliness of the Facility as required under this clause and in the environmental section of the Operation Plan.
- (c) The Contractor shall clean and tidy up the Facility, including but not limited to process block(s), administration block, workshops, offices, passageways, and other storage areas, on a daily basis. Any rubbish and debris dumped on site shall be removed as soon as possible.
- (d) In addition to Daily Cleaning, the Contractor shall carry out thorough cleaning at least once per month of all indoor carpets to ensure free of deep seated dirt, stains and soils, with wet/ steam carpet cleaning method.
- (e) The Contractor shall take necessary measures to avoid spillage/leakage of Food Waste, water, wastewater, Residues, chemicals or other waste within the Site. Any spillage/leakage occurred shall be confined, appropriate dealt with and cleaned immediately. The Contractor shall conduct a daily thorough check and clean-up on each working day.
- (f) The Contractor shall conduct a thorough cleaning and tidying up of the Facility on a weekly basis. Items include, but not limited to:-
 - (i) Thorough cleaning of the Facility, including but not limited to, process block(s), administration block, workshops, offices, passageways, and other storage areas etc.;
 - (ii) Re-organising of storage materials for better utilisation of storage spaces and safe stacking if appropriate;
 - (iii) Cleaning of external covers for plant and equipment;
 - (iv) Clearing of drains to prevent flooding;
 - (v) Other cleaning requirements as instructed by the Employer; and
 - (vi) Thorough cleaning of the Facility at least once per six months.
- (g) The Contractor shall develop inspection checklists for control of the cleaning and tidying activities. The inspection checklists shall include an assessment on cleanliness and tidiness of all key locations. The inspection checklists shall be reviewed and updated regularly when necessary and submitted to the Employer for consent.
- (h) The Contractor shall be responsible for ensuring the cleanliness of vehicles. A washing schedule shall be developed and strictly followed by the Contractor. If the Employer is not satisfied with the hygienic condition of the vehicles, the Contractor shall immediately revise the washing schedule and eliminate the problems.
 - (i) The Contractor shall take measures to prevent mosquito breeding and control of rodent and insect within the Facility.

6.1.7 Security

- (a) The Contractor shall provide security measures to meet the following objectives during the Operation Period: -

- (i) To prevent damage, vandalism and the like;
 - (ii) To prevent theft and unauthorised removal of any part (including Mobile Plant etc.);
 - (iii) To prevent unauthorised entry;
 - (iv) To prevent unauthorised vehicle parking;
 - (v) To prevent unauthorised use;
 - (vi) To provide immediate response to emergency cases such as firefighting and rescue; and
 - (vii) To provide first aid in an emergency.
- (b) The Contractor shall provide security measures on a 24-hour basis throughout the Operation Period. The services shall include but not limited to the following: -
- (i) Personnel/ vehicular entrances and/ or access gate(s) control; and
 - (ii) CCTV surveillance duty, except plant room areas.
- (c) The security measures shall cover the Facility, including the corresponding perimeters on a 24-hour basis.
- (d) Any malfunctioning of security and safety measures (including CCTV cameras) shall be logged and remedied promptly and the Contractor shall ensure that security and safety are not materially compromised at any time. Where necessary, interim provisions/ measures shall be implemented.
- (e) Security installations and procedures shall be reviewed and updated at regular intervals during the Operation Period to take advantage of technological improvements and comply with prevailing good practice.
- (f) Pursuant to Clause 37 of the Conditions of Contract, the Contractor shall arrange the issue of passes to his employees, agents and sub-contractors for the Operation, and persons authorised by the Employer for the admission to the Site and the Facility, and in such event any person who fails to show his pass on demand to any duly authorised person shall be refused admission. Incidents of unauthorised entry shall be reported to the Employer promptly.
- (g) The Contractor shall not allow and shall prevent any persons other than his employees, agents for the Operation, sub-contractors for the Operation and persons authorised by the Employer from entering the Site and the Facility. The Contractor shall at all time permit government launches the free and uninterrupted and means of access of the Site and the Facility.
- (h) The Contractor shall maintain a record showing the names and Hong Kong identity card numbers of all his employees or persons authorised by the Employer to whom passes have been issued. An updated record shall be available at all times for the Employer's inspection.
- (i) The Contractor shall maintain a record of his employees, sub-contractors and the Employer's authorised personnel as for minimum, with details to be updated no less than every month, and available for the Employer's inspection at all times.
- (j) The Contractor shall ensure that any pass issued must be returned and invalidated on the cessation of the bearer's employment, or as directed by the Employer, and in any case on the issue of the Handover Certificate.

6.1.8 On-site Communications

- (a) The Contractor shall manage and maintain computer facilities and telemetry connections between the Facility, the Existing Facilities and the Employer's offices.
- (b) The Contractor shall manage and maintain telephone and facsimile services to the Facility, and for the use of the Employer.
- (c) The Contractor shall establish communication links and provide proper equipment for communication between field staff, staff at control rooms, vehicle drivers so as to ensure efficient operation and maintenance.
- (d) Prior to using any radio-communications on the Site, the Contractor shall have obtained necessary licences granted by the Office of the Telecommunications Authority and all relevant bodies and authorities.

6.1.9 Employer's Audit

- (a) Unless otherwise specified, an Employer's audit shall be carried out, on a yearly basis, jointly by the Contractor and the Employer and shall include, without limitation, inspection and audit of the following: -
 - (i) Food Waste collection records;
 - (ii) Non-Permitted Waste types and corresponding quantities;
 - (iii) Pre-treated Food Waste quantities and characteristics;
 - (iv) General plant and equipment conditions;
 - (v) Spare parts conditions;
 - (vi) Storage of chemicals, dangerous goods and hazardous materials;
 - (vii) Conditions of security and safety installations;
 - (viii) Site Cleanliness and Housekeeping;
 - (ix) Odour;
 - (x) Noise;
 - (xi) Lighting;
 - (xii) Dust;
 - (xiii) Vermin/insect;
 - (xiv) Site Diary and Safety and Health Records;
 - (xv) Operational records and data including the operation management database of the Facility; and
 - (xvi) Manning levels.

- (b) The observations and findings of the Employer's audit, among the observations and findings identified from the routine inspections carried out by the Employer, shall be used to determine non-compliance with the Environmental and Safety Performance Requirements and the Operational Performance Requirements as specified in the Employer's Requirements. Nothing in Clause 6.1.9 of the Employer's Requirements shall preclude the Employer from examining at any time and record any non-compliance with the Environmental and Safety Performance Requirements and the Operational Performance Requirements. In such case, the Employer will notify the Contractor as soon as practicable specifying his observations of non-compliance in accordance with Clauses 50 and 62 of the Conditions of Contract.
- (c) On the basis of the Employer's audit the Contractor shall be required to remedy any part of the Operation that is not in accordance with the requirements of the Contract.
- (d) Nothing in relation to the Employer's audit shall relieve the Contractor of his obligations, liabilities and responsibilities and shall not constitute any admission on the part of the Employer that any such obligations, liabilities and responsibilities have been complied with.
- (f) The Employer will advise the Contractor of the date and time of the Employer's audit. The Contractor's Operation Engineer and Safety Manager shall be present during the Employer's audits.
- (g) From time to time the Employer will send an audit team comprising the Employer's employees and/or the Employer's agents to carry out on-site detailed monitoring of every aspect of the operation and maintenance. The Employer will give the Contractor a minimum 3 calendar day advance notice of commencement of the said audit. The Contractor shall make provisions to assist the Employer's audit team to monitor the operation and maintenance.
- (h) Unless otherwise specified, an Employer's audit shall be carried out, on a yearly basis, jointly by the Contractor and the Employer and shall include, without limitation, inspection and audit of the following: -
 - (1) To provide detailed operational and maintenance procedures and records within 3 days of being requested by the Employer in writing;
 - (2) To provide on the spot verbal explanation of operational and maintenance matters when asked;
 - (3) To provide responses to questions raised by the said team on the operation and maintenance; and
 - (4) To provide comments within 14 days of receipt of report(s) produced by the said team regarding the operation and maintenance matters.

6.1.10 The Contractor's Resources

- (a) The Contractor shall develop and implement a Project Management and Technical Resources Plan as specified in Clause 1.27.1 of the Employer's Requirements. In the sections of technical resources, the information shall include: -
 - (1) Description of technical resources, strategy and monitoring mechanism;
 - (2) Organisation structure, bureaucracy and line of reporting;
 - (3) Position description, qualification, responsibility and authority; and
 - (4) Succession planning of key positions.

- (b) The Facility shall be manned with adequate number of the Contractor's staff as may be necessary to ensure the safe, continuous, efficient and effective operation and maintenance in compliance with the Contract. The Contractor shall determine the required manning level of each shift of operation and maintenance arrangement during emergencies and inclement weather conditions for the approval by the Employer. The manning level shall be maintained at all times as that set out in the Project Management and Technical Resources Plan.
- (c) The Contractor shall at all times provide sufficient personnel to enable the fulfilment of all Operational Performance Requirements and Environmental and Safety Performance Requirements during Post-commissioning Stage in accordance with the Employer's Requirements, including the provision of sufficient staffing and equipment to handle any emergencies such that Operational Performance Requirements and Environmental and Safety Performance Requirements are maintained. The Contractor shall state the minimum operation and maintenance personnel required for the safe, continuous, efficient and effective operation and maintenance during the Operation. The Contractor shall also provide clearly defined roles and responsibilities of the respective key team members of each shift, due considerations shall be taken on the special requirements and location of the Facility.
- (d) The Contractor shall appoint an Operation Engineer to be responsible for the superintendence of the Operation. This Operation Engineer shall be suitably qualified and experienced and shall have experience of managing similar facilities elsewhere. The Contractor shall refer to Clause 1.10.4 of the Employer's Requirements for detailed qualification requirements of the Operation Engineer. A detailed curriculum vita of the Operation Engineer shall be provided to the Employer for consent prior to the commencement of the Operation.
- (e) The Contractor shall in the Operation Plan, provide clear considerations and special/particular measures on his shift manpower adequacy to ensure safe and smooth operation to handle possible operation effects before, during and after a typhoon.
- (f) The Contractor shall provide sufficient Plant and Mobile Plant to enable the effective and efficient operation. It shall be the Contractor's responsibility to determine the numbers and types of Plant and Mobile Plant items that shall be provided to ensure the smooth and safe Operation in accordance with the requirements of the Employer's Requirements.
- (g) In the Operation Plan, the Contractor shall indicate the type and number of Plant and Mobile Plant items that shall be deployed.
- (h) The number of each type of Plant and Mobile Plant items required shall be kept under constant review in the light of actual experience and operational requirements to ensure the Operation being carried out efficiently.
- (i) All the Plant and Mobile Plant shall comply with all relevant ordinances and regulations and shall be registered where applicable under any relevant ordinance or regulation of Hong Kong. Plant and Mobile Plant shall be registered under the name of the Contractor but the registration documents shall be deposited with the Employer, together with blank duly signed ownership transfer forms.
- (j) Unless otherwise approved by the Employer, all drivers/ operators of the Plant and Mobile Plant, inclusive all Food Waste collection vehicles, Residues vehicles, passengers/ maintenance vehicles and various cranes, shall possess valid qualification(s), licence(s) or/ and registration as required by the regulations and legislations of Hong Kong.

6.2 Operation of the Facility

6.2.1 Hours of the Operation

- (a) The operational hours of the Facility shall refer to Clause 1.1.3A of the Employer's Requirements.
- (b) The Employer may require the Contractor to open all or part of the Facility to receive Food Waste outside the regular opening hours, to be determined by the Employer within reasonable limits, which may arise from time to time. It is anticipated that the Facility shall only be required to remain open beyond regular opening hours in emergency conditions. The Contractor shall not be paid additional payments for any extension of opening hours for emergency conditions. The costs involved in the extended hours are deemed to be included in the Operation Fees.
- (c) The Contractor shall ensure the Facility not to be shut down for a period longer than 12 days in a 12-month rolling period in Post-commissioning Stage. The Facility is considered shut down on the day in the Post-commissioning Stage where the Contractor diverts or requests under the instruction of the Employer to divert the Food Waste delivered / to be delivered to the Facility to other locations when the total quantity of Food Waste delivered by others to the Facility in the particular calendar day is not greater than 50 tonnes.
- (d) The Contractor shall liaise with the contractors for delivering food waste to the Facility, operators of the Existing Facilities and Designated Landfill during typhoon and emergency situations for the arrangement of the Residues and Non-Permitted Waste disposal.

6.2.2 Traffic Control

- (a) The Contractor shall be responsible for the control of all traffic within the Site, and for the issue of safety instructions to vehicle drivers.
- (b) The only entrance gate to be used to the Existing Facilities will be that at Kiu Ha Road. The Contractor shall assign one traffic controller for every vehicle entrance to guide the vehicle drivers from the entrance of the Existing Facilities to the Facility.
- (c) The Contractor shall supervise and control the actions of the equipment and personnel involved in the unloading of Food Waste and loading, unloading and transport of Residues to ensure safe operation.
- (d) The Contractor shall establish communication links and provide proper equipment for communication between field staff, staff at control rooms, vehicle drivers and operator of Existing Facilities so as to ensure efficient operation and maintenance.
- (e) Operational procedures for Food Waste reception shall be conducive to the maintenance of smooth traffic flow to minimise the vehicle travelling time from the Existing Facilities to the Facility. The Contractor shall be responsible for: -
 - (i) Conducting traffic flow checks on a regular basis, or at the Employer's request, to look for ways of safety and flow improvement and optimisation;
 - (ii) Proposing to the Employer on the Contractor's continuous traffic management measures to ensure long term maintenance of operation safety and smoothness;
 - (iii) Coordinating with the Food Waste collection vehicles for the entrance and exit of the Existing Facilities; and; and

- (iv) Including all necessary contingency traffic management measures in event of emergency situations and in case of accidents.
- (f) The Contractors shall be responsible for the implementation of the traffic management within the Site. The Contractor shall provide assistance to and coordinate all the works required by other departments and authorities to implement the traffic arrangement, including during emergency situations.
- (g) The Contractor shall erect and maintain in good conditions traffic control and warning signs.
- (h) Queuing of Food Waste collection vehicles shall not be allowed inside the Existing Facilities. The Contractor shall arrange traffic controller(s) to manage the Food Waste collection vehicle. The traffic controller(s) shall escort and communicate with the Food Waste collection vehicle whole time in the Existing Facilities.
- (i) The Contractor shall arrange the Food Waste collection vehicles to queue along Shui Chong Street if necessary. Any blocking at the entrances of the Existing Facilities shall be prohibited.
- (j) Not more than two Food Waste collection vehicles are allowed to enter the Existing Facilities for every Food Waste unloaded. Two vehicles shall not be in the same vehicle type.
- (k) No vehicle is allowed parking within the boundary of the Existing Facilities unless it is consented by the operator of the Existing Facilities.
- (l) Travel routing of the vehicles inside the Existing Facilities shall be decided and instructed by the operator of the Existing Facilities.

6.2.3 Plant commissioning test of the Facility

- (a) Upon the completion to the satisfaction of the Supervising Officer of the following and commencement of Operation, the Contractor may then proceed with the plant commissioning test upon the consent of the Supervising Officer during the Proving Stage. The Contractor shall submit, at least 7 calendar days in advance, a written notification to the Supervising Officer for his consent for the commencement of plant commissioning test.
 - (i) FATs, SATs and system acceptance tests;
 - (ii) Safety system and fire annunciation and fighting system are fully functional and readily available when required; and
 - (iii) Any other as required by the Contractor and/ or the Supervising Officer.
- (b) The duration of the plant commissioning test period of the Facility shall be a minimum of 3 calendar days of continuous operation during working hours of the Facility.
- (c) During plant commissioning test, the Contractor shall demonstrate to the Supervising Officer the entire Facility operating as a whole under normal operation continuously. The entire operation of the Facility shall be put into automatic mode by the respective operation subsystem of the operation management system. Any manual or semi-automatic operation of the Facility's equipment/ systems/ plants shall not be allowed, unless as designed/ intended to be so or otherwise consented by the Supervising Officer.
- (d) Throughout the plant commissioning test period, the Contractor shall demonstrate the following without failure, throughout the entire plant commissioning duration: -
 - (i) Continuous and automatic operation;

- (ii) Continuous treatment of Food Waste meeting the required treatment capacity;
- (iii) Continuous compliance with relevant discharge requirements; and
- (iv) Continuous compliance with the Guaranteed Performance.
- (v) At least one standby-duty changeover of equipment, including any shared equipment between systems; and
- (vi) Any operation scenarios or commissioning requirements considered to be necessary by the Supervising Officer to be confirmed before the plant commissioning test commences.
- (e) The Contractor shall submit the plant commissioning test plan at least 60 calendar days prior to commencement of the plant commissioning test of the Facility.
- (f) The plant commissioning test plan shall include, but not limited to the following: -
 - (i) List of pre-requisites and pre-checks, namely system acceptance tests records, instrument calibration certificates and major equipment/system settings etc.;
 - (ii) Plant commissioning test programme;
 - (iii) Operation team and rosters;
 - (iv) Safety, fire, emergency and contingency plan;
 - (v) The procedures and necessary test and data logging forms shall be submitted;
 - (vi) Pre-treated Food Waste test procedures, including the associated test forms and reports format; Test procedures shall include the normal operation scenario and operation sequences under any scenarios of equipment or facilities faults.
 - (v) All testing /monitoring parameters including but not limited to the consumables;
 - (vi) The appointed HOKLAS laboratory;
 - (vii) Sampling and testing schedule;
 - (viii) Estimation of daily quantity of Food Waste required and total throughput during plant commissioning test period;
 - (ix) Arrangement and estimated daily quantity of the Residues disposal to the landfill throughout the plant commissioning test;
 - (x) Plant commissioning test daily activity logbook to be manually filled in and signed by the Contractor, which shall be immediately available for inspection when requested by the Supervising Officer before, during and after the plant commissioning test;
 - (xi) Plant commissioning test form and daily report format which shall be generated from the operation management system. Samples shall be submitted for the Supervising Officer's consent;
 - (xii) Methods and procedures to upkeep the facilities for smooth transition to Post-commissioning Stage; and
 - (xiii) Any other details considered to be necessary by the Contractor and/ or the Supervising Officer (To be confirmed before the plant commissioning test of the Works starts).
- (g) Subject to the discretion of the Supervising Officer, the occurrence of any of the following may constitute to a failure of the plant commissioning test and shall require the restart of the entire plant commissioning test: -

- (i) Failure to comply with any one of the requirements as specified in Clause 6.2.3(f) of the Employer's Requirements;
 - (ii) Failure to follow procedures and requirement as per the consented plant commissioning test plan by the Supervising Officer;
 - (iii) Failure of the operation management system causing disruption to the continuous treatment of Food Waste;
 - (iv) Failure of any major equipment/ system;
 - (v) Repetitive failure of instruments and/ or equipment/ systems causing disruption to the continuous treatment of Food Waste;
 - (vi) Unstable and unsafe equipment or system operation;
 - (vii) Failure to comply with the treatment process requirements; and
 - (viii) Any other functions and/or performance considered to be unsatisfactory by the Supervising Officer.
- (h) If the plant commissioning test is considered to be a failure by the Supervising Officer, the Contractor shall:-
- (i) Submit a report and rectification plan complete with a list of work within 5 calendar days after the receipt of the notification of plant commissioning test failure from the Supervising Officer;
 - (ii) Carry out the necessary rectification to meet the satisfaction of the Supervising Officer; and
 - (iii) Be responsible for all the time and costs required throughout this period.
- (i) Upon the completion of the rectification work to the satisfaction of the Supervising Officer, the Contractor shall resubmit a notification of the restart of the plant commissioning test, with at least 3 days advance notice prior to the restart.
- (j) Not more than 14 calendar days after the completion of the plant commissioning test, the Contractor shall submit the plant commissioning test report for the Supervising Officer's consent. The Supervising Officer shall then provide their comments, outstanding work lists and also their consent (or rejection) to the Contractor within 14 calendar days of the receipt of the plant commissioning test report of the Facility. Upon the Supervising Officer's consent of the plant commissioning test report, the Contractor may then formally request for the issuance of Certificate of Completion for the Works as per Clause 72B of the Conditions of Contract.
- (k) The Contractor shall be responsible for all the associated costs, labour and materials related to the plant commissioning test.

6.2.4

Food Waste Reception

- (a) The Contractor shall be alert that the contractors for delivering Food Waste to the Facility will collect, transport and dispose the Food Waste at the Facility, as well as conducting the Food Waste monitoring outside the Site.
- (b) All Food Waste delivered to the Facility on any specific day shall be processed and pumped to digesters within 24 hours after unloading in the metering bunker. No Food Waste shall be allowed to store outside the working hours at the Facility unless permission of the Employer was given.

- (c) The Contractor shall ensure that the Facility shall be adequately manned by trained and experienced operation staff during the specified opening hours of the Facility, and shall be performing their intended duties for a sufficient duration daily such that any Food Waste delivered to the Facility shall all be cleared on the same day they are received by way of satisfactory completion of the Pre-treatment and conveyance of the Pre-treated Food Waste into the designated anaerobic digesters at the Existing Facilities.
- (d) The Contractor shall develop and maintain an up-to-date and valid registration system and user account register in advance for the contractors for delivering Food Waste to the Facility.
- (e) The following information shall be recorded in the user account register: -
 - (1) Registration ID, if any, assigned by the Employer;
 - (2) Business / owner name account holder;
 - (3) Name of person responsible for Food Waste collection and transportation;
 - (4) Vehicle and/or container type for Food Waste delivery;
 - (5) Information specific to each load of Food Waste delivered to the Facility, for example, date in and out, time in and out and car plate number;
 - (6) Detailed record of any problem encountered during waste reception; and
 - (7) Other information as requested by the Employer at any time.
- (f) The registration system shall complete with a computer system to enable recording, querying, viewing and updating the user account register at the Facility to ensure that waste reception information is sent promptly and accurately to the users of the Facility.
- (g) The computer system shall maintain a historical record of all changes to the user account register. The system shall produce a written confirmation of change in account details to the concerned account holder(s) (both current and original, if altered). As a security measure, the computer system shall be designed in such a way that changes to the raw data are prohibited and that the Employer shall be allowed to check the records at any time.
- (h) When a vehicle delivers Food Waste to the Facility for the first time, the vehicle shall be pre-registered in the registration system. Entrance to the Existing Facilities shall be refused if the vehicle is not registered in the system. When a new waste delivery vehicle is accepted into the system, a printed confirmation shall be produced and sent to the concerned account holder. All such modifications and additions shall be undertaken with the express consent and under direct supervision of the Employer.
- (i) Each waste delivery vehicle shall be allocated to one account only at any one time. However, vehicles may change accounts, for example, either on transfer of ownership, by setting up a new account or transferring to another existing account. On transfer to an existing account, the system shall produce a written notification, which the Contractor shall send to both the original and new account holder. The computer system shall maintain an historical record of all accounts associated with a vehicle, together with the dates of transfer to those accounts.
- (j) On arrival at the Facility, each vehicle delivering Food Waste shall be directed to form orderly queues outside the entrance of the Existing Facilities. This shall be facilitated by the provision of adequate sign posting, road markings, traffic signals and traffic controllers, if required.

- (k) All Food Waste delivered to the Facility shall be processed by the Pre-treatment equipment and treated by anaerobic co-digestion. No Food Waste, except the Non-permitted Waste, shall be transported out of the Facility without prior permission of the Employer.
- (l) The waste tonnage of each delivery shall be measured and recorded.
- (m) The Contractor shall compile waste delivery statistics and report such information as follows in Site Diary, including as a minimum: -
 - (i) Tonnage of Food Waste received from contractors for delivering Food Waste to the Facility;
 - (ii) Time and quantity of Pre-treated Food Waste fed to the designated anaerobic digesters in the Existing Facilities;
 - (iii) Tonnage of Residues taken away from the Facility;
 - (iv) Tonnage of Non-Permitted Waste disposed of from the Facility to RTSs or Designated Landfill or other disposal locations as instructed by the Employer;
 - (v) Laboratory test data of Pre-treated Food Waste as specified in Clause 6.2.8 of the Employer's Requirements;
 - (vi) Report by vehicle of times in/out, inter alia visit times and waste tonnage;
 - (vii) Vehicle loads on an hourly basis; and
 - (viii) Any complaints and enquiries made by the contractors for delivering Food Waste, operators of the Existing Facilities, members of the public or any government authorities in relation to the Food Waste reception by the Contractor and the response actions taken.
- (n) The Contractor shall compile waste delivery statistics and report such information as follows in Monthly Reports, including as a minimum: -
 - (i) Tonnage of Food Waste received from contractors for delivering Food Waste to the Facility;
 - (ii) Time and quantity of Pre-treated Food Waste fed to the designated anaerobic digesters in the Existing Facilities;
 - (iii) Tonnage of Residues taken away from the Facility;
 - (iv) Tonnage of Non-Permitted Waste disposed of from the Facility to other locations as instructed by the Employer;
 - (v) Monthly average of laboratory test data of Pre-treated Food Waste as specified in Clause 6.2.8 of the Employer's Requirements;
- (o) Unauthorized alteration of any data or records of the weighing system is prohibited without prior consent by the Employer. All authorized alterations shall be logged and recorded with detailed descriptions of the reasons of alteration and the modifications made for reporting purposes.
- (p) Information recorded by the weighing system, as set out in Clause 6.2.3 of the Employer's Requirements, shall be stored in a database which allows retrieval using the SCADA System for data inspection, statistical analysis and reporting.

- (q) The Contractor shall ensure that no operations or act that may materially affect the measurement of the net tonnage of the said materials shall be undertaken inside the Facility or on the vehicle concerned after the tonnage measurements have been performed.
- (r) The Contractor shall be responsible for operation and maintenance of the weighing system at the Facility. The Contractor shall also carry out calibration of the weighing system at frequency not less than that recommended by the manufacturer and in any case no longer than 12-month intervals.
- (s) The operation of the weighing system will be audited from time to time by the Employer. Should the Employer be in doubt with the accuracy or performance of the whole or any part of weighing system, the Employer shall have the right to request the Contractor to carrying out verification of its operation by an independent surveyor. In case the accuracy or performance is verified to be acceptable in accordance with the Contract, the Employer will ascertain the cost incurred and reimburse the Contractor. Otherwise, all cost incurred shall be borne by the Contractor and that part of the weighing system shall be taken off-line immediately. The Contractor shall repair and re-calibrate the weighing system and at the same time implement necessary measures to ensure smooth waste reception.
- (t) To facilitate the Employer's audit in accordance with Clause 6.1.9 of the Employer's Requirements of the operation of the weighing system, the Contractor shall provide a remote terminal, as an integral part of the external workstation in the Employer's Office as specified in Clause 1.10S of the Employer's Requirements or otherwise consented to by the Employer, for downloading summary reports of the waste delivery information. Such reports shall be transmitted as required by the Employer and automatically at specific intervals. The Contractor shall provide all hardware and software required for retrieving, viewing and storing the data. The software for database and report format shall be submitted to the Employer for consent.
- (u) Where a vehicle suspected of carrying Non-Permitted Waste arrives at the Facility, the Contractor shall immediately notify the Employer for a joint inspection to verify whether such vehicle is carrying Non-Permitted Waste in accordance with the procedures set out in Clause 64 of the Conditions of Contract.
- (v) Leachate shall be properly collected and discharged to the buffer tank, and the Contractor shall clean the floor of the process block(s) after each discharge to remove any spillage.
- (w) If the weighing system of the Facility is out of order, the Contractor shall liaise with the operator of Existing Facilities if the Existing Facilities' weighbridge can be used, in which this should be agreed with the operator of the Existing Facilities before Operation Period and included in the Operation Plan. If the operator of Existing Facilities agreed with such arrangement, the Contractor shall use the weighbridge for the operation of the Facility. The Contractor shall repair the weighing system of the Facility in order to return to normal operating procedures as soon as possible. For the avoidance of doubt, any cost or expense due to this arrangement shall be borne by the Contractor.

6.2.5 Conveying Food Waste and Pre-treated Food Waste to Designated Food Waste Treatment Facility

- (a) If instructed by the Employer, the Contractor shall provide delivery services which is to convey Food Waste and Pre-treated Food Waste in the Facility to Designated Food Waste Treatment Facility. The delivery services shall be deemed to be included in the provisional items for conveying Food Waste to Designated Food Waste Treatment Facility and the provisional items for conveying Pre-treated Food Waste to Designated Food Waste Treatment Facility.
- (b) The delivery services shall include, but not limited to, all services and works to be provided by the Contractor in accordance with the terms of this Contract for:-
 - (i) Conveying Food Waste / Pre-treated Food Waste to Designated Food Waste Treatment Facility;
 - (ii) Loading suitable containers with Food Waste / Pre-treated Food Waste in the Facility;
 - (iii) Keeping the areas affected by the delivery in clean, hygienic, tidy and safe condition;
 - (iv) Liaison with all relevant government departments, operators, contractors and other stakeholders in connection with the delivery; and
 - (v) Preparing records and reports.
- (c) The Contractor shall be responsible for all costs and expenses incurred by the provision of the delivery services including that for the supply of the Contractor's delivery vehicles, manpower, labour, materials, power, fuels, oil, collection bins, waste containers, instruments, equipment, maintenance/cleaning services, fees/charges, insurance and all necessary resources for satisfactory execution and completion of this part of the Operation.
- (d) The Contractor shall be required to provide details of the particulars of the vehicle and the personnel to be employed in carrying out the delivery operation, and to report any subsequent changes, for identification and monitoring purpose.
- (e) The Employer will monitor all aspects of performance of the delivery services by the Contractor. The Contractor shall take all necessary action to cooperate with the Employer in the execution of its duties.
- (f) The Contractor shall provide training for his staff on the proper means to carry out the delivery services.
- (g) Neither the Contractor nor any of his agents or employees shall demand or accept any money, gratuity, bonus or other payments or benefit in cash or in kind for the delivery of the Food Waste/ Pre-treated Food Waste.
- (h) No spillage of the Food Waste/ Pre-treated Food Waste on, into or beside the ground, carriageway, watercourse, drainage system or channel is permitted. The Contractor shall devise for his working staff a set of handling and precautionary procedures to avoid any contraction and spreading of disease in carrying out the delivery services.
- (i) For the avoidance of doubt, the tonnage of the Food Waste/ Pre-treated Food Waste delivered by the Contractor to the Designated Food Waste Treatment Facility under this delivery services shall be measured for payment purpose. The information shall be stored in the database which allows retrieval using the SCADA System for data inspection, statistical analysis and reporting.

- (k) The Contractor shall maintain close liaison with the Employer, and the operators of the Designated Food Waste Treatment Facility for reaching an agreement on the waste delivery procedures and logistic arrangements associated with the delivery services.
- (l) The Contractor shall prepare and submit a delivery plan as part of the Operation Plan to the Design Checker for certification and the Employer for consent. The certification and consent of the delivery plan shall not relieve the Contractor of any duty, obligation or responsibility under this Contract.
- (m) The delivery plan shall set out clearly all details of the complete management system, logistic arrangement, and the operation procedures/guidelines/standards employed by the Contractor for safe and satisfactory execution and completion of the delivery services under this Contract. The delivery plan shall contain, but not limited to, details of the following key elements in relation to the delivery services: -
 - (i) Particulars of the vehicles to be employed and the drivers/helpers to be employed in carrying out the delivery services;
 - (ii) Method statement and guidelines for operation of the Contractor's delivery vehicles, including the loading and unloading of Food Waste/Pre-treated Food Waste to/from the vehicles; and
 - (iii) Emergency plan for handling spillage of waste and the list of equipment for emergency clean up.
- (n) Notwithstanding the duties given to the Contractor for liaising direct with the operators of the Designated Food Waste Treatment Facility or their agents/ contractors as appropriate for reaching agreements on the delivery services, the Employer shall have the power to decide on all such matters including, but not limited to, those listed below regardless of the results of the discussion made: -
 - (i) The locations of collection points;
 - (ii) The delivery frequency and/or schedule for the Food Waste/Pre-treated Food Waste;
 - (iii) The travelling routes of the Contractor's delivery vehicles;
 - (iv) The number of bins employed; and
 - (v) The date for commencement or termination of the delivery services;
- (o) To this end, the Employer may, if necessary, instruct the Contractor to follow strictly the decision made on that matter as reasonably obtained taking into account all factors of concerned and the interests of the various stakeholders and members of the public by serving of a notice to that effect. The Contractor shall not be entitled to claim extra cost arising from the work under such instructions
- (p) If by reason of any potential or confirmed outbreak of disease or any other event occurring which in the opinion of the Employer requires the delivery services to be suspended to prevent further spreading of disease or to avoid causing any health and safety risk to the public, the Employer shall have the power to suspend at any time in the course of the Contract the whole or any part of the delivery services for such time as the Employer may consider necessary. The Employer shall serve a notice to the Contractor to that effect stating the effective date of the suspension and the end date, if any, and the reasons for the suspension. The Contractor shall forthwith execute the order as instructed by the Employer.
- (q) Vehicles provided or deployed by the Contractor for performance of the delivery services under the terms and conditions of this Contract shall be included in the delivery plan.

- (r) No vehicle, other than the Contractor's delivery vehicles indicated in the delivery plan, shall be employed by the Contractor for carrying out the delivery services under the Contract, unless otherwise be permitted by the Employer in writing.
- (s) The Contractor shall provide or deploy an adequate number of Contractor's delivery vehicles, which are of appropriate types and sizes to suit the intended specific usage in respect of the vehicle concerned in the delivery plan. For the avoidance of doubt, all the costs associated with the provision of the Contractor's delivery vehicles shall be deemed to be included in the rates for provision of the delivery services.
- (t) The Contractor's delivery vehicles shall be of the following types, or a suitable type certified by the Design Checker and consented by the Employer: -
 - (i) An enclosed body truck fitted with a hydraulic tail lift for loading and unloading of loaded/empty collection bins into/out of the truck load compartment;
 - (ii) A road tanker fitted with a suitable container with carrying capacity of at least 4.5 cubic metres, coupled with a bin lifter embodied onto the vehicle chassis, for loading the content of the bins directly into the container and transporting/unloading the containment in bulk; and
 - (iii) A vacuum tanker with a pressure vessel.
- (u) The Food Waste/Pre-treated Food Waste shall be loaded and unloaded mechanically. Hand loading or unloading the Food Waste/Pre-treated Food Waste is not permitted. The automatic hydraulic/mechanical device fitted on the Contractor's delivery vehicles shall be so constructed as to withstand possible damage associated with loading and unloading of the collection bins loaded with Food Waste/Pre-treated Food Waste.
- (v) The container of the Contractor's delivery vehicles shall be leak-proof and covered or preferably enclosed or sealed during transportation. The container/collection bins, as appropriate, shall be securely fixed onto the Contractor's delivery vehicles to avoid skidding or falling during transportation. No excessive odour originating from the Food Waste/Pre-treated Food Waste shall be allowed to emit from the vehicles.
- (w) The Contractor shall display Contract number, the Contractor's name, and telephone number of the telephone hotline, or any information deemed suitable by the Employer, on the Contractor's delivery vehicles for identification purposes. The sign shall not be allowed to be covered, defaced or dirtied so as to render it illegible. The proposed display/markings on the Contractor's delivery vehicles shall be submitted to the Supervising Officer for certification and to the Employer for consent.
- (x) The Contractor shall provide tools or equipment to carry out cleansing or disinfection when necessary such as spillage of Food Waste/Pre-treated Food Waste during loading, transportation or unloading of Food Waste/Pre-treated Food Waste. Two (2) sets of protective clothing shall be provided, in good condition, in each Contractor's delivery vehicle at all times for emergency use. Protective clothing shall include: -
 - (i) Hair net;
 - (ii) Full length protective overall or gown;
 - (iii) Proper face mask;
 - (iv) Disposable surgical or rubber gloves;
 - (v) Wellington boots or shoe coveralls; and
 - (vi) Eye protection (goggles or face shield).

6.2.6 Pre-treatment

- (a) The below key objectives of the Pre-treatment System are to achieve the performance as specified the Employer's Requirements: -
 - (1) Removal of the impurities from the Food Waste, the removed impurities from the system is deemed to be the Residues;
 - (2) Size reduction of the Food Waste;
 - (3) Attainment of required quality of the Pre-treated Food Waste prior to entering the Anaerobic Co-digestion System in the Existing Facilities; and
 - (4) Provision of Annual Availability as set out in Clause 1.5A.3 of the Employer's Requirements to provide a treatment capacity of 50 wet tonnes per day of Food Waste.
- (b) The Contractor shall guarantee that the quality of the Pre-treated Food Waste should meet the requirements stipulated in Clause 1.5A.5 of the Employer's Requirements. If the Contractor fails to meet the requirements for a particular month, the Employer will deduct the Operation Fees in accordance with Clause 1.30 of the Employer's Requirements and Clause 72 of the Conditions of Contract.
- (c) The Contractor shall minimise the dilution water consumption as far as possible to reduce the delivery volume to the designated anaerobic digesters in the Existing Facilities. The Pre-treatment shall be maintained at the design operating conditions according to the Registered Design.

6.2.7 Pre-treated Food Waste Conveyance System

- (a) The Contractor shall deliver the Pre-treated Food Waste to the Existing Facilities by the Pre-treated Food Waste Conveyance System as set out in Clause 2.21 of the Employer's Requirements. For the avoidance of doubt, the operation and maintenance of the Pre-treated Food Waste Conveyance System shall be responsible by the Contractor.
- (b) The Contractor shall liaise closely with the operators of the Existing Facilities for the operation of the anaerobic co-digestion and any other processes downstream that could be affected the Operation of the Facility. In the event of emergency, the Contractor shall execute the relevant procedures as stated in the Operation Plan.
- (c) The Contractor shall have the consent of the Existing Facilities before operating the valves of the Pre-treated Food Waste conveyance system. The Contractor shall agree with the operators of the Existing Facilities to confirm the anaerobic digester(s) to be used before pumping the Pre-treated Food Waste to the anaerobic digester(s).
- (d) The operation of the valves of the Pre-treated Food Waste conveyance system shall be witnessed by the operators of the Existing Facilities. The Contractor shall give at least 12 hours prior notification to the operators of the Existing Facilities.
- (e) The Contractor shall check the settings of the valves of the Pre-treated Food Waste conveyance system daily before pumping of the Pre-treated Food Waste to the anaerobic digester(s) of the Existing Facilities. If there is any issue on valve settings, the Contractor shall notify the operators of the Existing Facilities immediately and rectify the issue.

- (f) The Contractor shall be responsible for the maintenance of the Pre-treated Food Waste Conveyance System. If clogging or any issue is observed at the Pre-treated Food Waste Conveyance System, the Contractor shall immediately notify and liaise with the operators of the Existing Facilities, and carry out the relevant repair to resume normal operation as soon as possible.

6.2.8 Handling and Disposal of Residues

- (a) The Contractor shall be responsible for the disposal of the Residues in the Facility. The Contractor shall transport the Residues to the disposal sites in accordance to his Contractor's Plans. The Residues shall not be stored within the Site for more than 3 days to minimize odour, pest and litter impacts. All Residues stored onsite shall be enclosed and maintained under negative pressure with connection to the deodorisation system.
- (b) The Contractor shall measure and record the net weights of Residues at the Facility.
- (c) The Contractor shall comply with the organic recovery requirement as specified in Clause 1.5A.5 of the Employer's Requirements. The Contractor shall not dispose excessive amount of organic matter of the Food Waste with the Residues. The Employer will review the quantity of the organic matter of Pre-treated Food Waste record submitted in the Monthly Report. If the Contractor fails to meet the organic capturing requirement for a particular month, the Employer will deduct the Operation Fees in accordance with Clause 1.30 of the Employer's Requirements and Clause 72 Conditions of Contract.
- (d) The Contractor shall provide sufficient vehicles for Operation including to dispose the Residues from the Facility to the Designated Landfill. The vehicles shall be regularly maintained and repaired to a good and clean condition for the Operation.
- (e) The Contractor shall provide sufficient containers for the storage and transport of the Residues from the Facility to the Designated Landfill. These containers shall be non-combustible, able to withstand accidental impact, provided with covers/lids that can be securely locked during transport.
- (f) All costs related to handling and disposal of the Residues, including but not limited to licence application, transportation, and containers provision, shall be borne by the Contractor and shall be deemed to be included in the Operation Fees.

6.2.9 Sampling and laboratory testing of Pre-treated Food Waste

- (a) The Contractor shall conduct an onsite daily testing on the dry solids content, volatile solid content and pH value of the Pre-treated Food Waste sample to monitor the performance of the Operation. The detailed schedules and testing methods shall be submitted to the Employer for approval and the operator of Existing Facilities for reference.
- (b) The Contractor shall be responsible for arranging a local laboratory with HOKLAS accreditation to conduct the offsite laboratory testing of Pre-treated Food Waste sample for determination of the waste characteristics once per week in both Proving Stage and Post-commissioning Stage. The detailed schedules and testing methods shall be submitted to the Employer for approval.
- (c) The Contractor shall at least collect 1 litres of the Pre-treated Food Waste grab sample prior to pumping to the designated anaerobic digesters in the Existing Facilities on the same day of sampling of the Pre-treated Food Waste for the characteristic analysis.
- (d) The parameters to be tested at the HOKLAS accredited laboratory shall at least include the following: -

- (1) pH;
 - (2) Moisture;
 - (3) Total solids;
 - (4) Volatile solids content;
 - (5) Carbon to nitrogen ratio;
 - (6) Volatile fatty acids;
 - (7) Particle size;
 - (8) Organic matter; and
 - (9) Any other parameters deemed necessary by the Employer and/or the Supervising Officer.
- (e) The Contractor shall conduct other necessary sampling and testing for satisfactory operation of the Facility at his own decision and cost.
 - (f) If requested by the Employer, the Contractor shall provide one set of the representative Pre-treated Food Waste grab sample in any days to the Employer free of charge.
 - (g) The cost for the sampling, handling, storage and testing of waste shall be borne by the Contractor and deemed to be included in the Operation Fees.
 - (h) The Contractor shall record all test results in the Site Diary (including result from on-site testing) and provide a summary of the waste test results in the Monthly Report (including result from HOKLAS and on-site testing). The test results shall be copied to the operator of Existing Facilities for reference.

6.2.9A Electricity tariff

- (a) The Contractor shall comply with the requirements for power supplies stipulated in the Employer's Requirements to construct, test, commission, operate and maintain the Facility and be required to make the power supplies available timely for testing, commissioning, operation and maintenance. The Contractor shall liaise and coordinate with the operators of the Existing Facilities about all issues related to the electricity tariff as stated in Clause 1.4.1B of the Employer's Requirements respectively.
- (b) During Operation Period, the Contractor shall arrange and install an onsite separate electricity meter for recording the monthly consumption of electricity of the Facility powered by the Existing Facilities in the SCADA system as stipulated in Clause 4.2.2S of the Employer's Requirements. The monthly power consumption shall be recorded on Monthly Report.
- (c) The Contractor shall adopt the Bulk Tariff Rate from CLP for the calculation and payment for the monthly electricity bill.

6.2.9B Water tariff

- (a) The Contractor shall comply with the requirements for water supplies stipulated in the Employer's Requirements to construct, test, commission, operate and maintain the Facility and be required to make the water supplies available timely for testing, commissioning, operation and maintenance. The Contractor shall liaise and coordinate with the operators of the Existing Facilities about all issues related to the water tariff as stated in Clause 1.5.4(c) of the Employer's Requirements.

- (b) The Contractor shall arrange and install an onsite separate water meter for recording the monthly consumption of water of the Facility provided by the Existing Facilities provided by the Existing Facilities in the SCADA system as stipulated in Clause 4.2.2S of the Employer's Requirements. The monthly water consumption shall be recorded on Monthly Report.
- (c) The Contractor shall adopt the Non-domestic Supplies for Trade Rate from WSD for the calculation and payment for the monthly water bill.

6.2.9C Odour Patrol

- (a) Unless otherwise agreed by the Supervising Officer, the Contractor shall arrange odour patrol to be attended by the Contractor's Agent and the Design Checker to measure the concentration of H₂S and NH₃ at the perimeter of the Site during Operation period. The proposed locations for monitoring are indicatively presented in Employer's Drawing No. 60434312/EP/1009.
- (b) The odour patrol shall be conducted once every two days. The time of patrol shall be consented by Supervising Officer. If the day of monitoring is under adverse weather (i.e. tropical cyclone warning signal No. 8 or above or Black Rainstorm), the monitoring shall be conducted on next working day.
- (c) The methodology of the H₂S and NH₃ measurement used in the weekly odour patrol shall be the same as the one used for baseline odour monitoring pursuant to Clause 1.24.32 of the Employer's Requirements.
- (d) All measurement results shall be recorded in the SCADA system.(e) In the event that the odour monitoring result measured in the odour patrol exceeds 0.05ppm+baseline level for H₂S or 0.5ppm+baseline level for NH₃, the Contractor shall report to the Supervising Officer and take remedial actions including but not limited to the following:-
 - (1) Investigate the causes of odour exceedance;
 - (2) Inspect whether all covers, enclosures, mechanical ventilation system, air curtains and fast-action door well-functioned and closed during operation;
 - (3) Inspect the operation of Deodorisation System and submit to the Supervising Officer the concentration of discharged gases including NH₃ and H₂S in stack in the past two days; and
 - (4) Propose mitigation measures to the Supervising Officer.

6.2.10 Expected Operating Scenarios

- (a) The Operation Plan shall include an emergency procedures plan for the Post-commissioning Stage of Operation as per Section 6.4 of the Employer's Requirements detailing the non-routine procedures to be adopted during different expected emergency operating scenarios.
- (b) During Operation Period, the Contractor shall take due considerations on different expected operating scenarios and ensure the minimum operating requirements are satisfied and the disruption to the Operation is minimised.
- (c) The Contractor shall operate and maintain the Facility to satisfy the minimum operating requirements during the corresponding expected operating scenarios as follows: -

Event	Minimum Operating Requirements
Weather conditions related	
A. Strong monsoon signal, and tropical cyclone warning signal Nos. 1 and 3	<ol style="list-style-type: none"> Continue the Operation except that direct danger or threat is posed to operation personnel. If higher tropical cyclone warning signal is anticipated: Typhoon safety preparation work shall commence.
B. Amber and red rainstorm warnings	<ol style="list-style-type: none"> Continue the Operation except that direct danger or threat is posed to operation personnel.
C. Thunderstorm warning	<ol style="list-style-type: none"> Continue the Operation except that direct danger or threat is posed to operation personnel.
D. Foggy conditions	<ol style="list-style-type: none"> Continue the Operation except that direct danger or threat is posed to operation personnel.
D. Tropical cyclone warning signal No. 8 or above and black rainstorm warnings	<ol style="list-style-type: none"> Continue the Operation two hours after the lowering of Tropical cyclone warning signal No. 8 or above and black rainstorm warnings
Food Waste reception related	
E. Not used	Not used
F. Not used	Not used
Food Waste Pre-treatment related	
G. Breakdown/ scheduled inspection/maintenance of the weighing system	<ol style="list-style-type: none"> Continue the Operation. Carry out inspection and repairing works immediately. Keep records of the Food Waste Collection Vehicle information required with the exception of weight. Liaise with the operators of the Existing Facilities for the use of weighbridge at the STSTW.
H. Breakdown/ scheduled inspection/maintenance of Pre-treated Food Waste Conveyance System.	<ol style="list-style-type: none"> Continue the Operation until the storage for Pre-treated Food Waste is full. Carry out inspection and repairing works immediately. Notify the Employer and operators of the Designated Food Waste Treatment Facility. Convey the Pre-treated Food Waste to the Designated Food Waste Treatment Facility when instructed by the Employer.
I. Breakdown/ scheduled inspection/maintenance of the designated anaerobic digesters at the Existing Facilities	<ol style="list-style-type: none"> Continue the Operation. Notify the Employer. Convey the Pre-treated Food Waste to the Designated Food Waste Treatment Facility when instructed by the Employer. Liaise with the operators of the Existing Facilities to understand the time expected to resume the normal Operation.

Event	Minimum Operating Requirements
J. Breakdown/ scheduled inspection/maintenance of the wastewater treatment system of the Existing Facilities	<ol style="list-style-type: none"> 1. Continue the Operation. 2. Dispose the wastewater offsite at own cost. 3. Liaise with the operators of the Existing Facilities to understand the time expected to resume the normal Operation.
J1. Breakdown/ scheduled inspection/maintenance of potable water or power supply source of the Existing Facilities	<ol style="list-style-type: none"> 1. Continue the Operation. 2. Liaise with the operators of the Existing Facilities to understand the time expected to resume the normal Operation 3. Provide the Employer and Supervising Officer with the predicted date of Operation resumption.
K. Pre-treated Food Waste's characteristics cannot meet the performance requirement	<ol style="list-style-type: none"> 1. Continue the Operation. 2. Locate and identify the cause(s) and rectify the problem(s) 3. Notify the Employer and operators of the Existing Facilities.
L. Minor electrical fault occurs leading to interruption of the Facility's Operation	<ol style="list-style-type: none"> 1. Subject to the severity of the situation, the electrical fault shall be immediately isolated and rectified to resume operation. 2. Notify the Employer and operators of the Existing Facilities immediately. 3. Any potential damage and/ or environmental impact shall be reported to the Employer as soon as possible. 4. Carry out inspection and repairing works immediately. 5. Resume the Operation as quick as practicable. 5. Continue the Operation.
Miscellaneous	
M. Closure of Designated Landfill in short notice	<ol style="list-style-type: none"> 1. Continue the Operation. 2. Unload and dispose of as much Residues as possible before the closure of Designated Landfill. 3. Work with the Employer immediately for arrangement on alternative disposal locations.

6.3 Maintenance of the Facility

6.3.1 General

- (a) The Contractor shall carry out preventive maintenance (PM) and corrective maintenance (CM) in accordance with the maintenance management plan in the consented Operation Plan to ensure that all the equipment, systems, Plant and Mobile Plant shall perform to the specified requirement and standards, in particular the Facility's performance requirement as stipulated in relevant clauses of the Employer's Requirements. As part of the Operation Plan, the Contractor shall include a maintenance management plan containing details but not limited to the following: -
- (i) Civil works, building works, equipment, systems, Plant and Mobile Plant condition monitoring strategies;
 - (ii) Preventive maintenance (PM) and corrective maintenance (CM) schedule and management strategies;
 - (iii) Calibration/ validation of equipment/ systems management strategies;
 - (iv) Equipment/ systems downtime minimisation strategies;
 - (v) Predictive maintenance strategies utilising the Facility's available records;
 - (vi) Strategies in eliminating long outstanding maintenance work orders (job cards);
 - (vii) Spare parts and consumables inventory management, procurement and stock level optimisation strategies;
 - (viii) Planned shutdown, mandatory certifications and inspection (monthly/ quarterly/ yearly) schedules; and
 - (ix) Monthly and yearly maintenance reports format.
- (b) The Contractor shall ensure on a continuous basis that at all times his maintenance procedures are sufficient to achieve the following at minimum: -
- (i) Operation shall be on a continuous basis in compliance with all the stipulated performances;
 - (ii) The maintenance schedule of Plant and Mobile Plant shall be carefully planned to cater different expected operating scenarios;
 - (iii) The Facility shall be maintained to achieve its required availability and full working life as specified in relevant clauses of the Employer's Requirements; and
 - (iv) The condition of the Facility at the expiry of the Operation Period shall meet its design life requirements as set out in the Employer's Requirements.
- (d) The overall PM and CM works shall be managed, scheduled recorded and updated in maintenance management plan . All CM and PM works records and its entire database from the time of the commencement of Operation shall not be erasable and editable after confirmation of entry; the Contractor shall be responsible for managing and archiving all data.
- (e) All elements shall be regularly and properly maintained by the Contractor to ensure safe and reliable functioning, operation and performance as required and intended. Monthly maintenance report shall be submitted by the Contractor and for the Employer's consent, with details of the following: -

- (i) Review and summary of the PM and CM works status and statistics as of the reporting month;
 - (ii) PM and CM works conducted on major/ critical equipment/ system of the reporting month with details of the works;
 - (iii) Summary and details on any unscheduled shut down, blackout or major interruptions alike, due to the PM and CM works carried out, their respective duration and effects, and their associated coordination/ liaison conducted and parties involved during the reporting month;
 - (iv) PM work scheduled to be conducted on major/ critical equipment/ system for the coming 3 months with details of the works, including but not limited to anticipated temporary shutdown, major operation interruptions, the respective anticipated disruption duration and effects, and associated advance coordination/ liaison/ arrangements/ temporary measures/ special requirements required and parties involved;
 - (v) Statutory inspection and certification works scheduled for major/ critical equipment/ system in the coming 3 months;
 - (vi) Major equipment/ system spare parts inventory and purchased for the calendar month and forecast for the next 3 months;
 - (vii) Mitigation measures and plan in completing any accumulated outstanding PM and CM works up to the reporting month; and
 - (viii) Any other information considered to be necessary by the Employer.
- (f) Similarly, for yearly maintenance report, it shall be submitted by the Contractor and for the Employer's approval, with details of the following: -
- (i) Review and summary of the PM and CM works status and statistics as of the reporting year;
 - (ii) Plant availability calculation;
 - (iii) Preventive maintenance programmes of the reporting year and the next coming year;
 - (iv) PM and CM works conducted on major/ critical equipment/ system of the reporting year with details of the work;
 - (v) Summary and details on any unscheduled shut down, blackout or major interruptions alike, due to the PM and CM works carried out, their respective duration and effects, and their associated coordination/ liaison conducted and parties involved during the reporting year;
 - (vi) PM works scheduled to be conducted on major/ critical equipment/ system for the coming year with details of the works, including but not limited to anticipated major shut down, major operation interruptions, the respective anticipated disruption duration and effects, and associated advance coordination/ liaison/ arrangements/ temporary measures/ special requirements required in advance and parties involved;
 - (vii) Statutory inspection and certification works, scheduled for major/ critical equipment/ system in the coming year;
 - (viii) Major equipment/ system spare parts inventory and purchased for the reporting year and forecast for the next year;

- (ix) Mitigation measures and plan in completing any accumulated outstanding PM and CM works up to the reporting year; and
 - (x) Any other information considered to be necessary by the Employer.
- (g) Maintenance shall be carried out in a safe manner following the procedures for ensuring the safety of operatives including but not limited to a "permit-to-work" system, the correct use of lifting equipment and the isolation of Plant. Accessories for the "permit-to-work" system such as key safes, lock-off padlocks and etc. shall be provided by the Contractor.
- (h) All elements shall be regularly and frequently cleaned, checked for damage, and repaired. The frequency of cleaning and checking shall be proposed by the Contractor and submitted for agreement with the Employer.
- (i) The Contractor shall complete remedial works identified in the manner and within the time allowed in accordance with Clauses 45, 67 and 68 of the Conditions of Contract. If the Contractor fails to complete the remedial works to the satisfaction of the Employer within the specified time, the Employer is empowered to instruct the remedial works to be carried out by other contractors and deduct the costs for such instruction from any payments due to the Contractor.
- (j) All historic and up-to-date PM and CM records and cleaning records of all elements shall be made available for the Employer's inspection within 24 hours' notice.
- (k) The Contractor shall maintain the Facility and the Site wholly in accordance with the requirements of the Contract and the approved maintenance management plans in the Operation Plan. If the Contractor identifies any possible alternative method of maintenance that may be more efficient, he shall notify the Employer accordingly. If any such change to the method is acceptable to the Employer, it will be implemented in accordance with the relevant provisions of the Contract.

6.3.2 Preventive Maintenance (PM) and Corrective Maintenance (CM)

- (a) The Contractor shall be responsible throughout the Operation Period for the maintenance of the Facility and parts thereof including all preventive maintenance, overhaul, repairs, rehabilitation, renewal and replacement of Plant and Mobile Plant which at all times shall be maintained in good functional conditions and to perform in accordance with the Employer's Requirements.
- (b) The Contractor shall develop and implement specific preventive maintenance programmes for every system, equipment, building and infrastructure with the objective of maximising their availabilities as well as minimising any unscheduled maintenance or emergency shutdown.
- (c) The scope and frequency of PM work shall meet the manufacturer's recommendations, and shall be adjusted with reference to conditions identified in the previous preventive maintenance, and any repair carried out recently. For avoidance of doubt, the scope and frequency of the PM work shall not in any way be of inferior or lesser than that of those as recommended by the manufacturer.
- (d) The preventive maintenance programmes shall be incorporated into the Operation Plan and updated whenever necessary for generation of work orders and for tracking/monitoring purpose.
- (e) The replaced items or parts upon maintenance or repair shall be regarded as the property of the Contractor. Disposal and/or removal off-site away of these items shall be approved by the Employer.

- (f) Scheduling of PM works which requires system or equipment shutdown shall ensure that the ability of the remaining associated system(s) or equipment can meet the Operational Performance Requirements and Environmental and Safety Performance Requirements.
- (g) The Contractor shall carry out all necessary or appropriate maintenance with due diligence and expedition. Conditions of the Facility and the Site shall be proactively managed with defects rectified within a time frame agreed by the Employer. The Contractor shall rectify any defects identified by the Employer in accordance with Clause 46 of the Conditions of Contract.
- (h) PM, CM and the subsequent repairs, renewal or replacement work shall be carried out in a safe manner, including the adoption of the appropriate safe work procedures stated in the Safety and Health Plan.
- (i) The Contractor shall pay particular attention to the setup and use of temporary equipment/ works such as mobile lifting equipment, mobile access platforms, scaffolding, platforms and ladders, etc. All relevant guidelines, Code of Practices and statutory requirements shall be strictly followed.
- (j) The Contractor shall notify the Employer on all unscheduled breakdown and CM of Plant, Mobile Plant and equipment immediately with all necessary details. The Contractor shall submit a report detailing the incident, the corresponding temporary works and CM applied and the estimated duration of the works within one week after the incident. The report shall be updated weekly until the works of the affected Plant, Mobile Plant and/ or equipment is finished.

6.3.3 Maintenance Management

- (a) The Contractor shall develop a maintenance management tool, including but not limited to issuance, tracking and management of all PM and CM work orders, spare parts and consumables inventory control and purchasing, of the Facility. All statistical analysis, summaries and reports related to the overall Facility maintenance management shall be properly recorded in EDMS.
- (b) The Contractor shall develop and implement specific preventive maintenance programmes for every system, equipment, building and infrastructure with the objective of maximising their availabilities as well as minimising any unscheduled maintenance or emergency shutdown.

6.3.4 Calibration/ Validation of Instruments and Measuring Equipment

- (a) The Contractor shall be responsible for maintaining accuracy and reliability of all instruments and measurement equipment throughout the Operation Period to enable correct and effective monitoring and control, and provide spares consumables, manpower, manufacturer's involvements, replacements and any required items.
- (b) The Contractor shall be responsible for the calibration/ validation as necessary of all measurement. All calibration/ validation work shall be carried out so as not to delay or disrupt the Operation. Unless otherwise specified, calibration/ validation frequency shall not be less than that as recommended by the manufacturers of the instruments/ measuring equipment but in any case no longer than 12-month intervals.
- (c) For all onsite and offsite calibration/ validation works requiring the use of an accredited testing and calibration/ validation organisation, this organisation shall be certified for such purpose and consented by the Employer. The results of calibration/ validation shall be made available to the Employer.

- (d) All calibration/ validation works for instruments and measuring equipment shall be included as part of the PM works.

6.3.5 Inventory Control

- (a) Throughout the Operation Period, the Contractor shall provide and maintain special tools and spare parts in accordance with the Registered Design and sufficient for 1 year operation. The Contractor shall also maintain stock level of all chemicals, dangerous goods, hazardous materials and consumables as specified in the Employer's Requirements or otherwise consented to by the Employer, to ensure continuous operation. The required stock levels shall take into consideration reliability of sources and supply interruptions, for example, due to inclement weather.
- (b) The required stock levels shall be set out in the Operation Plan. The quantity or amount of each item shall be recorded in the maintenance management plan for monitoring.
- (c) The current process chemicals and consumables levels shall either be updated online via monitoring signals of the SCADA System at a reasonable frequency with reference to the respective consumption rates, but in any case not fewer than once per week. All delivery of consumables shall be recorded as appropriate.
- (d) The Contractor shall develop and implement an appropriate inventory control system and work procedures such that stock levels of spare parts and consumables shall be updated in the maintenance management plan immediately at the time the spare parts and consumables are retrieved from the store. In general, the method and frequency of updating shall be stated in the Operation Plan for the approval by the Employer.
- (e) Apart from the routine updating of stock levels, the Contractor shall carry out inventory checks every six months. The inventory checks shall be scheduled to avoid disturbance to the Operation and a one-week advance notice shall be served to the Employer. The Employer may, at his discretion, attend any of these inventory checks.
- (f) At the expiry of the Operation Period, the Contractor shall handover to the Employer all special tools, spare parts and consumables in accordance with the Registered Design, including those which were also procured under the Contract during the course of the Operation. The stock level of spare parts shall be sufficient for 1 year operation from the date of Handover Certificate if reinstatement of the Site is not instructed by the Employer. For avoidance of doubt, all special tools, spares parts, consumables, Plant and Mobile Plant shall be of the properties of the Employer.

6.3.6 Storage of Chemicals, Dangerous Goods and Hazardous Materials

- (a) The Contractor shall provide and maintain storage of chemicals, dangerous goods and hazardous materials required for the Operation. Dangerous goods means any of the goods or substances to which the Dangerous Goods Ordinance applies.
- (b) The Contractor shall include in his Operation Plan a detailed list all chemicals, dangerous goods and hazardous materials to be used in the Operation with inventory control programme, Safety and Health Plan and procedures for handling and storage.
- (c) The Contractor shall maintain appropriate stock levels to allow continuous and efficient Operation but the quantity stored shall not exceed the regulatory limits.

- (d) All chemicals, dangerous goods and hazardous materials shall be packed in containers of suitable design and construction so as to prevent leakage, spillage or escape of the contents under normal conditions of handling, storage and transportation, and shall comply with relevant statutory and FSD requirements.
- (e) Storage areas of chemicals, dangerous goods and hazardous materials, including any room, cupboard, cabinet or bin, should display a hazard warning panel, notice or marking at or near the entrances or opening of the storage area and such panel, notice or marking should: -
 - (i) be indicated in English words and Traditional Chinese Characters;
 - (ii) be securely attached to or worked in vertical plane of the storage structure;
 - (iii) be weather resistant and rigid;
 - (iv) be kept clean and free from obstruction; and
 - (v) meet statutory and FSD requirements where appropriate.
- (f) The Contractor shall submit the chemical and consumables schedule which contains details of storage quantity and any chemicals classified as dangerous goods by FSD, whether the quantity is sufficient to requiring Dangerous Goods License from FSD or not, for the consent of the operator of Existing Facilities.

6.4 Emergency Procedures Plan and Responsibilities

6.4.1 General

- (a) The Contractor shall prepare an emergency procedures plan for the Operation under the Operation Plan for the Employer's consent. The emergency procedures consented by the Employer prior to the commencement of the Operation shall be regularly reviewed for updates by the Contractor, or as requested by the Employer and submitted for the Employer's consent. The Contractor shall regularly communicate with contractors for delivering Food Waste to the Facility and operators of the Designated landfill to update the transportation schedules and carry out special arrangements during different emergency scenarios.
- (b) The emergency procedures shall be developed specifically for the Facility, with due considerations on the works nature and locational constraints. The emergency procedures shall be those safety/ contingency measures, action and procedures to be followed by the Contractor during situations where life or properties may be or are in danger. The emergency procedures shall include, but shall not be restricted to the following: -
 - (i) Classification of area with potential risks and hazards;
 - (ii) A matrix of scenarios/ incidents/ events and their respective severity against level of action required;
 - (iii) General evacuation procedures with due considerations on the severity of the scenarios/ incidents/ events;
 - (iv) General rescue procedures with due considerations on the severity of the scenarios/ incidents/ events;
 - (v) List of emergency rescue gear and equipment and those considered to be necessary by the Contractor to cater for the day to day operation and maintenance personnel and visitors in case of any incidents/ accidents, and their respective installed/ stored locations;

- (vi) Periodic training operation and maintenance personnel and routine drills to ensure familiarity on the emergency procedures.
 - (vii) Fire risk safety assessment, items shall include but not to fire hazards of each location, people who may be exposed to the fire safety risk while being at the location, evaluation and action to remove or to reduce the fire safety risk, record/ plan/ train of fire safety risk assessment and regular review and update of all the fire safety risks over time and re-training of personnel; and
 - (viii) Plans, scopes, arrangements and reporting for different emergency situations in accordance with Clause 6.4.2 of the Employer's Requirements.
- (c) As part of the fire safety risk assessment, the Contractor shall comprehensively list out for each location of the Site, the respective and associated fire services installation provided, and also illustrations the escape routes to safe places during fire.
- (d) Without limiting the Contractor's obligations and responsibilities under the other provisions of the Contract, the Contractor shall provide from time to time all temporary arrangements and contingency provisions necessary or as may be provided in the Contract to maintain the Operation during the maintenance, overhaul, renewal, replacement, breakdown, Condition Surveys and subsequent repair, without limitation to the generality of the foregoing: -
- (i) The Contractor shall not be permitted to suspend the Operation by reason of any such event without the Employer's consent;
 - (ii) In case the Facility is not able to treat the Food Waste, the Contractor shall arrange diversion of Food Waste to Designated Food Waste Treatment Facility with the instruction of the Employer. The Food Waste shall only be diverted to other waste disposal facilities when the Designated Food Waste Treatment Facility is not available, or otherwise as instructed by the Employer;
 - (iii) The Contractor shall have available workers, Mobile Plant and Plant as provided in the Contract for the execution of emergency works at all times; and
 - (iv) If by any reason of any incident, accident or failure of other event occurring which, in the opinion of the Employer requires the emergency works to be executed or services to be performed, the Employer may give to the Contractor an order verbally in the first instance, to be followed by an instruction within 7 calendar days of the issue by the Employer of the verbal order. The Contractor shall upon receipt of the verbal order immediately execute the works or perform the services with due diligence as instructed in the verbal order.
- (e) The Contractor shall provide regular trainings to his operation staffs continuously. During an emergency situation, the Contractor shall be responsible for evacuating personnel to safety and contain the risks until the arrival of emergency services.

6.4.2 Expected Emergency Conditions

- (a) The Contractor shall state the non-routine operational procedures to be adopted during emergencies in the emergency procedures plan for the Post-commissioning Stage of Operation, and shall include at least the following: -
- (i) Emergency rescue and handling of casualties;

- (ii) Danger of floods;
 - (iii) Adverse weather conditions;
 - (iv) Fire and explosion;
 - (v) Vehicle collisions and accidents;
 - (vi) Facility blackout;
 - (vii) Facility closure/ emergency shut down;
 - (viii) Spillage and leakage of chemicals;
 - (ix) Evacuation; and
 - (x) Liaison requirements with the relevant emergency services.
- (b) The emergency procedures shall be submitted to all relevant authorities including but not limited to the operators of the Designated Landfill and the operators of the Facility for comment and submitted to the Employer for consent. The Contractor shall review and update the emergency procedures regularly or when considered necessary by the Employer.
- (c) The Contractor shall be responsible for the provisions of the following: -
- (i) All necessary personal protective equipment shall be adequate and suitable for daily operation and maintenance use; and
 - (ii) All necessary emergency rescue gear and equipment for different emergency situations. These rescue gears and equipment shall be provided and stored at strategic locations as proposed by the Contractor and readily available when required to be used.
- (d) In the event of the situations as listed in Clause 6.4.2 (a) of the Employer's Requirements and any other unforeseeable situations, the Contractor shall be responsible for: -
- (i) Notify the emergency services, the potential affected parties and the Employer immediately;
 - (ii) When the situation in a safe and contained manner, provide immediate verbal report to the Employer, including but not limited to overall status and situation of the matter, casualties and properties damage (if any), immediate special operation or temporary arrangements/ measures require to be made resulting from the effects on the situation, cause(s) of the situation and initial estimation on the time of safe resumption of full/ partial operation of the Facility;
 - (iii) The Contractor shall, within 1 week (or at a lesser time if required by the Employer), provide a written report on this situation, containing up to date information of the event, causes of the event, remedial/ rectification actions and plan, preventive action to avoid the repetition of the situation, and any other information as required by the Employer. This report shall continue to be updated every week (or at a lesser time if required) by the Contractor, until further instruction by the Employer;
 - (iv) Where in the case that staff's life is in danger, the Contractor shall also be responsible for their safe assembly and evacuation from area(s) of the incident/ accident from the Facility; and

- (v) The Contractor shall also be responsible for cooperating with the relevant emergency services and government authorities, both on the rescue work as well as the subsequent investigation work (if any) until to the full closure of the case.
- (e) The Contractor shall diligently resume the Food Waste reception and Pre-treatment by the Facility as soon as it is safe and practically possible.
- (f) Emergency rescue and handling of casualties: -
 - (i) The Contractor shall identify, for each part of the Facility, the safety risks and the potential injury involved with respect to the specifics of the location, constraints, nature, works and others associated with that part of the works; and
 - (ii) Due considerations shall be taken on liaison requirements with relevant parties in case of any interruptions to power import arrangements and temporary interruption to Operation of the Facility.
- (g) Danger of floods: -
 - (i) Any incident of flooding that results in large volumes of polluted water, or Residues being waterlogged, shall be reported to the Employer.
 - (ii) The Contractor shall liaise closely with the operators of the Existing Facilities to avoid the Site flooding during rainy seasons.
 - (iii) The Operation Plan shall describe the arrangements for resuming the Operation as quickly as possible, and dealing with any damaged materials.
- (h) Adverse weather conditions: -
 - (i) During tropical cyclone warning signal No. 8 or any higher signal, or if the Black Rainstorm warning is issued by HKO, communication between the the Contractor and the relevant parties shall be maintained in order that both can be informed of any particular emergency affecting the Operation.
 - (ii) The Contractor shall arrange staff in the event of adverse weather, including the arrangements for the resumption of the Operation after a tropical cyclone warning signal No. 8 or a Black Rainstorm warning is lowered or cancelled;
 - (iii) The Facility is not considered as non-compliance with the guaranteed Annual Availability requirements if the Operation is affected by adverse weather, including tropical cyclone warning signal No.8 or Black Rainstorm warning; and
 - (iv) The Contractor shall provide preventative measures to protect the Facility if a tropical cyclone warning signal No. 8 is expected; and to report on damage and the like after a storm or a typhoon has passed.
- (i) Fire and explosion: -
 - (i) The Contractor shall notify all relevant emergency services immediately when there is fire or explosion detected;
 - (ii) Adequate and sufficient fire safety training shall be provided to all staff regularly; and

- (iii) The Contractor shall evacuate all staff immediately to the designated safety assembly points, and/ or where necessary off the Facility. Means of escape and designated safety assembly points shall be carefully planned and maintained by the Contractor to ensure they will not be overcome by smoke, toxic gases, heat or fire. The public address system shall automatically repeat messages to direct personnel to safe places.
- (j) Vehicle collisions and accidents: -
 - (i) In the event of collision and/ or accidents, the Contractor shall be responsible for notifying all relevant emergency services as soon as possible. Photos of the accident site shall be taken and recorded for future use;
 - (ii) If there is fire or fuel leakage has occurred, the Contractor shall carry out the corresponding measures to minimise casualties and impacts to the Facility; and
 - (iii) The Contractor shall appoint at least a member of staff per shift to be an emergency traffic controller to provide manual traffic control during vehicle breakdown, collision and accidents. The emergency traffic controller shall require to be present and within the Facility to cover the entire the duration of vehicle operating hours.
- (k) Facility blackout: -
 - (i) The Contractor shall be responsible for ensuring that normal power and Operation is resumed forthwith after any power failure. If it is foreseen that the power cannot be resumed within 24 hours, the Contractor shall notify relevant parties, including but not limited to the contractors for delivering Food Waste, the Employer and the operator of the Existing Facilities; and
- (l) Facility closure/ emergency shut down: -
 - (i) All planned shutdowns, interruptions to any part of the Operation and closure of the Facility shall require prior notification to and consented by the Employer;
 - (ii) The Contractor shall also under no circumstances to close down the Facility under his own decision, except under emergency situations, that operation of the Facility is no longer safe, when personnel's life or property of the Facility are under threat or alike. In such event, the Contractor shall refer to Clause 6.4.2 (d) of the Employer's Requirements;
 - (iii) Upon completing any emergency shutdown or before closure of the Facility (if required), the Contractor shall diligently and responsibly put the Facility into the safest of state as practically as possible such that both life and properties of the Facility can be ensured;
 - (iv) The Contractor shall be responsible for the Facility closure or emergency shutdown, inclusive of any safety and temporary measures required;
 - (v) The shutdown procedures under various scenarios shall be covered in the Operation Plan as stated in Clause 1.27.3 of Employer's Requirements;
- (m) Evacuation: -
 - (i) Where in the case that human life are endangered due to a major incident/ accident, in the opinion of the Contractor or the Employer, the Contractor shall be responsible for the immediate assembly, organisation and safe evacuation of the all staff.

- (ii) An evacuation procedure shall be submitted for the Employer's consent, such procedure shall include details but not limited to possible scenarios which may lead to the need of evacuation, communication with the relevant emergency services and the Employer, evacuation route and means of evacuation.
- (o) Liaison requirements with the relevant emergency services: -
 - (1) The emergency procedures shall be submitted to all relevant authorities for comment and submitted to the Employer for consent.

6.5 Records and Reporting

6.5.1 Archiving of Operation and Maintenance Records

- (a) The Contractor shall manage and maintain all operation and maintenance records, including the data of the operation and maintenance system and the following throughout the Operation Period in a safe and secure manner: -
 - (i) SCADA System;
 - (ii) EDMS; and
 - (iii) Other as required by the Employer.
- (b) No data record in anyway shall be editable or erasable, whether they are generated automatically or manually input upon confirmation. Any editing to the data records shall only be made in accordance with agreed checking and authorisation procedures, which only be included as part of the Operation Plan submitted to the Employer for consent.
- (c) The Employer shall be allowed to check and have full access to the abovementioned data and records described at any time.
- (d) As far as practicable, all records shall be kept electronically utilising the operation management system with backup security. Backup shall be conducted automatically and shall be conducted at least once per month or as required by the Employer. Any hardcopy records production and filing required by the Contractor shall be agreed by the Employer or upon request by the Employer.
- (e) Backup duplication of all electronic records shall be made by the Contractor to the Employer. Arrangement and storage method of this backup duplication shall be agreed with the Employer prior to the commencement the Operation. This backup duplication for the Employer shall be conducted simultaneously during the backup exercise, or at an interval/ frequency requested by the Employer upon 1 week advance notification by the Employer.
- (f) The Contractor shall be responsible for preparing any electronic and/ or hardcopies of specific records in specific format which shall be made available routinely to the Employer upon his request. Format of such routine electronic and/ or hardcopies record shall be submitted for the Employer's consent.
- (g) For the purpose of retrieving operation and maintenance data records as well as real time monitoring of the Facility and the Existing Facilities under this Section, the Contractor shall provide Employer's workstations at the Employer's offices. The Employer's workstations shall be equipped with all necessary hardware and software.

6.5.2 Site Diary

- (a) The Contractor shall maintain a Site Diary in electronic form. The Site Diary shall be kept with original at the Facility's EDMS and a copy at the Employer's workstation. Final format, details and sign off method shall be agreed with the Employer, including as a minimum: -
 - (i) Date and weather measured and recorded by the Hong Kong Observatory;
 - (ii) Operation hours;
 - (iii) Labour on the Site;
 - (iv) Information recorded by the Reception System;
 - (v) Daily tonnage of Food Waste received from contractors for delivering Food Waste to the Facility;
 - (vi) Daily Food Waste and Pre-treated Food Waste statistical records;
 - (vii) Daily tonnage of Residues and waste disposed;
 - (viii) Mobile Plant, giving number of Mobile Plant working, number of Mobile Plant suspended and reason for being suspended;
 - (ix) Instructions to the Contractor;
 - (x) Comments by the Contractor;
 - (xi) Complaints received and action taken;
- (b) The Site Diary shall be checked and signed by authorised personnel of the Contractor in accordance with the consented Operation Plan. The completed Site Diary shall be available for inspection, verification and signing off by the representative of the Employer no later than noon time on the following day.
- (c) At least one bound hard copy version of the signed Site Diary shall be provided to the Employer each calendar week for his record. Final no. of copies shall be agreed with the Employer during Operation Period.
- (d) The Contractor shall keep appropriate detailed records of his staff and his subcontractors working in Facility's EDMS. The staff record shall be kept in the EDMS and regularly reviewed and updated by the Contractor whenever there is a change of staff in the Facility or as instructed by the Employer. The staff records shall be available at all times at the EDMS for inspection by the Employer throughout the Operation Period.
- (e) The Contractor shall retain at the Facility and the Existing Facilities a Construction Site Safety Manual, (DEVB or approved equivalent). All incidents, including near misses and serious incidents/ accidents, occurring to personnel during the Operation Period shall be notified and recorded to the Employer within two hours of the occurrences of the incidents/ accidents, and where necessary to the Labour Department in accordance with the labour legislation of Hong Kong.

6.5.3 Safety and Health Records

- (a) The Contractor shall keep records on all safety and health matters and update such records daily for inspection by the Employer.

6.5.4 Monthly Report

- (a) The Contractor shall provide and present details, in the form of Monthly Reports, of operational data and information in relation to the Operation of the Facility and the Existing Facilities to the Employer in a systematic and concise manner. Monthly Reports shall be submitted to the Employer by the 14th day of the month following the reporting month to which the report relates. The required information and data shall include, but not be limited to the following: -
 - (i) An updated organisation chart which includes details such as number of employees, including subcontractors, in the Facility by trades;
 - (ii) Change of staffing, including subcontractors;
 - (iii) Performance Tests carried out and scheduled in the following month;
 - (iv) Meetings held with the Employer and other relevant parties and authorities;
 - (v) Scheduled meetings in the following 3 reporting months;
 - (vi) Food Waste reception and pre-treatment statistics and a summary of problems encountered for Food Waste reception during the month;
 - (vii) Summary of quantity of Pre-treated Food Waste;
 - (viii) Sampling and testing data of the Pre-treated Food Waste;
 - (ix) Other key operation data;
 - (x) Records on the Contractor's financial performance including audited accounts with balance sheets and profit/loss statements.
- (b) The Contractor shall supplement and present any additional operational data and information, in form of Monthly Reports or in ad-hoc manner, as requested by the Employer from time to time.
- (c) Details and format of the report shall be submitted for the Employer's consent.

6.5.5 Annual Report

- (a) The Contractor shall submit Annual Report to the Employer before the last day of the month following the Operating Year to which the report relates: -
 - (i) Summaries of quantities and characteristics of Food Waste received and pre-treated at the Facility during the reporting year;
 - (ii) Overall performance of the Facility with highlights on non-compliance with Operational Performance Requirements and Environmental and Safety Performance Requirements;
 - (iii) Summaries of quantity of electricity and water consumed during the reporting year;
 - (iv) Summary of expiry dates for licences, permits and certificates for the Operation;
 - (v) Summary of major equipment breakdown, repair, overhaul, renewal, replacement, modification, Performance Tests, Condition Surveys carried out;
 - (vi) Summary of incidents/ accidents related to safety and health, environmental issues, security and complaints;

- (vii) Scheduled Maintenance, overhaul, renewal, replacement, modification of major plant and equipment, Performance Tests and Condition Surveys in the forthcoming 12 months;
- (viii) List of Change ordered by the Employer, with details and status;
- (ix) Summary of payments of Operation Fees;
- (x) Records on the Contractor's financial performance including audited accounts with balance sheets and profit/loss statements; and
- (xi) Any other items as considered necessary by the Employer.

6.6 Performance Tests, Condition Survey and Residual Life Assessment

6.6.1 Performance Tests

- (a) The objectives of the Performance Tests are to demonstrate that the followings are in accordance with the Registered Design and the Contractor's Plan: -
 - (i) all facilities are operating satisfactorily by both manual and automatic control; and
 - (ii) all safety and protection devices of the facilities operate satisfactorily.
- (b) The Contractor shall conduct Performance Tests for the Facility as ordered by the Employer in accordance with Clause 67 of the Conditions of Contract. A Performance Test plan shall be included with the Operation Plan for the Employer's consent. The plan shall include, as a minimum, the following: -
 - (i) scope and schedule of tests;
 - (ii) detailed descriptions of precautionary measures, testing procedures, test forms, and acceptance criteria;
 - (iii) effect on the Operation of the Facility including any reduction in redundancy or standby capacity, with mitigation measures or temporary arrangements clearly stated;
 - (iv) any safety, health and environmental related issues;
 - (v) details of any temporary work for the tests; and
 - (vi) contingency plan for emergency situations that may arise during the Performance Tests.
- (c) The Performance Tests shall consist of a continuous running period, to be agreed by the Employer, of each item of the Plant at up to its design capacity, during which proper functioning of all modes of operation, control, monitoring, data acquisition and interlocks shall be demonstrated. The Plant shall be continuously operated to verify the performance, efficiency, and reliability criteria. The length or pattern of the continuous running period(s) may vary in different system tests with regard to: -
 - (i) system/ equipment characteristics; and
 - (ii) operational need of the Facility.
- (d) For the avoidance of doubt, the performance and capacity of the following systems shall be verified by the Performance Tests: -
 - (i) Reception System;
 - (ii) Food Waste Conveyance System;

- (iii) Pre-treatment; and
- (iv) Pre-treated Food Waste Conveyance System.
- (e) The Performance Tests shall be witnessed by the Employer. The Contractor shall give 7 calendar days' notice to the Employer in writing of the date and time of the Performance Tests after receiving the order from the Employer.
- (f) No Performance Tests shall be conducted until the Performance Test plan and the proposed date and time are consented to by the Employer.
- (g) The Contractor shall prepare and submit a report of the Performance Tests to the Employer within 28 calendar days of the completion of the Performance Tests. The report shall include: -
 - (i) detailed testing procedures and results;
 - (ii) identification of any defects or deficiencies; and
 - (iii) recommendation of rectification work required to satisfy requirements of the Contract.
- (h) The report of the Performance Tests shall be made available for inspection by the tenderers bidding for any follow-on contracts.
- (i) In the event of disagreement between any of the results or interpretation, the results determined by the Employer's Laboratory shall prevail.
- (j) The actual performance of the Plant shall be compared with the performance data recorded during the Commissioning Tests.
- (k) In the event that the Employer considers, as a result of the Performance Tests, that any part or parts of the Facility require repair, maintenance, rectification or replacement to satisfy the requirements of the Contract, the Employer will serve notice under Clause 67 of the Conditions of Contract on the Contractor of the work necessary to be carried out. The Contractor shall ensure that all such repair, maintenance, rectification or replacement are completed within reasonable time and in any case not more than 90 days after receipt of the notice of the Employer, unless otherwise consented to by the Employer.
- (l) All Costs related to the Performance Tests shall be borne by the Contractor and deemed to be included in the Operation Fees.

6.6.2 Condition Survey

- (a) Upon request by the Employer, the Contractor shall engage an Independent Surveyor to carry out a Condition Survey in the presence of the Contractor and the Employer as specified in Clause 68.1 of the Conditions of Contract.
- (b) The scope of the Condition Survey shall include: -
 - (i) Inspection and auditing of manuals, schedules, reports, SCADA System for compliance;
 - (ii) Visual inspection of all components, including Plant, Mobile Plant, buildings and structures for state of maintenance and repairs;
 - (iii) Inspection of performance records and performance evaluation of the plant and equipment in operating condition;
 - (iv) Inventory check on chemicals, consumables, spare parts and special tools;

- (v) Requirements on any onsite online or offline tests required to be witnessed during the Condition Survey, including equipment calibration/ validation checks, performance verification tests etc.;
 - (vi) Based on the above information, forming a view as to the general operation and maintenance condition of the Plant, Mobile Plant, buildings and structures, with due regard to their service hours and/or age; and
 - (vii) Where condition of the Plant, Mobile Pant, buildings or structures are identified to be suffering from accelerated or abnormal deterioration in the opinion of the Employer and/ or the Independent Surveyor, cause(s) of these deteriorations should identified as practically as possible, with recommended remedial action to ensure their intended design life. Any condition of any parts of the Facility which are identified to be of immediate danger must immediately be reported to the Employer and the Contractor for immediate remedial action.
- (c) The Independent Surveyor shall have at least 10 years relevant experience in carrying out Condition Surveys with respect to each item of work specified in Clause 6.6.2(b) of the Employer's Requirements for the Condition Survey and Clause 6.6.3(c) of the Employer's Requirements for the Residual Life Assessment, where appropriate. The Contractor shall submit details of the proposed Independent Surveyor at least 90 calendar days prior to the commencement of the Condition Survey for the consent of the Employer. Should the Independent Surveyor be a company, the Contractor shall submit qualifications of the nominated personnel to demonstrate that the Independent Surveyor has personnel suitably qualified and available to complete the Condition Survey. The Contractor or the Independent Surveyor shall not substitute the nominated personnel without written consent by the Employer. The consent of the Independent Surveyor and the nominated personnel by the Employer does not relieve the Contractor of his responsibility and liability under the Contract.
- (d) The Independent Surveyor shall compile and submit a Condition Survey plan to the Employer for consent at least 45 calendar days prior to commencement of the Condition Survey. The Condition Survey plan shall be prepared in consultation with the Contractor to ensure interruption to Operation is kept to a minimum or even none. The Condition Survey plan shall include the following information, as a minimum:
- (i) A programme showing the works sequence, inspection activities of the various systems, equipment, structures etc., manpower/ resources requirements from the Independent Surveyors and Contractor which are included in the Condition Survey;
 - (ii) Detailed descriptions of precautionary measures, temporary measures (if any), methodologies, procedures, timing for the inspections, audits, measurements, extent of any Operation interruption (including duration and equipment/ systems involved), onsite online or offline tests and etc. to be carried out on each survey item;
 - (iii) Findings on effect on the Operation including any reduction in redundancy or standby capacity, performance etc. with mitigation measures or temporary arrangements clearly stated;
 - (iv) Any safety, health and environmental related matters identified during Condition Survey;
 - (v) Details and requirements of temporary work/ measures for the Condition Survey; if any;

- (vi) Contingency plan for emergency situations that may arise during the Condition Survey; and
- (vii) Overall Condition Survey Report format.
- (e) The inspections, measurements, tests or other necessary services by the Independent Surveyor shall be of sufficient scope and details to verify the performance of the Facility set out in the Contract and the Contractor's Plans.
- (f) The Condition Survey shall not commence until the Independent Surveyor and the Condition Survey plan have been consented to by the Employer. Desktop and field works of the entire Condition Survey shall be completed within 1 calendar month.
- (g) The Independent Surveyor shall prepare and submit, at the same time to the Contractor and the Employer, a detailed Condition Survey report as per Clause 68.2 of the Conditions of Contract. The report shall include: -
 - (i) Methodologies and findings of the survey;
 - (ii) Findings, defects and damages, including any photos or video records; and
 - (iii) Recommendations and compilation of a list per 6.6.3(b)(vii) of the Employer's Requirements.
- (h) In the event that the Employer considers, as a result of the Condition Survey and the Residual Life Assessment specified in Clause 6.6.3 of the Employer's Requirements, if appropriate, that any part or parts of the Facility and the Site require repair, maintenance, rectification or replacement to satisfy the requirements of the Contract, the Employer will serve notice under Clause 68 of the Conditions of Contract on the Contractor of the work necessary to be carried out. The Contractor shall ensure that all such repair, maintenance, rectification or replacements are completed within reasonable time and in any case not more than 90 calendar days after receipt of the notice from the Employer as per Clause 68.2 of the Conditions of Contract, unless otherwise consented to by the Employer.
 - (i) All completed defect work shall be demonstrated by the Contractor to meeting the Contract requirements and inspected to the satisfaction of the Employer.
 - (j) The Contractor shall provide the corresponding rectification and modification works as suggested by the Independent Surveyor in the Condition Survey to ensure the residual life of the Facility is at least 5 years upon the completion of the Operation Period.
 - (k) For the avoidance of doubt, Condition Survey as detailed in this Clause shall be independent to those inspections and certifications required for the Plant and Mobile Plant under Hong Kong legislations, including but not limited to the electrical switchboards, lifting gear and lifting appliances. Such inspections and certifications shall not be counted and/ or used as part of the findings or results of the Condition Survey. All costs associated with the carrying out and reporting of the Condition Survey shall be borne by the Contractor deemed to be included in the Operation Fees.

6.6.3 Residual Life Assessment

- (a) The Condition Surveys as per Clause 68.1 of the Conditions of Contract and the Condition Survey shall include a Residual Life Assessment of the Facility. The Residual Life Assessment shall be carried out as part of the Condition Survey by the Independent Surveyor.

- (b) The Residual Life Assessment shall benchmark the Facility against relevant international standards/ guidelines, and performance of similar facilities on a worldwide basis. The Independent Surveyor shall carry out inspections, audits, measurements and tests in sufficient scope and details to determine the residual life of the Plant and Mobile Plant.
- (c) The Independent Surveyor shall include details of the following for the Residual Life Assessment in the Condition Survey plan and submit for the Employer's consent as specified in Clause 6.6.3(b) of the Employer's Requirements: -
 - (i) Residual life assessment methodology;
 - (ii) Standards, guidelines and references adopted; and
 - (iii) Detailed descriptions of assessment to be carried out.
- (d) The Independent Surveyor shall include a separate section in the survey report specified in Clause 6.6.3 of the Employer's Requirements for the Residual Life Assessment, to record the following: -
 - (i) Details on any onsite tests conducted;
 - (ii) Detailed descriptions of assessment carried out;
 - (iii) Findings of assessment;
 - (iv) Highlights on findings which may affect the overall residual life;
 - (v) Evaluation residual life of the respective parts of the Facility and the Existing Facilities, and as a whole; and
 - (vi) Make recommendations and actions required to ensure the intended overall design life requirement can be maintained.

6.7 Reinstatement of the Site

6.7.1 General

- (a) If the Employer instruct the Contractor to reinstate the Site, the Contractor shall remove all equipment and materials from the Site, remove all associated facilities including but not limited to pipesworks, ducts, cabling, ducting and fittings for the Facility, make good any damages and reinstate it back to its original condition and to the satisfaction of the Employer as soon as practicable.
- (b) If the Contractor fails to comply with the obligation imposed by Clause 6.7.1 (a) of the Employer's Requirements, the Employer may, after giving notice in writing to the Contractor, have the work of cleaning, tidying up, repair and restatement carried out by other persons and the expense so incurred by the Employer may be recovered as a debt due from the Contractor, or may be deducted by the Employer from any monies that may then be or thereafter become payable to the Contractor.

6.8 Handover of the Facility

6.8.1 End-of-Contract Condition Survey

- (a) If requested by the Employer, the Contractor shall carry out a Condition Survey of the Facility, jointly with the Employer, at least 9 months but not more than 12 months prior to the expiry of the Operation Period (referred to subsequently as the end-of-contract Condition Inspection).

- (b) As part of the end-of-contract Condition Inspection, the Contractor shall carry out tests to demonstrate the performance and condition of the Plant and Mobile Plant etc. for the Employer's consideration of purchasing the process equipment prior to the expiry of the Operation Period. The tests shall be able to verify the capacities and performance in the Contractor's Plans and the Registered Design.
- (c) The Employer shall have the rights to purchase the process, electrical and mechanical equipment in accordance with the result of the end-of-contract Condition Survey. An instruction shall be written by the Employer to the Contractor for the execution of the buyback of the process equipment and transfer of ownership.
- (d) The ownership of the process equipment shall be transferred to the Employer upon the Employer's instruction. The Contractor shall initiate, not later than the first day of the last year of the Operation Period, a discussion with the Employer to agree the details of the end-of-contract arrangement, i.e. if handover to any follow-on contractor or Employer is necessary, and to arrange suitable handover procedures with agreement with the Employer.

6.8.2 Training of the Employer's Staff

- (a) The Contractor shall arrange formal training courses to the Employer's staff and/or the follow-on contractor (if any) prior to the handover of the Facility when instructed by the Employer.

6.9 **Operational Performance Requirements**

6.9.1 General

- (a) Further to Clauses 62 and 71 of the Conditions of Contract, the Operational Performance Requirements are set out in Table 1.02 of the Employer's Requirements.
- (b) The Contractor shall carry out the Operation of the Facility according to the Contractor's Plan and the Operation and Maintenance Manual unless otherwise instructed by the Employer.