

(1) G01-010 GENERAL REQUIREMENTS PARTS

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1 GENERAL

This Section sets out the general requirements for carrying out any works for the Project and shall be read in conjunction with all relevant work Sections and other contract documents.

In addition, under the same clause heading of each Section, any modifications and additions as listed in the Project Specific Data (PSD) shall take precedence over the original specification appended under same clause.

1.1 Project Particulars

PROPOSED BUILDING REPAIRS, REFURBISHMENT, ADDITIONS AND ALTERATION WORKS TO SINGAPORE SPORTS SCHOOL BUILDING

1.1.1 The Site

LOTS 127 PT, 128 PT, 3955 PT, 4010 PT & 4067 PT MK 13 AT CHAMPIONS WAY (WOODLANDS PLANNING AREA)

1.1.2 Project Team

The following words shall have the meaning assigned to them:

.	Organisation	Address	Represented by
Architect	FOMA Architects LLP	531A Upper Cross Street, Hong Lim Complex, #04-111 Singapore 051531 Tel: (65) 6906 1749	Ar Tan Chin Chieh Ms Wong Hui Jing
C&S Engineer	Longrove & Associates Pte Ltd	06-22 Commonwealth Ln, Singapore 149544 6659 3760	Mr Zhang Fan Mr Bernard
Quantity Surveyor	D+J Consultants Pte Ltd	124 Geylang Lorong 23. #07- 01 Arcsphere Building. Singapore 388405 Tel: (65) 8180 2909	Mr Jader Goh

1.1.3 Definitions, Abbreviations and Interpretations

1.1.3.1 Definitions

In the Specification, the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise requires:

"Employer" shall mean the party as set out in the Conditions of Contract.

"Consultants" shall mean the Employers Appointed Architectural Consultant, Civil and Structural Engineering Consultant, Mechanical and Electrical Engineering Consultant, Quantity Surveying Consultant, Project Management Consultant and other appointed Consultants.

"SO" shall mean the Superintending Officer who is the Architect, the Engineer or their representative on site, or as designated by the Employer.

"Architect" shall mean the Employers Appointed Architectural Consultants who is registered with the Board of Architects in Singapore.

"QP" shall mean Qualified Person who is a registered architect or a professional engineer with valid practical certificate registered in Singapore.

"PE" shall mean Professional Engineer who is registered under the Professional Engineers Board, Singapore

"AE" shall mean Authorised Examiner who is approved by the Commissioner for Workplace Safety and Health of the Ministry of Manpower by a Certificate in writing for the purpose of carrying out examinations and tests on lifting equipment in accordance with the Workplace Safety & Health (General Provisions) Regulations.

"Contractor" shall mean the party as set out in the Conditions of Contract.

"Registered Surveyor" shall mean Surveyor who is registered under the Land Surveyor Board, Singapore

"as approved" shall mean as approved by the Superintending Officer in written format.

"as agreed" shall mean as agreed with the Superintending Officer.

"as directed" shall mean as directed by the Superintending Officer.

"or other" shall mean as approved by the Superintending Officer

"as required" or "as shown" or "as indicated" or "as specified" shall mean as required or as shown or as indicated or as specified in the Drawings and/or Specification.

"acceptance" and "approval" are used within the following limitations:

- (a) No approval or acceptance by the Architect shall relieve the Contractor of any responsibility to achieve the specified quality and performance of the work under the Contract.**
- (b) Any approval given in respect to samples of materials, workmanship or methods of construction submitted in accordance with the requirements of the Specification, are not to be interpreted as denoting any degree of satisfaction with the materials used in the Works or in the execution of the Works.**

1.1.3.2 Abbreviations

The following abbreviations are used in the Specification:

ABGSM = Association of British Generating Set Manufacturers

AC or ac = alternating current

ACMV = Air-Conditioning and Mechanical Ventilation

AISI = American Iron and Steel Institute

AMCA = Air Movement and Control Association

ANSI = American National Standard Institute

AS = Australian Standard

ASTM = American Society for Testing and Material

AVA = Agri-Food and Veterinary Authority of Singapore

BCA = Building and Construction Authority

BMT = Building Maintenance

Team BS = British Standard

CAAS = Civil Aviation Authority of Singapore

CCTV = Closed-circuit Television

CPF = Central Provident Fund

Board CP = Code of Practice

DC or dc = direct current

DIN = Deutsches Industrie Normen

DSTA = Defence Science and Technology Agency (DSTA)

ECM = Earth Control Measures

ECO = Environmental Control

Officer EIA = Electronic Industry

Association ELCB = Earth Leakage

Circuit Breaker EMA = Energy

Market Authority

EN = European Standards

EPR = Ethylene Propylene Rubber

FTRR & I = for their respective rights and interests

FSSD = Fire Safety and Shelter Department

GS or gs = Galvanised Steel

GST = Goods and Services Tax

HRC = High Rupturing Capacity

IDA = Info-Communications Development Authority of Singapore

IEC = International Electrotechnical Commission

IECEE = IEC System for Conformity Testing and Certification of Electrical Equipment

IP = Index of Protection

ISO = International Organization for Standardization

ITE = Institute of Technical Education

JIS = Japanese Industrial Standard

LEW = Licensed Electrical Worker

MCB = Miniature Circuit Breaker

MCCB = Moulded Case Circuit Breaker

MEWR = Ministry of the Environment and Water Resources

MSSL = Market Support Services Licensee

Max or max = maximum

Min or min = minimum

MOM = Ministry of

Manpower MRT = Mass

Rapid Transit MS or ms =
mild steel

NEA = National Environment

Agency No. or no. = number

ONORM = Österreichisches Normungsinstitut (Austrian Standard)

PBTS = Public Basic Telecommunications Service Operators

PLS = Product Listing Scheme

PowerGrid or Grid = PowerGrid Ltd

PPE = Personal Protection Equipment

PSB = TUV SUD PSB Pte Ltd

PSD = Project Specific Data

PTL = Public Telecommunication Licensees

PUB = Public Utilities Board

PVC or pvc = Polyvinylchloride

RC or rc = Reinforced
Concrete

RCCB = Residual Current Circuit

Breaker rms = root mean square

SAC = Singapore Accreditation Council

SCV = StarHub Cable Vision Pte Ltd

SINGLAS = Singapore Laboratory Accreditation Scheme

SLA = Singapore Land Authority

SMRT = Singapore MRT Ltd

SOA = Socket-outlet assembly

SPPG = SP Power Grid

SPSL = SP Services Ltd

SS = Singapore Standard

SWA = Steel wire armoured

SWG = Standard Wire Gauge (British)

SingTel = Singapore Telecommunications Ltd

TIA = Telecommunications Industry Association

UHF = Ultra High Frequency

UL = Underwriters Laboratories Inc

uPVC or UPVC = Unplasticised Polyvinylchloride

VHF = Very High Frequency

v/v = measured by volume

w/w = measured by weight

WSH = Workplace Safety and Health

WSHO = Workplace Safety and Health Officer

XLPE = Cross linked polyethylene

% = percent

± = plus or minus

= or < = less than or equal to

= or > = greater than or equal to

< = is less than

> = is greater than

1.1.3.3 Interpretations

- (a) Words importing the singular shall also include the plural and vice versa where the context requires.

- (b) The clause or subclause headings in the Specification shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.
- (c) All clauses, including all subclauses under them in the Specification shall be deemed to be directed at the Contractor unless expressly specified otherwise to the contrary, and the Contractor shall perform and/or comply with such instructions, directions, requirements and obligations specified in the Specification and required under the Contract.
- (d) All Acts of Parliament, statutes, regulations, bylaws, orders, local and foreign standards and codes of practice specified shall be deemed to refer to the latest and shall be deemed to include any amendments, and/or modifications and/or additions and/or re-enactments thereto.

1.1.4 BCA Green Mark

The Project shall attain the respective Green Mark Score (as per **PROJECT BRIEF**) to achieve the stipulated Green Mark rating.

Allow for all cost and manpower in relation to application, submission and assessment in order to receive the Green Mark rating.

1.2 General Description of the Works

The Works for the project is generally described below:

The works consist of

- 1) repair works:-
 - Water seepage/ leakage works at roof, wall and floor of the existing building envelop & application of water proofing
 - Crack on ceiling, wall and floor/roof on the building envelop and internal common area
 - Repair to door elements at common corridor and M&E door at common area
 - Rain water down pipe
 - Lightning protection system on roof
 - Sealant to awning/window/façade/cladding
 - Tightening / replacement of screw fixture, bolt, nut, etc to existing awning/façade cladding/sun shade
- 2) Painting works:-
 - Water jet cleaning, manual scrap off of existing paint
 - Patch up of crack line, removal algae,
 - Repair water seepage source
 - Prepare base coat primer
 - Apply 2 layer of middle and top coat weather proof paint

Refer to the PSD for the specific description of work requirements for the project.

1.3 Standards, Codes, Regulations and Technical References

1.3.1 Standards and Codes

Unless otherwise agreed by the Architect, ensure all of the Works comply with the relevant requirements of the Standards and Codes referenced in the body of the Specification. Alternative Standards and Codes may be proposed for approval by the

Architect, provided it can be demonstrated that the alternative Standards and Codes comply with the requirements of the standards specified. All Standards and Codes quoted are the current version unless specific year references are noted.

In the event that the Standards or Codes are partially superseded or become obsolete, refer to the latest edition or the approved substitution for the relevant clauses.

In case of conflicting requirements between the Codes, refer to the Architect for resolution.

1.3.2 Regulations

The whole of the Works and materials are to be in accordance with the Building Control Regulations, other regulations as set out by the Authorities having jurisdiction over the Works, and the relevant bylaws unless otherwise stated.

Ensure that the Specification referred to are strictly adhered to when carrying out the Works, unless otherwise directed.

1.3.3 Technical References

Ensure that the Works comply with the relevant authority regulations and directions.

Where specified, be guided by the principles and methods as set out in the technical references when carrying out the Works. Alternative methods and principles may be proposed in lieu of the referenced document, subject to Architect's acceptance, if it can be demonstrated that the specified quality or performance of the Works can be achieved.

1.4 Trade Preamble

1.4.1 Ambiguity

Before commencing any works, obtain clarification or instructions in relation to any discrepancy or ambiguity, which is discovered within and between the Specification work sections, and/or other contract documents issued by the various parties.

1.4.2 Licences, Permits and Liaison with the Authorities

Be responsible to initiate the application for all necessary licences, permits, and to carry out all necessary liaison with the Authorities, whenever necessary, for the satisfactory completion of the Works.

Be responsible for ensuring that these licences and permits are obtained in good time.

1.4.3 Safety Regulations and Design for Safety

Strictly observe all necessary safety requirements to comply with the Workplace Safety and Health Act and any other requirements from the Authorities having jurisdiction over the Works.

Comply to the Workplace Safety and Health (Design for Safety) Regulations, and to participate in any Design for Safety (DfS) initiatives if so required for the project.

Responsible to execute the Works in a safe manner and ensure that the subcontractor and Designers engaged are competent and provide them all relevant information needed for them to perform their duties under the Workplace Safety and Health (Design for Safety) Regulations. These Designers are as defined under the Workplace Safety and Health (Design for Safety) Regulations.

Together with the relevant designers and subcontractors, attend the DfS review meeting held by the DfS Professional, to address to hazards or risks identified and ensure that they are properly managed through the execution GUIDE-3 of the Design Review Process.

Take over the DfS Register from the Consultants and continue from Guide 2

onwards. Refer to Clause 5 "Site Safety" of this Section for further detail requirements.

1.4.4 Safeguarding Properties Adjacent to Site

Propose and adopt site procedures and methods of working such as to limit to a minimum any disturbance and vibration to the buildings around the Site.

Identify and implement protective measures necessary to safeguard the adjacent properties prior to carrying out the Works.

Indemnify the Employer in accordance with contract conditions against all claims for loss and/or damage to the adjoining properties by reason of the carrying out of the Works or by reason of insufficiency of precautionary measures.

Refer to Section G01-010:Clause:1.7.7 for further detail requirements.

1.4.5 Maintenance Manual

Develop and submit, for the Architect's acceptance, a strategy in the form of a maintenance manual and logbook, to ensure that elements that are likely to deteriorate significantly can be replaced or rectified.

The maintenance manual and logbook are to describe the procedures for the satisfactory long-term care and regular maintenance of the materials and components identified in the work sections, which shall be carried out by the building owners. Include the following information, where appropriate:

- (a) An outline description of the installation and detailed description of specific items with product names, types, serial numbers, etc.
- (b) The name, address and telephone number of each supplier, fabricator, finisher, installer, etc., involved in the Works.

- (c) Recommendation on maintenance periods and planned preventive maintenance procedures.
- (d) Copies of manufacturers warranties or guarantees, service manuals, brochures, recommendations, etc.
- (e) Copies of test and approval certificates.
- (f) One original copy of documents showing "As Built" information and the like, relevant to the installation. Submit the "As-Built" information in soft copies where directed by the Architect. The Contractor shall compile one single set of the information from various subcontractors for submission.
- (g) Compilation of a list of parts to be replaced periodically and the names and contacts of the suppliers.
- (h) Realignment and adjustment instructions where relevant.
- (i) Procedures for dismantling and reassembling.
- (j) Details of finishes, including colour and required maintenance.

Logbook pages set up for recording the times of performance of the above procedures, sufficient in number to receive the entries for a minimum of 10 years or otherwise directed. Show examples of typical entries by recording any maintenance procedures (such as cleaning) performed during the Contract Period and/or maintenance/defects liability period. The forms of the maintenance manual and logbook are to be in A4 size, printed or typed on durable printing paper, each page consecutively numbered, neatly bound in durable vinyl or similar hard cover, and permanently labelled with the project name and date of issue. The Contractor shall compile one single set of the information from various subcontractors for submission.

1.4.6 Testing Authority

When tests and checks are called for in the Specification, engage a suitably equipped organisation or laboratory accredited under the Singapore Laboratory Accreditation Scheme (SINGLAS) and to Architect's acceptance, to carry out the tests and checks required.

1.4.7 Quality Control Plan

Prepare and submit a quality control plan for Architect's acceptance. Include a set of procedures/actions to:

- (a) Ensure the understanding of the project brief.
- (b) Ensure a number of checks and verification are put in place in the work process to enable the delivery of the brief.
- (c) Ensure the right person is employed to carry out the Works.

- (d) Ensure the Works are carried out based on proper operating instructions.
- (e) Ensure feedback and poor/defective works is picked up and attended to, and corrective/preventive action is in place.
- (f) Ensure prior approvals are obtained from Architect for any deviations from the Specification before Works commence.
- (g) Ensure documents of all tests and quality checks as specified are properly done and kept as records.

1.4.8 Building Information Modelling (BIM)

Allow for the BIM requirements stipulated for the project, including all cost for necessary but not limited to manpower, license, software and hardware. Such adoption shall be in line with latest Particular Conditions for Building Information Modelling and Singapore BIM Guide published by Building and Construction Authority.

1.4.8.1 BIM Particular Conditions

The Particular Conditions for Building Information Modelling shall refer to the BIM Particular Conditions, published by the Building and Construction Authority.

1.4.8.2 Singapore BIM Guide

The Singapore BIM Guide, published by the Building and Construction Authority, will be used for references for the project.

1.4.8.3 BIM Execution Plan

Together with the Consultants and BIM Professional, develop a BIM Execution Plan at the start of the project. The goals and the implementation details will be outlined in the BIM execution Plan.

1.5 Performance Criteria

1.5.1 General Requirement

Engage methods and resources that will ensure the Works achieve the specified quality within the agreed programme and cost.

1.5.2 Environment

Ensure the carrying out of the Works will not cause unacceptable pollution, noise, erosion and vibrations to the environment as stipulated by the NEA and other relevant Authorities.

1.5.3 Code on Accessibility

Comply to the Code on Accessibility in the Built Environment and its latest updates.

1.5.4 Buildability (Buildable Design and Constructability)

Comply to the latest amendments on Building Control Act and Regulations on Buildability and Productivity.

The Contractor is responsible to achieve the Constructability Score required for the project and declare the Constructability Score achieved and on the Certificate of Compliance of Constructability Score.

1.5.5 Good Industry Practices

Adopt the details of good practices as appended in BCA publications and advisories on the Good Industry Practices Guide Book.

1.6 Materials

1.6.1 Materials Generally

Products shall be new unless otherwise specified. All materials shall be supplied clean, undamaged and in good condition ready to be used for the Works.

For products with a limited shelf life, ensure no parts or whole are expired.

Where a choice of manufacturer or source is allowed for any particular product, supply the whole quantity required as the same type and from the same manufacture and/or source unless otherwise approved. Produce written evidence of sources of supply when requested. Ensure that the whole quantity of each product supplied is of consistent kind, size, quality and overall appearance.

Ancillary products and accessories shall be of a type recommended by the main product manufacturer, unless otherwise specified.

1.6.2 Ordering of Materials

Unless otherwise directed, do not place orders for materials before the sources and samples of the materials have been approved and the results of any preliminary tests required by the Specification have been accepted by the Architect.

1.6.3 Certificates for Materials

All materials and products shall be manufactured and tested in accordance with the specified or appropriate Standard. All materials and products delivered to the Site shall bear the manufacturer's name, brand name or any other data required to verify compliance with the specified requirements. Where appropriate, provide certificates from the supplier or test agencies verifying such compliance. Include, whenever applicable, the location in the Works or the delivery or batch which the certificate represents.

Where certificates of manufacture or tests are not available for materials proposed for use in the Works, carry out independent testing to determine compliance with the specified requirements where directed by the Architect.

1.6.4 Storage of Materials

Store all materials in a manner, which is not detrimental to their use in the Works and in accordance with any specified requirements.

Ensure that the storage facilities and the loadings resulting from the storage will not adversely affect the construction, the building and other buildings/amenities nearby. Engage specialist advice if appropriate.

Do not permit the storage of materials, components or equipment on new or partially completed work without prior approval.

1.6.5 Rejected Materials

Immediately remove from the site, all materials which are unidentified or do not comply with the Specification.

1.7 Workmanship

1.7.1 Workmanship Generally

Ensure that all works are carried out:

- (a) In accordance with the specified methods and procedures where applicable.
- (b) In accordance with good building practice.
- (c) In accordance with the manufacturers instructions where applicable.
- (d) By suitably qualified and experienced personnel.
- (e) With required site supervision by qualified personnel.

1.7.2 Co-Ordination of Drawings

Check all drawings and schedules to ensure that there is sufficient information to carry out the Works and that all the instructions, drawings and schedules provide compatible information on the Works to be carried out.

In the event of any discrepancy being found between the contract drawings and/or schedules, and other contract documents, notify the Architect immediately for resolution the Architect's decision shall be final.

1.7.3 Setting Out and Levels

1.7.3.1 Accuracy

Arrange the setting out, erection, juxtaposition of components and application of finishes in such manner as to ensure:

- (a) Compliance with specified tolerances.
- (b) Satisfactory fit at junctions.
- (c) No visually unacceptable changes in plane, line or level.
- (d) True, regular finished appearance.

1.7.3.2 Levels

Site levels, either spot or contour, and all other levels shown in the drawings are established with respect to the datum of 100.00 m at mean sea level. Check and verify all existing and proposed levels as indicated in the drawings. Highlight and resolve any discrepancy prior to the commencement of the Works.

1.7.4 Delivery, Storage and Handling

Deliver materials and products to the Site with labels showing brand name, product name and manufacturer's batch number.

Store materials in accordance with manufacturer's recommendations. Use in order of delivery and before expiration of the shelf life date.

1.7.5 Protection of Products and Components

Take measures to prevent overstressing, distortion and other damage to the products.

Keep products and components clean and free from contamination. Prevent staining, chipping, scratching or other disfigurement, particularly of products exposed to view in the finished work.

Keep dry to prevent premature setting, moisture movement and similar defects. Where appropriate store off the ground and allow free air movement between stored products.

Prevent excessively high or low temperatures and rapid temperature changes in the products.

Protect adequately from rain, damp, sun and other elements as appropriate. Ensure that products are of a suitable temperature and moisture content at time of use.

Ensure that sheds and covers are of ample size, in good weatherproof condition and well secured.

Keep different types and grades of products separately and adequately identified.

Keep products in their original wrappings, packings or containers until immediately before use. Wherever possible, retain protective wrappings after fixing until shortly before handing over to the Employer.

Ensure that protective measures are fully compatible with and not prejudicial to the products and materials.

1.7.6 Suitability of Conditions at the Start of Works

Provide all trades with necessary details of related types of work. Before starting each type of work, ensure that:

- (a) Previous work is appropriately complete, in accordance with the project documents, to a suitable standard and in a suitable condition to receive the new work.
- (b) All necessary preparatory work has been carried out, including provision for services, openings, supports, fixings, damp-proofing, priming and sealing.
- (c) The environmental conditions are suitable.

1.7.7 Execution of Works

1.7.7.1 Methods

Carry out the Works in accordance with accepted methods and equipment.

1.7.7.2 Allowance for Movements

Ensure that the performance, appearance and proper functioning of the Works are not affected by any movement, settlement, deflection, expansion or contraction that can be reasonably expected to occur in the building or the Works.

Where applicable, form joints between the Works and adjacent works to accommodate possible movements, settlement, deflection, expansion or contraction between the works.

1.7.7.3 Monitoring of Adjacent Structures

Provide proposals for surveys and monitoring of movement and vibration in adjacent structures and services before work commences and during the course of the Works.

Submit the assessment of the effect of wall deflection and ground settlement to adjacent properties and the proposed control limits.

1.7.7.4 Instrumentation and Monitoring

Provide instrumentation to monitor the ground movement, vibration and condition of adjacent properties. Refer to the drawings for the schedule of instrumentation required. If necessary or as required by the Authorities, propose and provide additional instrumentation and monitoring for records.

Take cognisance of and co-ordinate with other contractors on site who the persons may be carrying out instrumentation and monitoring works to avoid duplication of installation and readings.

Refer to Section C02-050 "Instrumentation and Monitoring" for further details.

1.7.7.5 Application/Installation of Products and Components

Use or fix each product and component in accordance with manufacturer's recommendations. Inform the Architect if recommendations conflict with any other specified requirement.

Provide suitable packings at screwed and bolted fixings to take up tolerances and prevent distortion.

Adjust the location and fixing of components and products so that joints which are opened to view are even and regular.

Ensure that all moving parts operate properly and freely. Do not cut, grind or plane pre-finished components and products to remedy binding or poor fit without approval.

1.7.8 Holes, Chases, Inserts and Fittings

Obtain approval for the size and position of any hole, chase, insert or fixing required before the related work begins. Unless otherwise agreed, form all holes and chases and build in any inserts or fixings at the time of construction. Do not cut or drill any part of the Works without approval.

Do not cast any conduits, recesses, pipes, etc. inside structural columns, walls, beams or slabs unless otherwise agreed.

1.7.9 Protection of Works

Take all necessary precautions to prevent damage to the Works from rain and other hazards, and due to the other works in progress, until hand over.

1.7.10 Defective Work

Where, in the opinion of the Architect, any of the finished work or materials or workmanship in any part of the Works fail to comply with the Specification, that part of the Works will not be accepted and may be classified as defective.

All work classified as defective shall be cut out and removed from the Works and replaced or otherwise dealt with in accordance with the Conditions of Contract. Propose and carry out suitable remedial measures to the Architect's satisfaction.

The extent and nature of any measures required as a result of defective work shall be determined by the Architect.

1.7.11 Cleaning Up

Where, in the opinion of the Architect, any of the finished work or materials or workmanship in any part of the Works fail to comply with the Specification, that part of the Works will not be accepted and may be classified as defective.

All work classified as defective shall be cut out and removed from the Works and replaced or otherwise dealt with in accordance with the Conditions of Contract. Propose and carry out suitable remedial measures to the Architect's satisfaction.

The extent and nature of any measures required as a result of defective work shall be determined by the Architect.

1.8 Verification and Submission

1.8.1 Records and Certificates

Unless otherwise directed, maintain 3 copies of records of all inspections and tests performed to substantiate conformity with the Contract Specification, including those carried out by subcontractors and/or third party testing agencies and manufacturers' or suppliers' certificates of test.

Retain one copy of these records on site and make available for inspection at any time. Submit the other 2 copies to the Architect and the Employer respectively and progressively. On completion of the Works, hand over all records to the Architect, unless otherwise agreed.

Submit to the Architect, without delay, any records which indicate work or materials not complying with the Specification, in order that proposals for any rectification may be assessed and carried out in good time.

1.8.2 Tests to Establish Acceptability of Works

In the event of failure to comply with the requirements of the Specification, propose suitable tests to establish the acceptability of the Works and be responsible for any consequential costs and delays.

1.9 Stamp Duties

All documents required by or arising out of or in connection with this Contract shall be properly stamped to comply with the Stamp Duties Act. The cost and expense arising out of this obligation, including all stamp duties required, shall be borne by the Contractor and shall be deemed to have been allowed for in the Contract Sum.

1.10 TOL Fee for Land Outside Contract Boundary

Where the Contractor requires land outside the contract boundary for the setting up of construction equipment and other temporary facilities for the Works, the Contractor shall check on the availability of such land and apply to the relevant Authority for the use of such land. In the event the relevant Authority allows the Contractor the use of such land, the Contractor shall at its own cost and expense comply with all the terms and conditions, pay any TOL (Temporary Occupation Licence) fees, bear all costs and expenses for the use and maintenance of and access to the said land imposed by the relevant Authority.

Any materials or goods stored at such land shall be considered unused materials or goods not delivered to Site.

1.11 Provisional Sum Items

Where Provisional Sum Items are included in the Contract, the Provisional Sum Items shall include all costs necessary in carrying out or supplying the Work, materials or goods. These Provisional Sum Items shall include the Contractor's profit and overheads but shall be nett of trade and cash discounts.

1.12 Prime Cost Sums

Where Prime Cost Sums (referred to as PC Sum for the purposes of this subclause) are provided for any work, materials or goods, these sums shall be inclusive of carriage but exclusive of Contractor's profit and attendance. These PC Sums shall also be net of trade and cash discounts.

Allow and separately price for profit and attendance in respect of such PC Sum in the Form of Tender.

Deduct PC Sum from the Contract Sum and in lieu thereof add the sums due to the Contractor for the said work, materials, or goods. The sum allowed by the Contractor in the Contract for attendance in respect of any PC Sum shall be fixed regardless of whether the actual sum expended is greater or lesser than the PC Sum. In respect of profit, the amount to be paid shall be the percentage quoted by the Contractor against the actual sum expended in relation to the PC Sum.

Should the work, materials or goods for which a PC Sum is provided in the Contract be not required, or if the Employer chooses to carry out or supply the aforesaid work, materials or goods by its own workmen or by other contractors, which the Employer is contractually entitled so to choose, then such PC Sum together with the profit and attendance allowed by the Contractor in the Contract shall be deducted in full from the Contract Sum.

Should the Contractor be engaged or instructed to carry out or supply any work, materials or goods under a PC Sum, the profit and attendance allowed by the Contractor in the Contract in respect of the PC Sum shall be deducted in full from the Contract Sum. In such event, the amount to be paid to the Contractor for the work, materials or goods shall be inclusive of the Contractor's overheads and profit for the work, materials and goods.

1.13 Overclaim Leading to Overpayment

If at any time during the Contract Period (including any extension thereof), the Contractor is found to have over-claimed and was paid for more than the value of the Permanent Works carried out and/or approved unfixed materials at the Site, the Architect shall be empowered to deduct from the Contractor's subsequent payments the sum overpaid together with the Employer's charge, and interest calculated at the prevailing rate.

1.14 Existing Ground / Road Levels

The existing ground / road levels / drain invert levels as shown in the drawings are approximate. Note that existing ground /road levels and drain invert levels may not necessarily be the same as shown in the drawings. Ascertain this and visit the Site prior to the tender and include whatever extra cost of cut and fill in the Contract Sum. In the event of the Contractor failing to visit the Site, the tender shall be deemed to have been submitted with its satisfaction of the actual levels on Site and other related ground conditions. The Contractor is deemed to have made necessary provision in the Contract Sum to cater for additional earthwork arising from the difference in levels found on site and that shown in the drawings, and no claims or compensation shall be entertained.

1.15 Raising or Lowering of Existing Sewer Manholes and Other Services Manholes

Include in the Contract Sum the cost of raising or lowering of existing sewer manholes and other services manholes/chambers, and their related works within the contract boundary to suit and match the proposed driveways and platform levels.

1.16 Work Method and Trade Demonstration

Submit to the Architect for approval the work methods of various trades as required by the Architect to ensure good in-process quality control and reasonably acceptable final workmanship. A marking system, where applicable, showing, inter alia, the control, grid and level reference lines shall be included in the work methods.

Ensure that subcontractors engaged for each trade shall also comply with the work methods approved by the Architect. As instructed by the Architect, conduct trade demonstrations for all critical work methods as approved prior to full scale production in the Contract.

Should it appear to the Architect at any time that the work methods proposed by the Contractor will not ensure good workmanship in the Works, the Architect may require the Contractor to make at his own cost and expense such modifications to the original work methods as the Architect may consider necessary or appropriate.

Employ only skilled workers who are capable of executing the Works in accordance with the work methods approved by the Architect. When there is a change in subcontractors, the Architect may instruct the Contractor to re-conduct the relevant trade demonstration if deemed necessary.

Approval by the Architect of the Contractors work methods, revised work methods or any details and information provided under this subclause shall not in any way relieve the Contractors liabilities or obligations under the Contract.

1.17 Site Layout Plan

After the Contract is awarded, submit a site layout plan to the Architect indicating proposed locations of all temporary structures (for example site offices, workers' quarters, stores, hoistways, construction equipment and labour lines) for approval before their erection. Notwithstanding such approval, any such structures shall be relocated at the Contractors own cost and expenses when required to do so by the Architect.

All such materials and structures shall be kept away from proposed roads, driveways, car parks and services lines.

Should any hoistway or structure be erected without the approval of the Architect, pull down and re- erect the hoistway or structure in an approved position within 7 days from the date of instruction by the Architect.

Provide for the maintenance of all such structures in a clean, hygienic and safe condition for the duration of the Works.

All such structures and hoistways shall be removed on completion of the Works.

1.18 Site Offices

Within an agreed period of time from the date of taking possession of the Site, erect site offices complying with the requirements of the MEWR and remove them on completion of the

Works or at a time approved by the Architect. Submit proposals for the design (inclusive of PE calculations), configuration and layout for the approval of the Architect taking full consideration the site constraints and conditions.

The following rooms shall have at least the minimum stipulated areas and complete with basic facilities, fittings and furniture, which can be made available at all times for use by the Architect and the Employer:

.	S/N	Facilities, Furniture and Fittings	No. of Items			
			Architect Room	Resident Site Staff/ Consultant Room	Meeting Room	Sample Room
.	1.	Room (Minimum size and able to accommodate all facilities specified)	N.A	1	1 (min. 40 sqm)	1
.	2.	Tables and Chairs	.	.	.	.
.	.	(a) 1.5m x 0.8m office table complete with at least 3 drawers	2	2	-	1
.	.	(b) 1.5m x 0.8m working table complete with storage space for drawings	-	-	-	-
.	.	(c) 0.8m wide side tables for computer and peripherals	1	1	1	1
.	.	(d) 1.2m x 0.8m table	-	-	6	-
.	.	(e) Chairs with hand rests	-	-	-	-
.	.	(f) Chairs without hand rests	2	2	24	2
.	.	(g) High Chairs without handrests (for working table)	-	-	-	-
.	3	Steel Cabinet complete with Shelves and Double-Leaf Doors with lock	-	2	-	-
.	4	Soft Board complete with Accessories	-	2	1	-
.	5	White Board complete with Accessories	-	-	1	-
.	6	Key cabinet	-	-	-	-
.	7	Air-Conditioner of Minimum 10,000 BTU Output	1	1	2	1
.	8	Telephone Installation	.	.	.	.

.	.	(a) Separate telephone line	-	-	-	-
.	.	(b) Telephone set	-	-	-	-
.	9	Drawing Rack complete with Drawing Holders	1	1	1	1
.	10	Electrical Installation, Connections and Accessories	.	.	.	.
.	.	(a) Lighting lux level	500 Lux	500 Lux	500 Lux	500 Lux
.	.	(b) 13 Ampere socket outlet	10	10	10	10
.	.	(c) 15 Ampere socket outlet	-	-	-	-
.	.	(d) Data point	2	2	6	-
.	.	(e) Emergency light	1	2	2	1

The doors leading to the Architect's room, the Resident Technical Officers room and the meeting room shall be provided with locksets and all the keys to the locksets shall be given to the Architect. Allow for the maintenance of the site offices, rest areas and all the facilities, furniture and fittings therein in a clean, habitable and good working condition to the satisfaction of the Architect. The Contractor shall pay all charges for the provision and use of the telephone and electricity at the site offices.

Should the Contractor fail to provide any of the aforementioned facilities, furniture and fittings after the commencement date of the Contract Period, the Architect/ Employer shall forthwith purchase and provide the same on the Contractor's behalf and all costs and expenses for such purchase and provision plus charges shall be recovered by the Employer from any monies due or becoming due to the Contractor or be recovered as a debt due by the Contractor to the Employer.

1.19 Provision of Equipment, Apparatus, Devices, etc.

1.19.1 Facsimile Machine

Provide 1 plain paper (A4 size) facsimile machine at the site office. Facsimile machine of the thermal paper type is not acceptable. Keep such machine in the Resident Site Staff room throughout the Contract Period (including any extension thereof). The facsimile machine shall be for the exclusive use by the Architect and/or Employer's officers only. Another facsimile machine should be provided for the Contractors own use.

Pay all charges, costs and expenses and be responsible for the continuous proper, good and efficient working conditions and maintenance of such facsimile machine. Produce the maintenance agreement with the vendor to the Architect for checking when requested. The maintenance agreement shall cover the whole duration of the Contract Period (including any extension thereof).

1.19.2 Digital Camera on Site

Provide a digital still camera on the Site throughout the Contract Period (including any extension thereof), for the purpose of photographing site occurrences (within the Site) by the Architect.

The digital still camera shall have zooming functions and be capable of taking pictures at a digitised resolution of at least 10 million pixels. The digital still camera shall have an expandable and removable memory storage media with a minimum capacity of 128 GB, and be provided with all the necessary software and accessories for editing and transferred digital images from the camera to the computer hardware. The Contractor shall bear all the costs and expenses incurred arising from usage of the digital camera and shall be responsible for its continuous and proper functioning.

1.19.3 Torch Lights

Provide sufficient torch lights on the Site at all times for use by the Architect, Resident Site Staff and/or representatives from other Authorities. These torch lights shall be in good working condition and sufficiently bright enough for use.

1.19.4 Metal Detector

Provide a battery-operated portable metal detector for the purpose of detecting metal reinforcement embedded in cement mortar joints of brickwalls. The detector must have either a light or buzzer indicator to indicate the presence of metal.

1.19.5 Moisture Meter

Provide a portable, battery operated, digital LCD display moisture meter with integral electrode pins for measuring moisture content of timber doors and frames delivered to the Site. The moisture meter shall be capable of measuring actual moisture content of wood in the range from 8% to 44% (minimum) with a 1% indicating tolerance at 0°C to 40°C ambient temperature. The meter shall also possess a built-in device for performing simple calibration checks.

1.19.6 Personal Protection Equipment (PPE)

Provide sufficient **Personal Protection Equipment (PPE)** such as safety helmets, safety boots, goggles and ear plugs for use by the Employer's officers, Consultant Team and visitors visiting the Site throughout the Contract Period (including any extension thereof). The ownership of the safety helmets and safety boots shall be reverted back to the Contractor upon the satisfactory completion of the Works.

Immediately replace those PPE which the Architect considers to be not in good working condition.

1.19.7 Stationery for Resident Site Staff / Consultants

Provide stationery and other devices for site use by the Employer's officers upon commencement of the Works.

1.19.8 Photo Copying Machine

Provide one plain paper photocopying machine at the site office with the following Specification:

- (a) minimum [to be specified by user] ppm in black and white
- (b) Support paper up to 160gsm and A3+
- (c) Auto paper selection
- (d) Auto response sensor

The photocopying machine shall be kept in the Resident Site Staff room throughout the Contract Period (including any extension thereof). The photocopying machine shall be for the exclusive use by the Architect and/or Employers officers only. Another photo copying machine should be provided for the Contractors own use.

Pay all charges, bear all costs and expenses and be responsible for the maintenance of such photocopying machine. Produce the maintenance agreement with the vendor to the Architect for checking when requested.

The maintenance agreement shall cover the whole duration of the Contract Period (including any extension thereof).

1.20 Provision of Temporary Site Facilities/Utilities

1.20.1 Access Roads and Protective Crossings

Repair and maintain all access roads serving the Site and provide temporary protective crossings over existing drains, channels, footways, etc. throughout the Contract Period (including any extension thereof). The Contractor shall be responsible for making good all damage and/or clearing away on Completion to the requirements of the relevant Authorities and to the satisfaction of the Architect.

1.20.2 Temporary Electricity Supply and Installation

Engage a LEW of appropriate grade to design and in charge of all temporary electrical installations necessary for building operations and works of engineering construction in accordance to SS 650-1; for site offices, meeting rooms, dormitories and etc. located within construction site in accordance to SS 638, at the date of closing of the Tender. Throughout the Contract Period and any time period when liquidated damages are imposed under the Contract, the Contractors LEW shall ensure good safety standards and practices and including the following:

- (a) For redevelopment sites, the Contractor is strongly encouraged to use M/s PowerGrid Ltds power supply to provide temporary electricity supply during the construction stage. All electrical generator sets shall be licensed with valid EMA licence. However, when the generator is used for the passenger cum material hoist and other general purposes, the minimum capacity of the generator for each block shall be upgraded to 100 kVA.
- (b) The electrical switch board which holds the ELCB shall be housed in a switch box located at least 1.5 m from the floor level.
- (c) Socket-outlet assembly complete with miniature circuit breakers (MCBs) and residual current operated circuit breakers (RCCBs) shall be provided at each storey of the building block. The installation shall last the entire Contract Period unless authorised to be removed earlier by the Architect or when permanent electricity supply is secured (whichever is earlier). The temporary incoming supply cable located within the precast refuse chute shall be supported with insulated lock bands. Upon termination of the temporary electricity supply, all cables and lock bands installed in the precast refuse chute shall be removed and the surface of the precast refuse chute shall be made good to a smooth finish.
- (d) All sheaths of cables, sockets outlets and plugs are in good working condition.
- (e) All cables are properly bound and do not cause obstruction to passageways, walkways and stairs.
- (f) All cables are properly supported with L-shaped galvanised steel brackets or insulated lock bands and placed at a suitable height, away from any source which cause mechanical damage.
- (g) All plugs, socket-outlets, socket-outlet assembly (SOA), cable couplers and plug adaptors are to be of the standard industrial type and of minimum classification of latest edition SS 638 and SS 650-1.
- (h) The supply to provide artificial lighting shall be taken from the socket-outlet assembly located at each storey. Fluorescent lighting of 1 200 mm enclosed in suitable mechanical enclosure to a minimum classification of IP 44 shall be used to provide lighting or to achieve a minimum lighting level of 400 lux.
- (i) Provide sufficient temporary lighting, according to the instruction of the Architect, for workers/subcontractors to carry out in-process construction works such as internal plastering/skimming, wall and floor tiling, application of water-proofing membrane etc. within the units or common areas of the building under construction.

1.20.3 Temporary Use of Lift

For each building block in the Works designed with lift facilities, when needed during the progress of works, seek the Architect's approval for the temporary usage of one lift upon completion of lift testing and commissioning by the lift subcontractor. All costs and expenses incurred in complying with the provisions of this clause shall be deemed to be included in the Contract Sum.

The temporary use of the lift shall be subjected to the terms and conditions stipulated hereunder. Such terms and conditions shall be incorporated into the agreement to be executed between the Contractor and the lift subcontractor. The terms and conditions shall be as follows:

- (a) The Contractor shall seek the approval of the Architect for the use of the lifts.
- (b) The Contractor shall arrange for a designated person to certify that the lifts are for temporary use and seek approval from MOM before it can be used.
- (c) The Contractor shall provide proper protection such as plywood, adhesive tapes, etc. to the lift cages, floors, car doors, architraves, transoms and landing doors, etc. The Contractor shall ensure that the protection for the lifts is always in a proper condition. Any physical damage to the lifts shall be the responsibility of the Contractor.
- (d) The Contractor shall engage a full-time lift attendant to operate each lift. Under no circumstance shall a lift be left unattended when it is in operation.
- (e) The Contractor shall ensure that the lifts are not over-loaded.
- (f) The Contractor shall take up additional insurance for the use of the lifts as temporary use lifts and Public Liability coverage, naming the Employer and the lift subcontractor as the co-insured, for the period of usage. Copies of the insurance policies shall be given to both the Architect and the lift subcontractor before the lifts are allowed to be used. Alternately, the Contractor may pay the lift subcontractor for taking up the insurance and public liability coverage on its behalf.
- (g) The Contractor shall be responsible for the daily maintenance of the lifts, such as cleaning up the cages and sills in order to prevent unnecessary breakdown and damage to the lifts.
- (h) The lift subcontractor shall service the lifts once a month during normal working hours.
- (i) Smoking is strictly prohibited in the lifts.
- (j) At least 3 days prior to handing over each building block to the Employer, a joint inspection shall be conducted between the Contractor and the lift subcontractor for the purpose of handing the lift back to the lift subcontractor. Any damage that occurs during or as a result of or arising from the temporary usage of the lift which affect the handing over of the lift to the Employer shall be the responsibility of the Contractor. All costs and expense for rectification and repair shall be borne by the Contractor, subject to verification by the Architect.

1.21 Protective Roof for Temporary Site Structures

Provide appropriate protective materials for the roof of these temporary structures. The protective material shall be made of 18 mm thick timber ply.

For site office and workers' quarters, the timber ply shall be laid in dual double layers; with one double layer laid just beneath the metal roofing sheet and another double layer at the bottom of the steel truss system supporting the metal roofing sheet. For all other temporary structures, such as toilets, carpenter yards, etc. the protective timber roof shall be laid in single double layer beneath the roofing sheet. However, at the sole discretion of the Architect, such protective materials may not be necessary if the temporary structures are deemed far beyond the nearest building block under construction. Under such cases, there shall be no adjustment to the Contract Sum. The Contractor's PE shall consult the Architect on these protective roofs before proceeding with the design of the temporary structures.

1.22 Construction Site Hoarding

Submit a complete set of the hoarding workshop drawings to be endorsed by the Contractors PE for Architect's approval. The proposed layout of the images and designs used on the hoarding shall be indicated on the plans and elevation of the workshop drawings submitted.

All sites will use flat panel hoardings on all sides of the contract boundary lasting throughout the Contract Period including any period when liquidated damages are imposed under the Contract. The hoarding panels shall be white or off-white zincalume steel or galvanised steel flat panel.

Maintain and upkeep the hoarding panels in good condition. As and when instructed by the Architect, replace the hoarding panels to the satisfaction of the Architect, at the cost and expense of the Contractor.

As and when instructed by the Architect, remove or relocate all or part of the hoarding panels with the signage and reinstate the affected grounds to the satisfaction of the Architect at the cost and expense of the Contractor. On satisfactory completion of the Works, the hoarding panels with the signage shall be cleared away upon the approval of the Architect.

1.22.1 Signage on Hoarding

Provide images for the "Construction in Progress" and way-finding signage to inform the public that the project is under construction and for guiding the public on the correct way to take around a construction site.

The "Construction in Progress" and way-finding signage shall be mounted conspicuously on the white or off-white zincalume steel or galvanised steel flat panel hoarding throughout the external perimeter of the contract boundary.

- (a) Ensure that the signage is printed on adhesive laminate film that is waterproof, fade-proof and durable against the weather. The colour setting on the printer shall be Adobe RGB. The signage shall be stuck onto the flat panel hoarding.
- (b) The signage shall be mounted at areas of high pedestrian traffic and/or high visibility and shall last throughout the Contract Period including any period when liquidated damages are imposed under the Contract.

- (c) The size of the "Construction in Progress" signage shall be 4.0 m in height and 2.7 m in length on a 6.00 m high flat panel hoarding. It should be scaled proportionately for hoarding of other heights. The signage shall be mounted at a comfortable viewing angle and level for the public. Seek the Architect's approval for the appropriate size for the way- finding signage.
- (d) The signage shall not block or obstruct the hoarding design with images depicting the overall perspectives of the project, community images and project information and construction progress at all times. Seek the Architect's approval of the appropriate placement of the signage. The Architect shall instruct the Contractor to remove the signage should it be placed at an inappropriate location, at the cost and expense of the Contractor.
- (e) Conduct regular inspection of the condition of the signage to ensure the signage are in good condition. Should any signage be found to have faded or damaged, the Architect shall instruct the Contractor to replace the defective signage, at the cost and expense of the Contractor and to the satisfaction of the Architect.

1.23 Site Management

Within 14 days from the date of the Letter of Acceptance, submit to the Architect for his approval the following details on site planning:

- (a) Site organisational structure
- (b) Names, roles and responsibilities of Contractor's site management, technical and supervisory staff
- (c) Manpower schedule for each trade
- (d) Schedule of heavy equipment and machinery
- (e) Measurement Plan and Survey method
- (f) Safety Management System

Within 30 days from the date of the Letter of Acceptance, submit to the Architect for his approval the overall construction programme for each building block and/or phases of Works of the entire project.

Furnish the Architect with such further details and information as the Architect may require in regard to the above items.

Should it appear to the Architect at any time that the site planning proposed by the Contractor is not able to ensure smooth progress and good workmanship in the Works, the Architect is empowered to require the Contractor to make, at the Contractors own cost and expense, all necessary modifications to the plans.

Approval by the Architect of the Contractor's site planning details, revised site planning details and further information provided under this subclause shall not in any way affect, vary or relieve the Contractor's liabilities or obligations under the Contract.

At least 14 days before the commencement of the Works by the subcontractors or the supply of the materials by the manufacturers / suppliers, submit the names of its subcontractors for the Works and the manufacturers / suppliers of the materials to the Architect. Where there are changes made by the Contractor to its subcontractors / suppliers, such information shall be submitted to the Architect 14 days prior to the commencement of the Works or supply of materials.

1.24 Employment of Contractors Site Personnel

Employ the site personnel as specified in the table below and station them full-time on site upon the approval from the Architect.

The Project Manager, Workplace Safety and Health Officer, Environmental Control Officer, Security Guard and at least 50% of the total number of the stipulated Site Supervisors (Architecture, Structural, or Mechanical and Electrical Engineering) shall be employed and be full time on site from the commencement date of the Contract. The Contractor is given up to one month from the commencement date to deploy the Workplace Safety and Health Co-ordinator, Site Clerk and the rest of the Site Supervisors.

Upon their employment, the site personnel shall be full time on site throughout the construction period including any period when liquidated damages are imposed under the Contract, unless otherwise approved by the Architect.

S/N	Type of Personnel	Number of Each Type of Personnel to be Employed	Fully Agreed and Accepted Rate by the Contractor and the Employer For the Cost and Expense Deemed to be Allowed by the Contractor for the Employment of Each Personnel
1	Project Manager	Refer to Tender document	\$ [to be specified by user]permonth
2	Workplace Safety & Health Officer (WSHO)	Refer to Tender document	\$ [to be specified by user]permonth
3	Workplace Safety & Health Co-ordinator	Refer to Tender document	\$ [to be specified by user]permonth
4a	Site Supervisor for Architectural & Structural Works	Refer to Tender document	\$ [to be specified by user]permonth
4b	Site Supervisor for Mechanical & Electrical Works	Refer to Tender document	\$ [to be specified by user]permonth
5	Environmental Control Officer (ECO)	Refer to Tender document	\$ [to be specified by user]permonth
6	Security Guard	Refer to Tender document	\$ [to be specified by user]permonth
7	Site Administrator	Refer to Tender document	\$ [to be specified by user]permonth
8	Customer Relations Officer (CRO) for Building Maintenance Team	Refer to Tender document	\$ [to be specified by user]permonth

1.24.1 Qualifications/Experience/Responsibilities of Site Personnel

1.24.1.1 Project Manager

The Contractor's Project Manager shall be qualified, competent and possess the skill, knowledge and ability to manage and co-ordinate the project effectively. The Project Manager shall be the Contractor's Representative as required under the Contract.

The Project Manager shall possess the following minimum academic qualifications and experience:

- (a) For Contract Sum less than \$50 million, the candidate shall have:
 - (i) A degree in Architecture, Civil/Structural/Electrical/Mechanical Engineering, Construction Management, Building Science or Quantity Surveying with 3 years of relevant post-graduate working experience in the building construction industry. The degree shall be recognized by the respective Professional Bodies professional institutions or Building and Construction Authority; or
 - (ii) A diploma in Architecture, Civil/Structural/Mechanical/Electrical Engineering, Building Science, Building Management, Construction Management, Building Services Engineering and at least 8 years of relevant working experience in the building construction industry. The working experience should preferably be working on past projects and shall be recognised by Architect as relevant working experience.
- (b) For Contract Sums of \$50 million and above, the candidate shall have a Degree in Architecture, Civil/Structural/Electrical/Mechanical Engineering, Construction Management, Building Science or Quantity Surveying with 5 years of relevant post-graduate working experience in the building construction industry. The degree shall be recognized either by the respective Professional Bodies, professional institutions or Building and Construction Authority.
- (c) Regardless of the Contract Sum, the Project Manager shall possess a Certificate in Construction Productivity Management recognised either by the respective Professional Bodies, professional institutions or Building and Construction Authority. The Project Manager who is without "Certificate in Construction Productivity Management" shall attend the course conducted by BCA Academy and obtain it within 12 months upon his employment at the site. Where there is a need to attend the course conducted by BCA Academy, the fee will not be reimbursed.

1.24.1.2 Workplace Safety and Health Co-ordinator / Workplace Safety and Health Officer (WSHO)

The Contractor's Workplace Safety and Health Co-ordinator shall possess recognised and approved certification in construction safety to take charge of all matters related to safety. The said Workplace Safety and Health Co-ordinator shall spend their time fully performing the following:

- (a) To supervise safety and promote safety conduct
- (b) To inspect and rectify any unsafe place of work
- (c) To correct any unsafe practice

- (d) To ensure that the provisions of the Workplace Safety and Health Act and its Subsidiary Legislation made thereunder are complied with

Employ a full-time Workplace Safety and Health Officer to comply with the requirements under the Workplace Safety and Health Act, Workplace Safety and Health (Workplace Safety and Health Officers) Regulations. The Workplace Safety and Health Officer shall implement appropriate safety measures and ensure a safe work environment and safe work procedures in accordance with the Workplace Safety and Health Act and Subsidiary Legislation including the provisions of the Workplace Safety and Health (Construction) Regulations 2007 and the requirements specified under the Contract.

1.24.1.3 Site Supervisors

The Contractor's Site Supervisors shall be qualified and competent, and possess the relevant skills, knowledge and the ability to supervise and co-ordinate the Works; and with any one of the following requirements:

- (a) Possess a National Certificate in Construction Supervision (NCCS) and at least 5 years of similar capacity relevant working experience in the building construction industry
- (b) Possess a recognised Diploma in Architecture / Civil / Structural / Mechanical / Electrical Engineering, Building Science, Building Management, Building Services Engineering, Construction Management and at least 3 years of relevant working experience in the building construction industry
- (c) Possess a Degree (foreign university) in Architecture / Civil / Structural/ Mechanical / Electrical Engineering, Building Services, Construction Management and at least 2 years of relevant working experience in the local building construction industry
- (d) Relevant working experience of minimum 15 years working in past projects.

Notwithstanding the requirements as specified in (a) to (d) (inclusive) above, where the Contractor is required to employ the Site Supervisor for mechanical/electrical Works, the Site Supervisor must be suitably qualified under the mechanical/electrical engineering academic qualifications and with the relevant work experience and also received adequate safety and health training to ensure that the work which he oversees or supervises can be carried out safely.

1.24.1.4 Environmental Control Officer (ECO)

Employ an Environmental Control Officer (hereinafter referred to as "ECO" for the purposes of this subclause) to comply with the Environmental Public Health Act Environmental Public Health (Employment of Environmental Control Officers) Order 1999. The ECO shall be employed on a full-time basis where the Contract Sum is above \$50 million or on a part-time basis where the Contract Sum is between \$10 million and \$50 million. The ECO shall be responsible for monitoring and advising the Contractor on the following main areas:

- (a) Control of disease-bearing vectors and rodents.
- (b) Proper management and disposal of solid waste.

- (c) Control of noise and dust pollution.
- (d) Drainage and silt control.
- (e) Air and water pollution control.
- (f) General housekeeping management of the project/Site.

The ECO shall conduct regular site checks and take prompt corrective actions to ensure that the workers' quarters, toilets, site offices and other facilities and general surroundings of the Site are kept clean, tidy and hygienic at all times. In addition, the ECO shall also ensure that the Site is kept mosquito-free at all times.

The ECO shall possess a "Certificate of Competency (CoC) in Earth Control Measures (ECM) for Construction Site Personnel". The ECO who is without "Certificate of Competency (CoC) in Earth Control Measures (ECM) for Construction Site Personnel" shall attend the course conducted jointly by PUB and IES (Institute of Engineers Singapore) and obtain it within 6 months upon his employment at the site.

The ECO shall compile and submit environmental related data to the Architect upon request. This data can include:

- (i) Water, electricity and diesel consumption on site.
- (ii) Concrete wastage on site.
- (iii) Amount of construction debris generated on site.

The ECO shall also compile a record of any checks by the Authorities (e.g. NEA for noise and vectors, PUB for ECM) and the result of such checks. This record shall also be submitted to Architect upon request.

If the Works have been certified more than 95% completed, the Contractor may write to NEAs Regional Office to seek approval to allow the ECO to perform on a part-time basis and copied to Architect. There shall be no cost recovery from the Contractor if NEA is agreeable to allow the ECO to perform on a part-time basis.

1.24.1.5 Security Guards

- (a) Employ Security Guards from a Security Agency licensed by the Singapore Police Force with a minimum Grade of "C". Inform the Architect in writing on the security agency which supplied the Security Guards, within 2 weeks from the commencement date of the Contract Period.
- (b) All Security Guards shall at all times be in proper uniform of their security agency with their names and identification tags on. Essential security enforcement equipment such as whistle, torchlight, walkie-talkie, shall be provided to them. They shall respond within 5 to 10 minutes whenever they are called either through telephone or walkie-talkie. They shall also have the necessary access to the telephone at the Contractor's site office during and after normal working hours for emergency reporting purpose. The Security Guards must not be armed with weapons that are disallowed by the Singapore Police Force.

- (c) A proper guard post with adequate security lighting and communication facilities shall be erected at every major entrance to the Site. All temporary gates/openings along the fencing/hoarding shall be guarded by a Security Guard during normal working hours and locked up after normal working hours.
- (d) The Security Guards shall be responsible for the general security of the Site and shall ensure that unauthorised personnel and vehicles do not enter the Site. They shall also be responsible for the security of the Contractor and site offices during and after normal working hours.
- (e) The Security Guards shall be employed to perform site security duties on a 24-hour basis. A minimum of one Security Guard shall be on duty at any one shift including Sundays and public holidays throughout the Contract Period (including any extension thereof). No Security Guard shall leave the Site until he is properly relieved by a replacement, even if his shift has ended.
- (f) A proper record of the Security Guards' attendance must be kept and made available to the Architect upon request.

1.24.1.6 Site Administrator

Employ [to be specified by user] full-time Site Administrator(s) at the site office to answer all incoming calls during office hours and to attend to the clerical works as and when directed by the Architect. The Site Administrator shall be proficient in basic software and equipped with good public relations skills and able to handle phone enquiries competently.

1.24.1.7 Customer Relations Officer (CRO)

Deploy [to be specified by user] full-time Customer Relations Officer(s) (CRO) to manage the Building Maintenance Team (BMT).

Notwithstanding other provisions in this clause, if the Contractor incurs additional costs and expenses over and above the agreed rates specified herein complying with the requirements stipulated in this clause, the Contractor alone shall bear such additional costs and expenses in full.

1.24.2 Certified CONQUAS Personnel

Ensure that site personnel employed are recognised by Building and Construction Authority (BCA) under the Certified CONQUAS Manager and Certified CONQUAS Supervisor Schemes.

To fulfil this requirement, the Contractor is allowed to have their existing site personnel recognised as Certified CONQUAS Manager and Certified CONQUAS Supervisors in addition to their existing role.

S/N	Type of Personnel	Number of Each Type of Personnel to be Employed Based on Contract Sum Value		Fully Agreed and Accepted Rate by the Contractor and the Employer For Cost and Expense Deemed to be Allowed by the Contractor for the Employment of Each Personnel
		Not Exceeding \$50 Million	Exceeding \$50 Million	
1	Certified CONQUAS Manager	1	1	\$ [to be specified by user] per Certified CONQUAS Manager per month
2	Certified CONQUAS Supervisor	1	2	\$ [to be specified by user] per Certified CONQUAS Supervisor per month

The number of Certified CONQUAS Personnel are specified in the table above. The Contractor is given up to 12 months from the commencement date to deploy such personnel upon approval from the Architect.

In the event that the site personnel employed do not have the required certification, the Contractor shall employ personnel to fulfil the requirement, at its own cost and expenses. Upon their employment, the Certified CONQUAS Personnel shall be full time on site throughout the construction period including any period when liquidated damages are imposed under the Contract, unless otherwise approved by the Architect.

1.24.3 Replacement of Site Personnel

The Architect shall be empowered to instruct the Contractor to replace at the Contractor's own cost and expense, any site personnel not carrying out their duties to the satisfaction of the Architect.

1.24.4 Compliance with Requirements and Submission of Information of Site Personnel

The employment of the site personnel shall be subject to the approval of the Architect. Submit to the Architect within one month from the commencement of works, the name, identity card numbers and documentary evidence of the educational qualifications and experience of all the site personnel employed by the Contractor.

In addition, comply with the requirements and keep records and submit information to the Architect or Employer upon request to show compliance with the requirements.

- (a) Keep records indicating the number of days the site personnel are employed for each month.
- (b) Except for the security guards and safety supervisors, all the site personnel employed shall be on the Contractor's monthly payroll. Keep records of monthly CPF or levy contributions as proof of employment.

1.24.5 Inclusion of Cost and Failure To Employ The Site Personnel

The Contractor shall be deemed to have included in the Contract Sum for all costs and expenses it incurs in complying with the requirements stipulated in this clause.

In the event of the Contractor not employing the number of site personnel, required by the Contract or not employing such site personnel for the period or periods required by the Contract, without prejudice to the Employer's rights under the Contract, the Contractor shall be indebted to the Employer at the rate or rates as specified for each of the respective site personnel per month and such indebtedness shall be deducted by the Employer from any monies due or becoming due to the Contractor or be recovered by the Employer as a debt due from the Contractor. These rate or rates shall be deemed to have been fully agreed and accepted by the Contractor and the Employer as the costs and expenses allowed by the Contractor for the employment of each of the respective site personnel for each month.

For the purpose of this clause, each of the site personnel shall be employed by the Contractor for at least 20 days within a calendar month before he can be considered as being employed for that particular month under the Contract, except where expressly specified otherwise. In the event that the first and/or the last calendar month of the Contract Period or any period when liquidated damages are imposed under the Contract, have less than 20 days, each of the site personnel shall be employed for the full number of days in the said first and last calendar month of the Contract Period or any period when liquidated damages are imposed under the Contract.

In the event that the deployment of the site personnel fails to comply with the requirements, the cost recovery for the period of non-deployment shall be based on the stipulated monthly rates on pro-rated basis.

Notwithstanding other provisions in this clause, if the Contractor incurs additional costs and expenses over and above the agreed rates specified herein in complying with the requirements stipulated in this clause, the Contractor alone shall bear such additional costs and expenses in full.

1.24.6 Application for Release of Site Personnel

The Architect may consider a request by the Contractor in writing to release any of its site personnel from the obligations of this clause if the Works has been certified more than 95% complete. It shall be up to the absolute discretion of the Architect to decide whether the Contractor's site personnel can be released and the number of site personnel to be released as provided for under this clause. A written approval from the Architect shall be obtained in this respect.

1.24.7 Superintending Officer's Decision

All differences and/or disputes arising under this clause including all subclauses under it (including questions relating to interpretation) shall be determined by the Architect whose decision shall be final and binding.

1.25 Service Roads, Driveways and Drains

For completed service roads, driveways and drains within the Site contract boundary, the Contractor is obliged to maintain washing and cleaning; and making good any damage arising from their own actions to the satisfaction of the Architect all at the Contractor's cost and expense. If the Contractor fails to carry out his obligations as aforesaid, the Architect may engage other parties to execute the outstanding works and all costs and expenses incurred shall be borne by the Contractor.

1.26 Existing Services and Cables/Services Detection

Visit and examine the Site carefully and ascertain its nature and make provision in the Contract Sum or prices for the type of ground conditions, constraints and underground services.

Take due care to safeguard all existing services that will be affected by the Works. Where existing services are required to be terminated or diverted for the execution of the Works, give the necessary notices to the Authority and the Employer. Co-ordinate site survey to identify the existing services and arrange for the Works to be carried out.

Where in the case the Architect is of the opinion that it becomes essential to divert permanently any sewer, drain, pipe, cable, or other services, the cost for the diversion shall be borne by the Employer. Provided always that such diversion does not form part of the Works.

1.26.1 Statutory Requirements

Comply with all the requirements of the various Authorities in respect of the existing services at and around the vicinity of the Site, whether underground, on or above ground, or at the site peripherals.

Terminate or divert all relevant existing services as required by the Authorities before work begins.

1.26.2 Information on Services

Obtain information in relation to existing services from the relevant Service Providers.

Verify actual sizes and locations of all services with the Public and Statutory Authorities and make enquiries as to the presence and location of any privately-owned land drains and services. Locate, identify and mark on site before commencing work.

Arrange with and offer the Authorities all necessary assistance in ensuring timely diversion, disconnection, termination, or capping off of the services.

- (a) Detection of services located on site.
- (b) Locate and mark the positions of services affected by the Works.
- (c) Conduct detection of suspected underground services. Propose suitable method for acceptance by the Architect.
- (d) Mark underground services with signboards giving type and depth and inform the Authorities concerned of any such services encountered on site.

1.26.3 Drains in Use

Protect drains, manholes, gullies, vent pipes and fittings still in use and ensure that they are kept free of debris at all times. Make good any damage arising from the Works and leave clean and in working order at completion.

1.26.4 Bypass Connections

Provide as necessary to maintain continuity of services to occupied areas of the Site and adjoining properties. Give sufficient notice to occupiers if shutdown is necessary during changeover.

1.26.5 Services to Remain

Notify the Architect and the Authorities or Employer of any damage. Make all arrangements for repair to the satisfaction of the Architect, the Authorities or Employer.

1.26.6 Cable/Services Detection

Provide cables/services detecting devices to locate all existing cables/services prior to the commencement of excavation or any other work such as driving of piles, piling of earth electrode and lightning conductors or poles and columns which are liable to damage existing buried services. Engage EMA licensed cables/services detection workers to carry out all cables/services detection work. The proposed line of excavation or area of other work shall be checked for existing services in a systematic manner by making sufficient passes in a grid formation to cover the entire area of work.

The extent of checking carried out shall be properly documented and countersigned by the Architect. The Contractor shall be liable for all costs and charges incurred if he damages any services.

Seek assistance from the relevant Authorities if it has any query on the location of existing cables/services belonging to the Government Department or Statutory Board. In the case of PowerGrid or SPSL cables/services, the Contractor may seek assistance from the Cable Damage Prevention Unit, PowerGrid or SPSL.

Engage the services of EMA Registered Excavator Operator only for all excavation Works. In the event the Contractor fails to employ EMA Registered Excavator Operator, no excavation works shall be allowed.

1.27 Damage to Public/Private Property

In the event damage is caused to public/private services or property such as cables, pipes, fittings and fixtures, etc. by the Contractor whether by accident or otherwise leading to black-outs or other nuisance or inconvenience to the public or is likely to bring the Employer into disrepute, all costs and expenses incurred for necessary reinstatement or repairs including charges shall be recoverable by the Employer from the Contractor by deduction from monies due or becoming due to the Contractor, or as a debt due by the Contractor to the Employer.

1.28 General Housekeeping

(a) Periodic Cleaning Up

All rubbish and debris shall be cleared from the Site and buildings under construction at least weekly or from time to time as they accumulate or when so directed by the Architect. Particular attention shall be directed to those areas where other tradesmen or contractors will be working. Housekeeping shall be carried out in such manner and at such times so as not to cause any inconvenience to either the adjoining owners, occupiers and the public. Debris shall be wet to minimise the risk of dust pollution

(b) Provision of Bins for Waste and Debris

During the course of construction, provide proper bulk bins of adequate size and appropriate locations for the proper storage of construction waste, chemical waste and debris in compliance with the relevant legislative requirements or regulations imposed by MEWR.

(c) Dumping of Debris And Rubbish

Dispose of all unwanted debris, rubble or excess earth at MEWR approved dumping grounds/sites. All charges levied for the use of the dumping grounds/sites shall be borne by the Contractor.

If the Contractor indiscriminately dumps construction debris, rubble or excess earth on land owned by the Employer or the Government without written permission, it shall remove all such debris, rubble, or excess earth from such land at its own cost and expense.

1.29 Time Required for Contractor to Prepare for Project Handover Inspection

Complete the Works or any phase or sub-phase thereof as set out in the Letter of Acceptance in accordance to the Contract Period or any subsequent extensions of time approved by the Architect.

All completed Works or any phase or sub-phase thereof shall be handed over to the Employer within or by the Contract Period or any subsequent extensions of time approved by the Architect, prior to the issue of any Completion Certificate.

Note that the Contract Period has been computed to include the time allowed for preparation of handing over inspections. Therefore, the duration required for the preparation of and the handing over inspections shall be incorporated into the Programme for the Works or revised Programme, if any, to be submitted to the Architect for approval, as required under the Contract.

1.30 Restriction on Use of Project Information for Publicity

The Contractor and its subcontractors/suppliers shall not quote or make reference to the project design, products, technologies or methods of construction used in the Works for trade promotion, advertisement, publicity, etc. or for any other purposes without the written approval of the Architect. This requirement shall not be applicable to proprietary products, technologies or methods of construction introduced by the Contractor or its subcontractors/suppliers.

1.31 Provision of Respiratory Masks

Building contractors are required to provide suitable respirators for their outdoor workers, as well as the supervising consultants' site staff at the sites, when the haze level at the Site reaches a very unhealthy level with a 24-hour Pollutant Standards Index (PSI) value measured by NEA exceeding 200 or upon appropriate public advisories by NEA.

The air-purifying respirators must have an efficiency to filter 95% of 0.3 micron diameter fine particle size, commonly referred to as N95.

Start to purchase and stock up the N95 respiratory masks when the haze condition is approaching the unhealthy range with the PSI Index value exceeding 100.

1.32 Publicity

Provide and render all necessary assistance to the Architect or other authorised persons procuring publicity materials on any aspects of the construction works in progress. When directed by the Architect, provide all brochures, quotations, subcontract agreements, invoices, etc., from its subcontractors, suppliers and specialists for goods and services provided for the Works, all at the Contractor's cost and expense.

1.33 Handover Inspection

- (a) Notify the Architect in advance to request for a handing over inspection and the following functional tests, where relevant. The extent of testing shall be agreed on with the Architect.

S/N	Type of Test
1	Chokage Test for Main and Secondary Stack Pipe
2	Chokage Test for Rainwater Down Pipes and Down Pipes
3	Chokage Test for Branch Pipes Serving Units on Lowest Floor
4	Chokage Test for Branch Pipes Serving Units on Typical Floor
5	Leakage Test for Refuse Chute Flushing System
6	Water Pipe Pressure for Concealed Pipes
7	Gradient Test for House Drains
8	Gradient Test for House Sewer Lines
9	Gradient Test for Main Roof, Pump Room Roof, Staircase Roof, Lift Machine Room Roof
10	Gradient Test for Scupper Drains and Wash Area
11	Water Test for Toilet, Kitchen, Service Yard and Private Balcony
12	Water tightness Test for Window/Wall Joints
13	Water tightness Test for Precast Wall Joints

- (b) Upon receipt of the Contractors request, the Architect shall arrange a joint inspection date with the Employer. The Employer shall be present to witness the functional tests. In the event the tests fail to meet the requirements of the Contract, proceed to rectify the defect with due diligence and expedition and without delay, and arrange for re-tests in accordance with the requirements under the Contract.

- (c) If the Works are considered to have met the requirements of the Contract, including the approved workmanship standards, and there is no major defect detected during the handover inspection, the Works shall then be taken over by the Employer. Otherwise, the Architect shall give the Contractor a list of outstanding defects for rectification. The Contractor shall proceed to rectify the defects with due diligence and expedition and without delay. The Contractor's liability to rectify the defects under this Subclause shall not be limited to the list of defects given by the Architect, but shall include all other defects surfaced in between the handing over inspections. Upon completion of the defect rectification, the Contractor shall notify the Architect in writing that all outstanding defects found in the inspection, as well as all apparent defects identified between the handover inspections have been rectified and shall request another handing over inspection. The provision of the preceding Subclause (b) above shall apply, mutatis mutandis.
- (d) If the Contractor is unable to hand over the Works to the Employer after 2 handing-over inspections, the Architect shall invoke the provisions of the Clause 6 on "Nuisance and Irregularities".
- (e) The Contractor shall clean all parts of the project thoroughly. If the cleanliness of an area is not satisfactory before handing over to the Employer, the Contractor shall do repeat cleaning of the area at the Contractor's own cost and expense.
- (f) The Contractor shall, before Completion of the Works, remove all rubbish, construction equipment and surplus materials, wash and scrub clean all floors, staircases, pavings, drains and all parts of the buildings and leave the Works in a clean and hygienic condition fit for habitation. The Site and periphery shall be cleared of all rubbish left from the Contractor's work.

1.34 Defects Management

1.34.1 Employment and Deployment of Site Supervisor

Employ and deploy [to be specified by user] Site Supervisors full-time on the Site for every day where defect rectification works are carried out during the Maintenance/Defects Liability Period.

For defects reported, deploy a full-time Site Supervisor to manage and complete the rectification works within 14 calendar days. In the event that Contractor is unable to meet the service standards of 14 calendar days, the Contractor is required to increase the number of Site Supervisors to eliminate the delay. All cost and expense arising from the additional manpower/resources deployed is deemed to have been included in the Contract. In addition, the Employer may exercise the provisions of Clause 6 "Nuisance and Irregularities" to address the unsatisfactory works.

The Contractor's Site Supervisor shall be qualified and competent, and possess the relevant skills, knowledge and the ability to co-ordinate and supervise the defect investigation and rectification works. The Site Supervisor deployed to handle defects reported to Building Maintenance Team must be able to communicate with neighbours effectively. The Site Supervisor shall attend inspections together with the neighbours to better understand their requests and/or feedback, monitor the defect rectification to ensure timely completion of the rectification works, and attend the handover inspection together with the neighbours. The Site Supervisor is also required to conduct surveillance checks on the lift operation, illegal dumping and any other duties related to the project as instructed by Architect.

The Site Supervisor shall possess one of the following academic qualifications and experience:

- (a) National Certificate in Construction Supervision (NCCS) and at least 5 years of similar capacity relevant working experience in the building construction industry.
- (b) Recognised Diploma in Civil/Structural/Mechanical/Electrical Engineering, Building Science, Building Management, Building Services Engineering and at least 3 years of relevant working experience in the building construction industry.

The Architect shall be empowered to instruct the Contractor to replace, at the Contractor's own cost and expense, any Site Supervisors not carrying out their duties to the satisfaction of the Architect. In the event of the Contractor not employing the number of Site Supervisors required by the Contract or not employing such Site Supervisors for the period or periods required by the Contract, without prejudice to the Employer's rights under the Contract, the Contractor shall be indebted to the Employer at the rate of \$ [to be specified by user] per month per Site Supervisor not deployed and such indebtedness shall be deducted by the Employer from any monies due or becoming due to the Contractor or be recovered by the Employer as a debt from the Contractor. This rate shall be deemed to have been fully agreed and accepted by the Contractor and the Employer as the cost and expense allowed by the Contractor for the deployment of a Site Supervisor.

For the purpose of this clause, a Site Supervisor shall be deployed by the Contractor for at least 20 days within a calendar month before the supervisor can be considered as being employed for that particular month under the Contract, except where expressly specified otherwise. In the event that the first and/or the last calendar month of the BMT operating period or any period when liquidated damages are imposed under the Contract, have less than 20 days, each of the Site Supervisors shall be deployed for the full number of days in the said first and last calendar month of the BMT operating period or any period when liquidated damages are imposed under the Contract.

Notwithstanding other provisions in this subclause, if the Contractor incurs additional cost and expense over and above the agreed rate specified herein in complying with the requirements stipulated in this subclause, the Contractor alone shall bear such additional cost and expense in full.

On expiry of the Defects Liability Period, the Contractor may submit a written request to the Architect for the release of the Site Supervisor. A written approval from the Architect shall be obtained with this request.

1.34.2 Timeframe for Defects Management

Ensure that an operationally ready Building Management Team (BMT) is set up in a timely manner. The defects and feedback reported can be through:

- (a) Physical BMT on site which is 12 months subjected to extension by the Employer.
- (b) Virtual BMT, which is an online version of BMT.
- (c) Any emails/instructions from Employer and Architect.

Unless otherwise instructed by the Architect, the BMT operating hours during the physical BMT stage shall be: Mondays to Saturdays: 8.30am to 5.30pm (except Sundays and Public Holidays). Whichever channel that is provided for feedback, attend to them for a period of [to be specified by user] months from the Completion Certificate.

The personnel employed by the Contractor to manage the virtual BMT subsequently after the physical BMT has ceased must also possess the skill, knowledge and ability as specified in the "Employment of Customer Relations Officer". The service level during the virtual and physical BMT shall remain the same.

At the Contractors own cost and expense, provide uniforms for all site personnel, including subcontractors and suppliers, etc deployed to carry out defects rectification works reported to BMT. The design of the uniform shall be submitted to the Architect for approval at least 4 weeks before the BMT commences operation.

1.34.3 Provision of BMT Office

Liaise with the Architect for a suitable location within the Site to host the BMT for at least 2 months before the estimated completion date. The minimum size of BMTs Office is [to be specified by user] m2 and shall comfortably accommodate a waiting area for visitors, working space for Contractors Staff, Registered Technical Officer and Employers Representatives, office furniture/equipment and materials sample display area. Use materials that are non-combustible and water-resistant properties to enclose the BMTs Office. Provision of metal gate in front of the aluminium framed glass door is required. The plan layout of the items such as furniture, equipment within the BMTs Office shall be submitted to Employer for comments before setting up.

The BMTs Office shall be equipped with:

- an air-conditioning system: To provide thermal comfort for the occupants
- a personal computer: Based on current Specification for "Computer Hardware And Software" for the visitors to make e-appointment
- Two (minimum) office desks: including lockable drawers
- steel cabinet of size: 1.7 m x 0.8 m x 0.4 m, including shelves and double-leave doors
- a printer (capable to print up to A3 size)
- a colour scanner
- a photo stating machine
- a fax machine, telephone
- an auto-message and voice recording machine with 120-hour recording time
- adequate fluorescent lighting
- a digital camera
- torch lights
- chairs
- aluminium suggestion box of size: 0.3 m x 0.3 m
- soft board and white board of size: Size 2.4m x 1.2m, including accessories

- hot and cold drinking water dispenser
- drawing rack: complete with drawing holders and office stationary
- sofa at waiting area
- vinyl flooring
- area to display material samples (e.g., tiles, parquet flooring, water closet, wash basin, shower mixer and shower assembly, basin mixer, bib tap, electrical sockets and switches).

Provide and install a signboard of minimum size: 1.4 m x 1.0 m, before starting the operation of the BMT. The design of the signboard shall be submitted to the Architect for approval.

Provide and install 2 notice boards at the BMTs Office. Each notice board shall be of size: 1.8 m x 1.2 m with aluminium casing and aluminium frame door in-filled with 5mm thick clear polycarbonate sheet.

1.34.4 Information on Key Personnel

Within 14 days from the Date of Completion of the first building block and/or first phase of Works, submit the following to the Architect for approval:

- (a) Name and contact numbers of the Contractor's key management staff and the appointed Site Supervisors for defect investigation and rectification works within the Defects Liability Period
- (b) Name and contact numbers of the relevant manufacturers, suppliers and specialist contractors etc.
- (c) Name and contact numbers of the stand-by plumber and stand-by electrician

1.34.5 Defects Investigation and Rectification During Building Maintenance Team Operation

Within 14 calendar days from the date the access to the area is granted by Employer and/or upon Architect's instruction and/or written notification by the Architect, at the Contractor's own cost and expense, investigate, repair, rectify and make good to the satisfaction of the Architect all defects, imperfections, shrinkages and other faults arising from or out of the use of materials or workmanship not in accordance with the Contract or from neglect or failure (of the Contractor) to comply with any obligation on its part under the Contract which may become manifest.

Propose and implement a Quality Management System for defects rectification to ensure that the reported defects are rectified within 14 calendar days. The Quality Management System shall be submitted to the Architect for approval.

Prior to the commencement of any defect rectification works, submit a schedule of repair and method statement for the approval of the Architect. Mobilise only skilled and certified workers who are capable of executing the works in accordance with the method statement as approved by the Architect. All works must be attended to and supervised in person by the appointed Site Supervisor.

Dust and noise must be minimised, whenever possible and cleaning up must be carried out daily if the unit is occupied and/or after the repairs. Inconvenience caused to others should be minimised by completing the defect rectification works in the shortest possible time.

If there is failure by the Contractor to carry out its obligations as aforesaid, the Architect may invoke the relevant provisions of Clause 6 "Nuisance and Irregularities".

Without prejudice to the foregoing provisions, the Architect shall have the right to engage other persons or contractors to repair, rectify and make good all such defect, imperfections, shrinkages and other faults if the same are not repaired, rectified and made good within 14 calendar days from the date the access to the unit is granted by resident and/or upon the Architect's instruction and/or written notification by the Architect, and the cost and expense incurred shall be recovered from the Contractor. In addition, the Architect may invoke the relevant provisions of Clause 6 "Nuisance and Irregularities".

1.34.6 Rectification of Defects Prior to Issuance of Final Completion Certificate

For the purpose of certifying completion of defect rectification prior to the issuance of the Final Completion Certificate, one month before the expiry date of the Defects Liability Period, arrange with Architect for a final joint inspection. All defects listed after this joint inspection shall be rectified by the end of the succeeding one month commencing from the expiry date of the Defects Liability Period. A second final joint inspection shall be arranged to verify the completion of defects rectification.

If the Contractor fails to rectify and make good the defects on the second final joint inspection, the Architect may invoke the relevant provisions of the clause on "Nuisance and Irregularities". Notwithstanding the above, the Architect shall in addition have the right to engage workmen or other contractors to rectify and make good all defects and the cost of rectification and charges imposed shall be recovered from the Contractor.

1.34.7 Standby Plumber and Electrician for Restoring Essential Services

Provide a stand-by plumber and a stand-by electrician for 24-hour stand-by duties every day, including Sundays and Public Holidays, throughout the Defects Liability Period. The plumber and electrician need not be stationed on the Site but would be called upon to rectify defects causing disruption to essential supply such as water and electricity.

The Contractor or its representatives shall be contactable 24 hours a day, for every day, including Sundays and Public Holidays throughout the Defects Liability Period by means of telephone, mobile phone, radio pager, facsimile or any other suitable modes of communication.

The stand-by plumber and/or stand-by electrician shall attend to such defects within an agreed time with the Architect for their services is made. They shall carry out the rectification expeditiously and in a workmanlike manner to restore the essential services quickly to minimise any inconveniences to the residents. In the event that the stand-by plumber and/or stand-by electrician fails to attend or fails to attend within the time frame stipulated, the Architect may exercise the relevant provisions of the clause on "Nuisance and Irregularities".

1.34.8 Protection to Lift Interior During Defect Liability Period

Provide protection to all interior finishes of lift car using an approved material, to protect the lift car walls, top of the lift car and the lift car base. Handrail protection shall be made of cloth tape or other durable protection cover approved by the Architect.

Check and maintain the condition of the protection to the interior of the lift car regularly. In the event that the protection is found to be not in good condition, replace and make good such protection at its own cost and expense.

Seek the Architect approval before the removal of lift car protection. If the Contractor fails to rectify and make good any defects, the Employer reserves the right to exercise its rights under Clause 6 on "Nuisance and Irregularities".

1.35 Precautionary Measures to Be Taken during a Disease Pandemic

Implement necessary precautionary measures as advised by Ministry of Health or other relevant Authorities during a disease pandemic. Based on the recommendations from government's advisory, provide full cooperation and follow up expeditiously to plan for such a contingency and stock up necessary supplies or equipment (e.g., thermometers) so as to be able to implement the required measures at short notice.

1.36 Works Within Railway Protection Zone And Railway Safety Zone

Comply with the Land Transport Authority (LTA) Code of Practice for Railway Protection and the Mass Rapid Transit (Rail Protection, Restricted Activities) Regulations for construction of the Works and other activities within the railway protection zone and railway safety zone. Submit proposals to the Architect for approval on the effective measures for the protection of MRT above ground structures together with details of activities of mobile cranes, tower cranes and other mechanical equipment adjacent to the MRT line structures. Such submissions shall be made at least one month prior to the use of such construction equipment. No jib or lifting appliance or any other moving or stationary part of the mechanical construction equipment shall encroach within 6.0 m on plan from the edge of the nearest MRT above-ground or at-grade structure unless the construction equipment is restricted to work beneath the structure. The foundation of the mechanical construction equipment shall be certified structurally sound and adequate by the Contractor's PE prior to its installation.

Install an auto cut-off system on tower cranes to prevent the top of the boom from swinging closer than 6.0 m from edge of the viaduct structure. The jibs of the cranes must always be pointed away from the MRT line structure. Any temporary access shall be sufficiently stable and level for construction equipment travel. Carry out regular checks to ensure that all mechanised construction equipment is in good working condition at all times. Employ only experienced, trained and competent operators for the operation of mobile cranes, tower cranes and other mechanical equipment. Install temporary height restriction gantries with signboard 6.0 m away from the edge of both sides of the viaduct structure for any access passing underneath the MRT line structures.

1.37 Recovery of Legal Costs for Court Proceedings

All legal costs, charges and expenses (including but not limited to solicitors' fees as between solicitor and client) incurred by the Employer for the purpose of, or incidental to, the enforcement by the Employer of any rights and remedies under the Contract, or any other contracts between the Employer and the Contractor or in respect of any garnishee proceedings which may be brought or commenced against the Employer by the Contractor's creditors, may be deducted by the Employer from monies due or becoming due to the Contractor including any retention monies, financial bonds, or security deposits, or other bonds.

1.38 Completion of Site Works

Take note that site works refers to all site structures/facilities, such as, but not limited to, driveway, car park, guard house, childrens playground/hard courts/footpaths and landscaping works, such as earth mound formation, turfing, trees and shrubs planting where included in the Works.

Plan the stages of site works to be completed and submit to the Architect for approval.

1.39 Erection of Temporary Buildings

In addition to the submission of the site layout plan, further submit detailed structural plans and design calculations, certified by the Contractors PE, for temporary buildings of 2 storeys or higher, to the Architect not later than 3 months from the commencement date of the Contract Period or 2 weeks before the actual commencement of the Works for such proposals, whichever is earlier. Bear all consequences for late submission.

Erect all such temporary buildings in strict compliance with its PEs plans and calculations. The works shall be supervised by the Contractor's PE.

Not later than 2 weeks after the completion of the Works, the Contractor's PE shall submit a Certificate of Supervision, stating that it has carried out such supervision work and is fully satisfied that the works have been constructed in accordance with its structural plans and design calculations as approved by the Architect.

1.40 Goods and Services Tax

Do not include in the rates and prices quoted in the Contract Sum, the GST chargeable for the supply of goods, services or Works required in the Contract. All rates and prices quoted shall be exclusive of the GST.

The Employer shall reimburse the Contractor any GST charged on the goods, services or Works supplied.

The Contractor shall declare its GST status in its Tender. The Contractor shall clearly indicate whether it is, or whether it will be, a taxable person under the GST Act. The Contractor shall, if available, furnish the GST registration number to the Employer.

The Contractor will be deemed to be a taxable person if no declaration to the contrary is made in the Form of Tender. A Contractor that declares itself to be a non-taxable person under the GST Act but that becomes a taxable person after it has been awarded the contract shall forthwith inform the Employer of its change in GST status. The Contractor shall be entitled to reimbursement by the Employer of any GST charged on the goods, services or Works it supplies after its change in GST status.

1.41 Works and Materials Warranty

In every case where the Specification require the Contractor's Specialist to co-warrant the Works and/or materials to be executed or supplied under the Contract, such Specialist, subject to such other requirements as may be prescribed in the Specification, may only be employed by the Contractor with the Employer's prior written approval. The Employer will approve such employment if the Specialist gives his written undertaking to execute the Deed of Warranty prescribed in the Specification. If such written undertaking is not given, then appoint an alternative Specialist willing to give the written undertaking. The employment of any Specialist who refuses to give its written undertaking is not recognised by the Employer, and no Specialist may commence any work or supply any materials before its written undertaking is given.

The Employer's prior written approval of such Specialist's employment shall not in any way affect or diminish the Contractor's contractual obligations to the Employer in respect of any Works or materials executed or supplied by such Specialist on behalf of the Contractor, and the provisions of this subclause shall not in any way affect or diminish the Employer's entitlement to withhold the payment of any sums due to the Contractor by reason of the Contractor's and/or Specialist's failure to execute and submit the Deed of Warranty within the time specified.

1.42 Cost of Water and Electricity

Provide suitable and adequate supply of water and electricity for the Site including for the purposes of conducting tests on the Works. Where directed by the Architect, provide and allow other contractors on the Site employed by the Employer, free and unrestricted use of the water and electricity for carrying out testing and commissioning of such other contractors' works. Bear all costs and expenses for the water and electricity consumed at the Site, including the cost of water and electricity consumed for carrying out testing and commissioning by such other contractors employed by the Employer on the Site. Where applicable, the Architect may at his/her sole discretion, direct the Contractor to transfer the account for the water and electricity supply to the Employer or such Management Corporation or such other party. The Contractor shall be deemed to have included in the Contract Sum for all costs and expenses incurred in complying with the requirements stipulated in this Subclause.

1.43 Site Control and Security

1.43.1 Identification Pass

Provide a serially-numbered security identification pass to each of its workers and subcontractors' workers. The identification pass shall consist of the worker's photograph, name, identification card number or passport number and name of the Contractor. Issue temporary entry passes, on a day to day basis, to workers from other contractors employed by the Employer or other Government/Statutory Board Authorities or other companies carrying out works on the Site.

Be responsible for controlling and issuing these security identification passes and temporary entry passes. Maintain an updated list of the passes issued for accountability and to facilitate enforcement checks. Ensure that all workers on the Site wear and display their passes prominently and securely at all times while working on site.

1.43.2 Erection and Removal of Temporary Metal Hoarding

Unless otherwise specified, provide, erect and maintain a continuous metal hoarding around the entire contract boundary before the commencement of Works. The hoardings shall be erected at not less than 300 mm away from any permanent structure such as footway, drain, pipeline, etc.

Refer to the drawings for the location and type of hoardings to be used. Should there be failure to comply with this requirement, the Architect reserves the right to impose any action deemed necessary and any cost and expense incurred thereof, including charges that shall be recoverable from the Contractor.

As and when instructed by the Architect, remove, relocate, reconstruct all or part of the hoardings and reinstate all the affected grounds to the satisfaction of the Architect, all at the cost and expense of the Contractor.

Submit a complete set of workshop drawings to be endorsed by its PE and approved by the Architect.

Provide metal gates/doors for the main and side entrances. Location of these entrances shall be approved by the Architect. There shall be a maximum of 2 entry points for the entire Site, unless otherwise approved by the Architect. Close the metal gate at the main entrance (for vehicular traffic) and lock up after working hours when construction activities have stopped. Provide a side entrance beside the main gate for passage of workers and visitors that can be monitored by the Security Officers. These entrances/gates and the perimeter shall be well-lit during the hours of darkness (7.00 pm to 7.00 am).

(a) Comply with the following minimum requirements for the flat panel hoardings:

- (i) Use a minimum of 0.60 mm thick steel with zinc/aluminium alloy coating for the metal hoardings. All exposed metal sheet surfaces of the metal hoardings shall be finished with paint coating.
- (ii) The full height of the hoardings shall be 6 m, the hoardings comprising an overhang roofing that has a vertical height of 1 m. There shall be no use of netting.
- (iii) Use corrugated panel for the overhang roofing.
- (iv) There shall be no struts at the exterior of the hoardings where it is visible to the public.
- (v) The colour for the flat/corrugated panel hoardings and the overhang roofing shall either be white or off-white.

(b) Comply with the following minimum requirements for the corrugated panel hoardings:

- (i) Use a minimum of 0.42 mm thick steel with zinc/aluminium alloy coating for the metal hoarding. All exposed metal sheet surfaces of the metal hoardings shall be finished with paint coating.
- (ii) The full height of the hoardings shall be 4 m with no overhang roofing and no netting (as shown in the drawings).

- (iii) The colour for the flat/corrugated panel hoardings and the overhang roofing shall either be white or off-white.

Use timber posts and horizontal bracings of common grade timber under strength group A of SS CP 7 and/or steel members of grade S275.

Use a minimum of grade 30 concrete foundations.

"DANGER - KEEP OUT", "NO TRESPASSING" and "WORK IN PROGRESS" signs in 4 official languages shall be displayed on the exterior side of the hoardings. Print these signs using the template provided. Mount the signs only on the corrugated hoardings where required and not on the flat panel hoardings. The size of these signboards is specified in the drawings.

The position of the lightings is critical in achieving a professional look and feel for the entire project. Do not install the lightings (LED light fixtures) on the design panel this prevents covering the messages or community photos on the hoardings design panels. Locate the lightings above the design panel instead. Ensure that the hoardings erected are illuminated adequately to achieve a maintained illuminance of average 10 lux, or as otherwise instructed by Architect.

Maintain the hoardings and gates at all times to ensure no deterioration of the structures and fading of the paint works throughout the Contract Period (including any extension thereof).

On satisfactory Completion of the Works, clear the hoardings away upon the approval of the Architect.

1.44 Registered Trade Subcontractors

At the time of tender, submit the list of subcontractors intended to be engaged for the Works. Submit with the list, with details such as the relevant track records of the firms, the qualification of personnel and details of equipment to be engaged for the Works. All subcontractors for the Works are subject to the Architect's acceptance.

Ensure that the Contractors appointed first-level subcontractors have valid Building and Construction Authority (BCA) or Ministry of Finance (MOF) registration at the time of appointment. If the appointed first-level subcontractor is registered with BCA, ensure that the appointed first-level subcontractor is registered under the appropriate BCA workhead.

At least 14 days before commencement of the Works by the subcontractors for the respective trades, confirm the name of its subcontractors for the Works to the Architect. In the event that there are changes to any of the Contractors subcontractors, submit such information to the Architect.

The Contractor shall be responsible for any eventual delay in the progress of the Works owing to its failure to ensure the required on-time registration of its subcontractors and no extension to the Contract Period shall be granted on account of such delays.

1.45 Engagement of Bizsafe Level Certified Subcontractors

All subcontractors engaged by the Contractor shall possess a valid bizSAFE Level [to be specified by user] Certificate awarded by the Workplace Safety and Health Council. Ensure that all subcontractors possess a valid certification throughout the entire period which they are engaged to carry out works on site.

At the point of engagement, if any of the subcontractors have not attained the aforesaid certification, seek written approval from the Architect for their engagement, provided that the Contractor gives a written undertaking to the Architect that the subcontractor shall attain the aforesaid certification within 6 months or before work commencement on site, whichever is earlier.

The Architect may invoke the provisions of Clause 6 "Nuisance and Irregularities" if they fail to meet the above requirement.

1.46 Insurance Policies

The Contractor shall warrant that the insurance policies issued in accordance with the Conditions of Contract include the following requirements:

(a) Insurance for Work Injury Compensation

- (i) The Policy shall be issued in a prescribed form as agreed with the Employer.**
- (ii) The Insured shall be "(Name of Contractor to insert) as Contractor and all its subcontractors, and the Employer as Principal FTRR & I".**
- (iii) The period of insurance shall commence from the date the Site is handed over to the Contractor and shall end upon expiry of the Defects Liability Period under the Contract. The Policy shall firstly cover the whole of the original Contract Period plus 6 months and plus a further 12 months for Defects Liability Period.**

(b) Insurance for Personal Injury and Property Damage

- (i) The Policy shall be issued in the joint names of the Employer, the Contractor and all its subcontractors.**
- (ii) The limits of liability shall be read as follows:**
 - (a) In respect of any one accident: \$ [to be specified by user]**
 - (b) Unlimited for the period of insurance**
- (iii) The period of insurance shall commence from the date the Site is handed over to the Contractor and shall end upon expiry of the Defects Liability Period under the Contract. The Policy shall firstly cover the whole of the original Contract Period plus 6 months and plus a further 12 months for Defects Liability Period.**

- (iv) The period of notice for cancellation of the Policy, if such a period is stipulated, shall read 30 days.
- (v) The Policy shall expressly include coverage of the following risks:

 - (a) Death, bodily injury or damage to property caused or occasioned by the Insured's subcontractors or by such subcontractors' employees.
 - (b) Death, bodily injury or damage to property caused or occasioned by or connected with or arising from the ownership, possession or use by or on behalf of the Insured of any equipment or machinery not expressly specified in the Schedule of such equipment or machinery.
 - (c) Liability assumed by the Insured by agreement, unless such liability would have attached to the Insured notwithstanding such agreement.
 - (d) Liability in respect of loss or damage to property belonging to or in the charge or control of the Insured or of any servant or agent of the Insured.
 - (e) Liability in respect of injury to or illness of any person or loss or damage to any property or land or building caused by vibration or removal or weakening of support
 - (f) Liability in respect of injury, illness, loss or damage caused by or connected with or arising from any commodity, article or thing supplied, repaired, altered or treated by or to the order of the Insured, happening at any of the Insured's premises.
- (vi) The Policy shall expressly contain the following endorsements:

 - (a) "This Policy shall cover all the Contractor's insurance obligations with regard to personal injuries or death and injury or damage to property real or personal (including property of the Employer but not the Works themselves) arising out of or in the course of or by reasons of the carrying out of the Works stated in the Contract between the Employer and the Contractor (name of Contractor to insert)."
 - (b) "Each of the parties comprising the Insured shall for the purpose of this Policy be considered as a separate and distinct unit and the words "the Insured" shall be considered as applying to such party in the same manner as if a separate policy had been issued to each of the parties and the insurers hereby agree to waive all rights of subrogation action which they may have or acquire against any of the aforesaid parties arising out of any accident in respect of which any claim is made hereunder provided nevertheless that nothing in this clause shall be deemed to increase the limitation on extent of Insurer's liability in respect of any one accident or series of accidents as stated in the Schedule."

- (c) **"This Policy is extended to cover the employees and/or representatives of the Employer, consultants, other professional parties and Resident Site Staff whilst on the contract site as third parties."**
- (d) **"Notwithstanding anything stated in the Policy to the contrary, cover under the Policy shall not be suspended in the event of stoppage of work by the Contractor on the contract site from any cause for a period not exceeding 90 days. In the event of partial or total cessation of work, the Insured shall use diligence and do all things reasonably practicable to protect the insured property. Subject otherwise to the Terms Exceptions and Conditions of this Policy."**
- (e) **"All deductibles shall be borne by the Contractor."**

(c) Insurance for Works

- (i) **The Policy shall be issued in the joint names of the Employer and the Contractor.**
- (ii) **The Works insured shall read the project title given in the Employer's Letter of Acceptance.**
- (iii) **The sum insured shall be the same as the Contract Sum.**
- (iv) **The period of insurance shall commence from the date the Site is handed over to the Contractor and shall end upon expiry of the Defects Liability Period under the Contract. The Policy shall firstly cover the whole of the original Contract Period plus 6 months and plus a further 12 months for Defects Liability Period.**
- (v) **The period of notice for cancellation of the Policy, if such period is stipulated, shall read 30 days.**
- (vi) **The policy shall expressly contain the following endorsements:**
 - (a) **"This Policy shall cover all the Contractor's Works insurance obligations stated in the Contract between the Employer and the Contractor (name of Contractor to insert)".**
 - (b) **"Notwithstanding anything stated in the Policy to the contrary, cover under the Policy shall not be suspended in the event of stoppage of work by the Contractor on the contract site from any cause for a period not exceeding 90 days. In the event of partial or total cessation of work, the Insured shall use diligence and do all things reasonably practicable to protect the insured property. Subject otherwise to the Terms Exceptions and Conditions of this Policy".**
 - (c) **"All deductibles shall be borne by the Contractor".**

1.47 Contract Documents and Reference Material on Site

Keep at the Site the following:

- (a) A complete set of the signed contract documents described in the Agreement.**
- (b) A complete set of the further or revised Drawings and instructions referred to in the Conditions.**
- (c) The relevant Codes of Practice or Standards referred to in the Specification.**
- (d) These documents shall be made available for inspection and use by the SO, and any other person authorised by the Architect in writing.**

1.48 Prohibition of Dogs in Construction Sites

Do not rear or keep dogs at the Site for any purposes or under any circumstances, regardless of whether or not the dogs are licensed with Agri-Food and Veterinary Authority of Singapore (AVA). The feeding of stray dogs beyond the contract boundary by any site personnel is also prohibited.

The Contractor shall be responsible for complying with this requirement and shall take the necessary measures which include but are not limited to the following:

- (a) Providing designated waste bins with covers for food waste disposal at workers quarters, workers rest and recreation areas, and other areas where workers are likely take their meals. The waste bins should remain closed at all times to prevent dogs from foraging for the disposed food.**
- (b) Ensuring that the waste collector removes the food waste from the Site on a daily basis.**
- (c) Putting up notices at prominent areas within the Site as well as on the external face of the hoarding to remind workers and members of the public not to feed stray dogs.**
- (d) Having a system of regular site checks which should also cover the secluded spots within the Site where stray dogs could hide, such as under storage containers. The Contractor shall keep a record of such checks indicating the days, time and names of site personnel conducting the checks. The records shall be made accessible to Architect upon request.**
- (e) Having a system of regular reminders to all site personnel (security guards and customer relations officers inclusive) on this requirement.**
- (f) Informing AVA immediately for assistance if the presence of stray dogs is found within or at the vicinity of the Site.**

If the Contractor is found to have breached the above requirement, the Architect may invoke the provisions of Clause 6 "Nuisance and Irregularities".

1.49 Lightning Protection to Temporary Structures and Metal Structures

Ensure that all temporary buildings such as site office, site electrical substation, workers quarters, carpenter and bar bending sheds and temporary structures with continuous metal such as steel framework, scaffolding, tower cranes, batching plants and mobile machinery such as crawler cranes and concrete pumps are adequately and effectively protected from lightning strike at all times. The lightning protection system shall be in accordance with and complying with the latest edition of SS 555.

Submit detailed risk assessment and management, drawings showing the design of the lightning protection system, consisting of the air-termination system, down conductor system and earth-termination system, duly signed by the Contractors PE (Electrical) stating that the design complies with the latest SS 555. For temporary structures without Lightning Protection System (LPS), a PE certification with reasons shall be provided. The Contractors PE (Electrical) shall provide a Certification of Supervision on the lightning protection system together with the earthing reports not later than 3 weeks after the erection of the temporary structure and before usage. The Contractors PE (Electrical) shall also conduct routine inspections including submitting earthing reports once every 6 months to ensure that the Contractor has provided adequate and effective lightning protection system for the Site. The inspection and earthing reports are to be submitted to the Architect and a copy shall be kept in the site office and made available for inspection at all times.

1.50 Computer Hardware and Software

1.50.1 Computerised Project Management Software

Within one month from the commencement date of the Contract Period, provide and implement a Computerised Project Management Software (CPMS) during the Contract Period (including any extension thereof). The Architect's and the Employer's officers shall be allowed to have full and free access and usage of the CPMS at all times.

Use the CPMS which shall be installed on the Site to prepare the programme for the Works based on the Critical Path Method. The programme for the Works shall include the duration, early start/finish dates, late start/finish dates and floats for all activities involved in the Works. It shall also include constraints and parameters such as fixed start/finish and target start/finish dates for the activities and milestones for the different phases or stages of the Works.

The programme for the Works shall comprise summary and detailed reports in textual and graphical forms. It shall be updated monthly or as and when required by the Architect to indicate, inter alia, the critical path, actual start and finish dates of completed activities, actual start dates and percentage completion of the activities in progress, and target start and finish dates of the delayed activities, their slippages and floats.

Submit to the Architect the actual programme for the Works within 3 weeks after the Date of Completion.

1.50.2 Computer Hardware

Within one month from the commencement date of the Contract Period, provide the computer hardware during the Contract Period (including any extension thereof) and till closing of BMT.

1.50.2.1 Personal Computer

Provide **01** Personal Computers (PC) for the exclusive use of the Architect and unless specified otherwise, 3 units of PC for BMT operation. The PC shall comply with the following minimum requirements:

- (a) An Intel Core i5-4670 Processor of 3.4GHz equivalent or faster processor to run BIM software.
- (b) 4 GB DDR3 1600MHz Memory equivalent or better.
- (c) 500 GB SSD or more equivalent or better [The hard disk must have 2 partitions e.g. C and D drive].
- (d) An Intel® HD Graphics 4600 equivalent or better to run BIM.
- (e) One 24" LCD monitor equivalent or better.
- (f) System BIOS updateable via software should be licensed flash BIOS of the latest version.
- (g) One keyboard.
- (h) One optical USB mouse or compatible.
- (i) One DVD writer.
- (j) Wireless enabled.
- (k) Casing shall be secure and come with one good quality chassis lock of unique combination. All keys to the lock shall be given to the Architect.
- (l) Include all the necessary features and accessories required to support the type of broadband connection services specified in this Clause and all subclauses under it.
- (m) Loaded with the software as specified in this clause including all subclauses under it.

The PC shall be Microsoft certified.

1.50.2.2 Internet Connection

The Contractor shall at its own cost and expense provide and maintain Broadband Connection Services and WiFi via a major Broadband Service Provider, e.g. Starhub, M1, SingNet or equivalent to be approved by the Architect) for the PC during the Contract Period (including any extension thereof) and till closing of BMT operation. The minimum connection speed to be provided is as follows:

- (a) 50 Mbps for cable broadband, or
- (b) 100 Mbps for fibre

The broadband connection shall be catered solely for the PC. Access to the broadband connection must be adequately secured with password protection to prevent unauthorised usage or network eavesdropping.

1.50.2.3 Laser Printer

Provide [quantity to be inserted] laser printer equivalent or better, complying with the following minimum Specification:

- (a) At least 16 MB of RAM and upgradeable to at least 160 MB.
- (b) Able to print at least 20 pages of A4 per minute and 11 pages of A3 per minute.
- (c) Automatic Duplex Printing Unit.
- (d) Print at 600 x 600 dpi resolution or more.
- (e) Support high speed bidirectional IEEE 1284-compliant parallel port (C-type connector).
- (f) Support PCL 5e, PCL 6 and Postscript Level 3 emulation.
- (g) Must be able to support printing in the software specified in this Clause, including all subclauses under it.
- (h) Bundled with drivers for the software specified in this Clause, including all subclauses under it.

1.50.2.4 Uninterruptible Power Supply (UPS)

Provide [quantity to be inserted] Uninterruptible Power Supply (UPS) equivalent or better, complying with the following minimum Specification:

- (a) Conform to the following industry standards: IEEE 446, NEMA PE1, ANSI C62.41, IEEE587B, IEC 801-146;
- (b) Conform to the following safety standards: UL 1778, CSA C22.2 and VDE
- (c) 10 minutes or more runtime at full load
- (d) Provide alert on AC power failure, power restore and diagnostic tests through management software
- (e) Provide at least 3 output ports
- (f) Include all connecting cables joining the UPS output ports and equipment.

1.50.2.5 Colour Scanner

Provide [quantity to be inserted] colour scanner equivalent or better complying with the following minimum Specification:

- (a) Flatbed, one-pass colour and monochrome**
- (b) At least 600dpi x 600dpi resolution**
- (c) Able to scan A4 size documents**
- (d) Support Universal Serial Bus(USB) port**
- (e) Include(s) scanning software that can display the image file size to users at the preview screen**
- (f) Able to support all image formats including but not limited to:**
 - TIFF**
 - BMP**
 - JPEG**
 - FPX**
 - GIF**
 - WMF**
 - PDF**
- (g) Bundled with drivers for the software specified in this clause including all subclauses under it.**

1.50.3 Computer Software

Within one month from the commencement date of the Contract Period, provide the computer software during the Contract Period (including any extension thereof).

Provide the latest version of the following licensed software packages (full packs with original licences, documentation and media provided) for each PC and/or tablets provided under this Clause, including all subclauses under it:

- (a) Windows operating system**
- (b) Microsoft Project**
- (c) Microsoft Office**
- (d) Firewall and anti-virus package**
- (e) Internet Explorer**

(f) **BIM Revit software**

(g) **NavisWorks (for site staff to view BIM model)**

Adopt the software listed above so as to ensure compatibility with Consultants IT environment and applications. Alternative software may be proposed, subject to the Architect's approval and provided the software does not pose any compatibility issues.

Purchase maintenance license for the Virus Scan software to cover the Contract Period (including any extension thereof). The PC must be set to automatically scan for virus at least once a day when the PC is switched on.

1.50.4 Computer Software Licensing

All the computer software as specified in this Clause, including all subclauses under it shall be licensed copies obtained from Authorised distributors or dealers. The Contractor shall at its own cost and expense provide any software upgrade, to the latest version or release upon request by Architect, during the Contract Period (including any extension thereof). Ensure that only authorised software are used with the hardware and obtain written approval from the Architect before installing any software other than the ones specified in this Clause including all subclauses under it, into the computer hardware system.

1.50.5 Approval and Testing of Computer Hardware and Software

Submit Specification and details of the computer hardware and software as specified in this Clause including all subclauses under it to the Architect for approval BEFORE the purchase of the hardware and software. The Contractor shall at its own cost and expense make such necessary arrangement for the hardware and software to be tested at the relevant Consultant's office and the subsequent delivery to the work site upon request by the Architect.

1.50.6 Computer Furniture and Accessories

Provide the necessary furniture and accessories at the site office to accommodate and facilitate the usage of the computer hardware and software. The PC designated for the exclusive use of the Architect shall be located in a fully enclosed room within the site office. The room shall be of minimum size 8 m² as specified. The room shall be provided with a lock and be partitioned in half-height glass panels.

1.50.7 Computer System Maintenance

Ensure that the computer hardware and software are in good working condition and pay for all maintenance, licence fees, subscription fees, etc. for the hardware and software during the Contract Period (including any extension thereof).

If the Contractor fails to make available the hardware and software within one calendar month from the commencement date of the Contract Period or fails to rectify any hardware or software faults, within one day, the Architect will make the necessary arrangement to acquire or to rectify the faults and all costs and expenses thus incurred shall be deducted from payments due to or becoming due to the Contractor or recovered as a debt due from the Contractor.

1.50.8 Security

Make all necessary arrangements and provisions to prevent theft/burglary of the computer hardware and software. Replace any stolen or missing hardware and software within 3 days of such occurrence, failing which the Architect will make the necessary arrangement to acquire the systems and all costs and expenses thus incurred shall be deducted from payment due to or becoming due to the Contractor or recovered as a debt due from the Contractor.

1.50.9 Unauthorised Usage

Ensure that the hardware and software are not used for any other purpose except for those approved by the Architect.

1.50.10 Email Account

Apply for and maintain an email account to facilitate transmission of information and correspondence. Provide the email address to the Architect within 1 month from the date of the Letter of Acceptance.

1.51 Assignment of Copyright of Photographs, etc

Assign the copyright of the photographs (including the prints/slides/transparencies/negative) taken and all documents prepared under this Contract to the Employer.

The Employer shall have unfettered rights to use or reproduce all the photographs (including the prints/slides/transparencies/negatives) taken and all documents prepared by the Contractor under this Contract for any purpose other than for the purpose for into which the Contract was entered.

In the event that third parties are engaged (by the Contractor) to take the photographs (including the prints/slides/transparencies/negatives) or prepare the documents, procure the assignment of the copyright from such third parties to itself and thereafter, assign the copyright to the Employer.

The Contractor and/or any third parties are strictly prohibited from using or reproducing any of the photographs (including the prints/slides/transparencies/negatives) taken and all documents prepared under this Contract in any other publication or for any other purpose whatsoever.

1.52 Provision of Envelopes for Keys During Handover

Upon successful handover of the Works to the Employer after inspection by the Architect and the Employer, provide the necessary number of envelopes to contain the household keys of each area or room in the Contract. Each envelope provided shall fulfil the following requirements:

- (a) C6 size (114 mm by 162 mm)
- (b) Key envelope with string and white eyelet
- (c) 120 gsm paper

- (d) Colour white

Propose the type of envelope to the Architect for approval.

The 2 external sides of the envelope may either be printed or stamped with the following information:

- (e) On the Front of the envelope Print/Stamp in Arial Black Font Type of Font Size 18, the following statement: KEY TO PREMISES NO. [to be specified by user]
- (f) On the Back of the envelope: To print/stamp in Arial Black font type of font size 12, the following statements:

S/N Location	No. of keys
1	N.A
2	N.A
3	N.A
4	N.A
Total	N.A

1.53 Schedule of PEs Submission

Provide the required PEs submissions as specified for the Works and/or as agreed with the Architect. These submissions shall include but not be limited to the following:

- (a) Site offices
- (b) Temporary buildings
- (c) Passenger cum material hoist foundation, masts and tie-back
- (d) Metal Access scaffold and working platforms.
- (e) Alternative system to safety net system
- (f) Working platforms for lift shafts and voids wall
- (g) Protective Shelter as Overhead Shelter
- (h) Tower cranes and other tall construction equipment foundation and tie-back
- (i) Mobile crane and piling machine access
- (j) Temporary staircases
- (k) Planking and strutting
- (l) Rectification of defective work

- (m) Design of formwork
- (n) Formwork system for reinforced concrete water tank
- (o) Metal roof structural plans and fastening details

1.54 Earth Control Measures

The Contractor shall be responsible for the implementation of effective Earth Control Measures (ECM) during construction stage at all time. The ECM shall be implemented according to the Code of Practice on Surface Water Drainage and meet the requirement under the latest Sewerage and Drainage Act Cap 294.

Note that ECM are meant for the containment and treatment of silty rainwater runoff only, and not meant for the treatment of process water from construction activities such as slurry from tunnelling, pipe-jacking and bore-piling works. Such process water shall be handed and treated to comply with the requirements under Environmental Protection and Management Act (Chapter 94A).

Provide schematic diagrams outlining the ECM for the whole duration of the construction activities, taking into account the various ECM requirements under different phases of construction activities. The ECM plan shall be designed and endorsed by a Qualified Erosion Control Professional (QECP) and form the basis for the Contractor to price for ECM. The Contractor shall be deemed to have included all the costs and expenses for complying with all ECM requirements in the Contract Sum.

Engage a QECP to design ECM. Implement ECM accordingly to the QECP's ECM plan before earth works starts. During the course of construction works, engage a QECP to review the effectiveness of the ECM regularly, in tandem with the various phases of construction works. Revise the ECM as and when advised by its QECP.

Keep good records of the ECM operation and maintenance. The records shall be made readily available to the Architect.

Do not remove the ECM until all Works are completed and upon the advice of the Contractors QECP.

Submit the ECM plan duly endorsed by its QECP to Director, Catchment and Waterways (PUB) to obtain the necessary clearance before the earth works start, in the format as prescribed by PUB. The ECM plan shall include the following content:

- (a) Project Brief, which shall include the following:
 - (i) Project description
 - (ii) Name and address of site occupier
 - (iii) Site area and Contract Period
 - (iv) Location map and site plan
 - (v) Construction phases and schedules

- (b) ECM Design Calculations
- (c) Erosion Control Plan
- (d) Sediment Control Plan
- (e) Site ECM Management System

1.54.1 Erosion Control Plan

The plan shall include minimising of bare earth areas/slopes/stockpiles via sequencing and phasing the earth works, paving up / covering bare earth surfaces with lean concrete, milled waste, erosion control blankets, close turfing, canvas, etc.

1.54.2 Sediment Control Plan

The plan shall include the following:

- (a) Concrete-lined cut-off drains (minimum C7 precast channel) along the perimeter of the construction sites.
- (b) Sealing of site hoarding.
- (c) Ramp/curb at site entrance/exit.
- (d) Separate drainage for bare earth surfaces and non-bare earth surfaces.
- (e) Silt fence properly installed and embedded onto the ground along the internal and perimeter cut-off drains.
- (f) Silt traps.
- (g) Holding sumps/ponds for silty water.
- (h) Adequate silty water treatment systems to treat silty water before the discharge points into public drain.
- (i) Turbidity curtains for works in or adjacent to water bodies, such as canals, rivers, sea or in a reclamation work.

1.54.3 ECM Management System

The Management System shall include:

- (a) Daily ECM inspection and report by an ECM trained site staff.
- (b) Regular ECM review and report by QECP.

- (c) **Monitoring and alerts of the treated runoff quality, and if required by PUB, CCTV with Silt Imagery Detection System to monitor the discharge at the public drain.**

Deploy an ECM trained site staff to supervise the operation and maintenance of the ECM implemented on site as well as conduct daily checks. The site staff shall be the project manager, a qualified ECO, RTO or Safety Officer, who has attained, or will attain within 3 months from commencement of contract, a valid certificate from attending and passing an IES- endorsed ECM course for site staff, such as "Certificate of Competency in ECM for Construction Site Personnel Course."

1.55 Environmental Public Health Measures at Construction Sites

1.55.1 General Requirements

Comply with the Environmental Public Health Act (hereafter referred to as "the Act" for the purposes of this subclause) and its Subsidiary Legislations including the Environmental Public Health (Employment of Environmental Control Officers) Order 1999, (hereafter referred to as "the Order" for the purposes of this subclause) and any amendment or re-enactment thereto throughout the Contract Period (including any extension thereof).

Upon completion of the Works, engage a NEA registered Acoustic professional to measure the boundary noise for Building Permit application, from sound generating equipment, e.g. cooling towers, generators, AC condensing units, exhaust fan outlets, refuse compactor; and recommend mitigation measures when noise levels measured are excessive.

1.55.2 Noise Nuisance

Judicious management and control over the activities within the Site shall be exercised by the Contractor for the abatement of noise nuisance. In this respect, implement all necessary noise control measures at its own cost and expense, to comply with the Environmental Protection and Management Act (hereafter referred to as "the Act" for the purposes of this Subclause) and its Subsidiary Legislations including the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations, (hereafter referred to as "the Regulations" for the purposes of this subclause) and any amendment or re-enactment thereto throughout the Contract Period (including any extension thereof).

The Contractor shall be deemed to have inspected and examined the Site and its surroundings and to have satisfied itself as to the surrounding developments and construction activities. Prior to the commencement of Works, propose a noise management plan and execute the appropriate noise control measures at its own cost and expense.

1.55.3 Noise Control at Construction Site

1.55.3.1 Noise Management Plan

Within 14 days from the date of the Letter of Acceptance, submit a noise management plan complying with SS CP 602 to the Architect for approval. The noise management plan shall include, but not be limited to the following:

- (a) Comparison charts between baseline noise monitoring results prior to the commencement of Works and the anticipated noise emission levels during construction.
- (b) Identification of sensitive buildings, for example hospitals, schools, institutions of higher learning, homes for the aged sick, etc., and residential buildings within 150 m from the construction site boundary.
- (c) Site utilisation plan, indicating the locations of site facilities and noise generating equipment including, but not limited to generators, compressors and concrete pumps.
- (d) Specification of the machinery, equipment and plant proposed to be utilised on site as well as their indicative noise emission levels. Construction equipment and methods of work that generates excessive noise will not be allowed to be used on Site.
- (e) Identification of noise generating activities and delineate the sequence of work and construction methods for such activities, as well as indicate the anticipated noise levels accompanying each type of activity.
- (f) Proposed noise control measures for noise generating activities along with the estimated reduced noise levels in the form of administrative and engineering controls or other measures deemed effective in noise abatement. Noise control measures shall take into consideration site planning and layout (administrative controls), adoption of engineering controls and behavioural considerations of site personnel.
- (g) Proposed scheduling of works with due consideration to noise generating activities.
- (h) Contingency noise abatement measures for unavoidable works that have to be carried out after 7pm with the approval of the Architect.
- (i) Noise monitoring system to be implemented, which includes the details of instrumentation, locations of installation, measured values of Leq and correction factor to be applied in the presence of ambient noise.
- (j) Public relations strategies to foster close community relationships throughout the Contract Period (including any extension thereof), such as signboards, newsletters, circulars, complaint handling procedures and investigation, standard response time to public feedback and complaints

In formulating the noise management plan, take into account the working days and hours, as well as consider the effects of construction noise on personnel working in or around the site as well as the neighbourhood within proximity of the Site. Take into account the nature of land use in the area, duration of works and the effect of lengthening works period or other nuisances that may affect the neighbourhood.

1.55.3.2 Noise Control Measures

Implement all noise control measures included in the approved noise management plan, including any other noise control measures as instructed by the Architect or NEA from time to time. Noise control measures shall include the following, where necessary to comply with the Regulations:

- (a) All machinery and plant shall be identified to be sound-reduced prior to entering the Site.
- (b) All plant, machinery and equipment shall be pasted with a weather-proof sticker clearly indicating its noise emission level (at source) under normal operating condition.
- (c) All machinery in operation shall have their covers properly shut at all times.
- (d) Noisy plant and equipment shall be housed in acoustic sheds or enclosures.
- (e) Noisy activities shall be barricaded with portable noise barriers and panels.
- (f) Noise barriers shall be erected prior to commencement of works.

Noisy construction equipment (e.g., compressors) and installation (e.g., temporary refuse chute) shall be sited away from occupied blocks. All construction equipment shall be properly insulated and maintained to minimise its operating noise level. The Architect has the discretion to require the Contractor to take necessary precautions, whether specified herein or not, to maintain or to repair such construction equipment or to instruct their removal from site when it is determined that the noise level generated from the construction works fails to comply with the Regulations or Code.

1.55.3.3 Noise Monitoring System

Set up the wireless, web-based real-time noise monitoring system prior to the commencement of Work on Site. The cost of setting up, operating and maintaining the noise monitoring system shall be borne by the Contractor.

The system shall include an integrated solar-powered sound level meter complying with IEC 61672 (Type 1) or other comparable standards approved by the Architect. In addition, the system shall provide wireless, real-time transmission of the sound level data to a secured (password-protected) website, where data is presented for Leq 5-min, Leq 1-hr and Leq 12-hr periods. The system shall enable all current and historical sound level data recorded from the Site to be retrieved from the website. The system shall also incorporate a short message service (SMS) alert system to notify the designated recipients when the construction noise levels exceed the permissible noise limits stated under the Regulations.

The sound level meter must comply with the following requirements:

- (a) An integrating-averaging sound level meter set to frequency weighting "A".
- (b) Equipped with a data logger for sampling the running value of "A"-weighted sound level pressure levels with adequate memory to store 5-min equivalent continuous readings on a 24-hr basis for up to 1 month.
- (c) Dynamic range shall be of at least 40 dB.
- (d) The sound level meter shall have a laboratory calibration certificate dated not more than 3 months before the commencement date of the Contract. The integrating sound level meter shall be sent to an approved accredited laboratory for calibration at an interval of every 6 months or as and when required by the Architect.

Install the sound level meter at a suitable location at the nearest occupied building. The location shall approved by the Architect or NEA. Liaise with the relevant Authorities, for example Town Council, for permission to install the sound level meter. Where there is no suitable location outside the Site, the sound level meter may be installed within the Site, subject to the approval of the Architect or NEA. The installed sound level meter can be sheltered, but the microphone of the sound level meter must face the construction site and in the line of sight of the construction activities without any physical barrier or obstruction.

1.55.3.4 Sites in Close Proximity to Sensitive Buildings

For construction sites close to premises that are sensitive to noise disturbances, e.g. schools, hospitals, institutions of higher learning, homes for the aged sick, the Architect reserves the right to direct the Contractor to implement any noise control measures deemed necessary to reduce the noise disturbances regardless of the noise level generated and compliance with the permissible noise levels in the Regulations. For the avoidance of doubt, the measures could include, but not be limited to erection of temporary noise barriers to shield the affected buildings from excessive noise, switching to use of quieter machinery or adoption of quieter construction methods, installation of air-conditioning systems within the noise sensitive premises, etc. The Contractor shall also be responsible for dismantling all temporary noise control measures and shall make good any affected premises when requested by the occupier of the affected buildings. The Contractor shall obtain written permission from the Architect prior to the dismantling of such measures. The cost of implementation of such measures, including dismantling, shall be borne by the Contractor.

1.55.4 Landscaping Works

1.55.4.1 Preservation of Trees

Where any existing tree(s) on the Site is stipulated to be preserved (hereinafter referred to as "Preserved Trees" for the purpose of this Subclause), take all necessary precautions to avoid damage or injury to such tree(s) and the roots and comply with the following requirements:

(a) Treatment of Preserved Trees in Area of Fill

- (i) Tolerable Depth of Fill:** The area around Preserved Trees shall not be filled more than 300 mm in depth.
- (ii) Construction of Well Around Trees:** Well not exceeding 1 m in depth shall be constructed around Preserved Trees. The minimum diameter of the well shall be 6 times the diameter of Preserved Trees measured at the trunk 0.5 m above ground level. Details of the well shall be as shown in the drawings.
- (iii) Treatment of Preserved Trees in Area of Cut**
- (iv) Tolerable Depth of Cut:** The area around Preserved Trees shall not be cut to a depth exceeding 300 mm.

- (v) **Retention of Raised Planter Around Tree:** An area around Preserved Trees shall be retained as raised planter to conserve the root system. The minimum diameter of raised planter shall be 6 times the diameter of Preserved Trees measured at the trunk 0.5 m above ground level. Details of retention of raised planter are as shown in the drawings.
- (b) **Protection of Existing Trees from Physical Damage**
 - (i) All Preserved Trees shall be protected against damage during construction operation by suitable fencing or armouring. The protection of Preserved Trees shall be placed before commencing any excavation or grading operation/work and shall be maintained in repair for the duration of the Contract Period (including any extension thereof) unless otherwise directed. The extent of fencing shall be determined by the Architect. Fencing shall be erected all round not less than 1.2 m from the trunk of Preserved Trees.
 - (ii) Individual Preserved Trees near heavy construction traffic shall be wrapped with gunny sacks and 50 mm x 100 mm planks worn vertically as armour around the trunk and spaced at no more than 50 mm apart to a height of 1.5 m above ground.
 - (iii) Any damage to Preserved Trees root system shall be repaired immediately by the Contractor under the supervision of a qualified horticulturist. Roots that are exposed and/or damaged during grading operations shall be cut off immediately and the inside of the exposed and/or damaged area cleaned; cut surfaces shall be treated with approved sealing compound and topsoil spread over the exposed root area.
 - (iv) Any damage to Preserved Trees branches shall be treated in accordance with the drawings.
 - (a) **Branch trimming of damaged branches**
 - First cutting: To be made at point A 300 mm from the main trunk of Preserved Trees; depending on the diameter of the branch being cut. Depth of cut shall not be more than $\frac{1}{2}$ of the diameter of the branch.
 - Second cutting: To be made at point B parallel to cutting at point A. The distance between these 2 cuttings shall be 75 mm to 150 mm.
 - Make a shallow cut at C.
 - Final cut to be sharp and clear.
 - Apply coats of anti-fungus wound sealant on cut area.
 - (b) **Wound treatment**
 - Clean away ragged or loose edges of bark with a sharp pruning knife.
 - Shape the wound into an oval, pointed at both ends
 - Coat the entire exposed surface with tree-wound paint.

- (v) If any Preserved Trees are severely damaged by any mechanical equipment, etc., make good such damages and pay for any fines imposed by the Authorities.

(c) Health and Condition of Preserved Trees

- (i) Ensure the following:
 - (a) Compaction of soil around Preserved Trees shall be avoided.
 - (b) No materials shall be stored within the root system.
 - (c) There shall be no spillage of any nature within the spread of the Preserved Trees.
 - (d) There shall be no parking of vehicles underneath the Preserved Trees.
 - (e) There shall be no dumping of excavated materials, concrete, equipment etc., within the spread of the Preserved Trees crown.
 - (f) Soil around Preserved Trees is properly cultivated to ensure that adequate supply of air and water get to the roots.
 - (g) The Site is drained in periods of heavy rainfall and irrigated during periods of drought.
- (ii) Carry out any other routine maintenance of the Preserved Trees, e.g. branch trimming, pesticide spraying, etc. as instructed by the Architect.
- (iii) If the growth of the Preserved Trees is stifled, the Contractor shall inter alia bear the cost of making good and charges imposed by Authorities, in accordance with Clause 6 on "Nuisance and Irregularities".

1.55.4.2 Turfing, Landscaping and Tree Planting

Carry out all turfing and planting works to the satisfaction of the National Parks Board (NParks) and/or the Architect. All works in connection with external landscaping shall be considered accepted, only upon the successful handover to the NParks.

1.55.4.3 Supply and Spreading Approved Soil Mix (ASM)

The Soil Media / Mixture used for general landscape must comply the guidelines specified in the latest edition of "Specification for Soil Mixture for General Landscaping Use", a publication by Centre for Urban Greenery and Ecology (CUGE), National Parks Board.

The component of ASM, generally to be used for landscape beds shall be in the ratio 3:2:1 of loamy soil, compost and washed sand, respectively. The proportions are by volume.

The ASM shall be clear of all lumps of clay, debris, stones, rubbish, hazardous materials, and roots.

1.55.4.4 Maintenance of Grass

Throughout the Maintenance/Defects Liability Period of the Contract, all turfing shall be watered regularly and weeded until it is accepted by the Architect. All weeds shall be pulled out by the roots. Allow for such watering and tending. Any dead turves, badly growing turves or otherwise unsatisfactory turves shall be removed and replaced with approved quality turves by the Contractor at its own expense. All weeds shall be removed at least twice a month.

All cut grass, cuttings together with trimmings, loose stones, rubbish, etc. shall be collected and removed from the Site and disposed of expeditiously to the ENV's approved dumping grounds.

After one month until the end of the Maintenance/Defects Liability Period, the Contractor shall carry out top-dressing with top soil and rolling for any depressions or unevenness of the terrain detected on the ground.

1.55.4.5 Grass Cutting Frequency

Unless otherwise specified, the frequency of grass cutting for established turf area shall be once every 2 weeks, until the end of Maintenance/Defects Liability Period. All cut grass within the road reserves shall be immediately swept and removed.

1.55.4.6 Tree and Shrub Planting

Unless otherwise specified, provide the necessary specified tree saplings and shrubs, plant and maintain them till established. Replace any trees or shrubs that die or are in a poor state of growth or had failed to establish.

All plants proposed and the planting plan must be approved by the Architect.

Any plants replaced within the last 3 months just before the end of the Maintenance/Defects Liability Period, the Contractor shall undertake to maintain the plants for a period of 3 months commencing from the date of the plants replaced.

At the end of Maintenance/Defects Liability Period, the plants must be healthy, lush and undamaged.

At the end of Maintenance/Defects Liability Period, rectify all defects to the satisfaction of the Architect.

1.55.4.7 Watering

Immediately after planting, water the trees and shrubs and continue to do so at least once a day and as and when required until the trees and shrubs are well established and need no further daily watering.

The Contractor is expected to water the plant at any time during the Maintenance/Defects Liability Period whenever it is required and as directed by the Architect, all at the Contractor's expense.

1.55.4.8 Maintenance of Trees and Shrubs

Carry out all necessary maintenance of the planted trees and shrubs. Maintenance shall mean watering and replacement of trees or shrubs that failed to establish, replacement of tree guards and stakes, proper pruning and trimming, weeding and clearing of unnecessary growth such as weeds and "lallang", at least once a month or at any time as directed by the Architect, liming, feeding, forking of soil around the plant base (area of planting hole or bed) spraying with approved pesticide, adding compost to the top 50 mm, etc. all at Contractor's own expenses.

The period of maintenance begins as soon as a tree, shrub or sod of turves is planted up to the end of the Maintenance/Defects Liability Period .

If the Contractor fails to carry out regular maintenance of the turves and trees as stipulated, the Architect shall engage others to carry out the necessary maintenance work. All expenses arising therefrom shall be borne by the Contractor and shall be deducted from any monies due or to become due to the Contractor, including 20% administration charges.

1.55.4.9 Handover

Turfs, trees and shrubs planted in public areas, e.g. within road reserves shall be handed over to NParks. Carry out regular weeding, cut the turf, top dressing, prune the trees and shrubs, etc., and get them ready to a standard acceptable to NParks for inspection and taking over.

Attend all site inspection by NParks and comply with all requirements and comments by NParks including any re-inspections till the turves, trees and shrubs are accepted and taken over by the relevant Authorities all at the Contractors own expenses.

Note that the taking over of the road is dependent on the taking over of turves, trees and shrubs within road reserve. The Contractor shall therefore have to attend expeditiously to all NParkss requirements and comments.

Trees, shrubs and turves in other areas shall be to a standard acceptable to the Architect for handover to relevant Authorities.

Allow for the compliance of the above requirements in its Tender Price.

1.55.4.10 Turfing / Grass Cutting Within Road Reserve

Commence turfing works progressively as the side tables are ready. Proper care shall be taken to ensure that the turf covers the full area in time for the inspection by NParks for taking over, otherwise the close turfing shall have to be provided, all at the Contractors own costs.

Carry out grass cutting once in 2 weeks throughout the Contract Period. Continue to maintain the turf by submitting schedule of maintenance to Architect till successful handover the turf to relevant Authorities or NParks.

The schedule of maintenance includes monthly weeding, fortnightly grass cutting, rolling, top dressing, mulching to trees and shrubs, pest and disease control, and nutrient management regime.

1.55.5 Temporary Site Access Within Site Boundary

Propose and construct a temporary site access within the Site boundary linking the main construction entrance/exit to all building blocks, inclusive of multi-storey carpark building.

Engage a PE to design the access. The drawings and calculations endorsed by the PE shall be submitted to the Architect for approval before the construction of the access. The access shall be of concrete or bituminous pavement or precast concrete plank. It shall be laid over well- compacted hardcore base or other suitable material to the Contractors PE design. The access shall be inspected by the Contractors PE and the certificate of supervision issued prior to use.

The precast concrete plank shall be 175 mm thick with modular size of 1.20 m by 2.20 m. The Contractor can opt for any other size subject to the Architect's approval. It shall be reinforced with welded mesh and the edges shall be protected with angle iron. It can be cast with grade 40 eco-green concrete.

To ensure proper site drainage, properly-graded Type C7 composite channel cut-off drains shall be laid along the perimeter of the construction site. Similar cut-off drains shall be laid along the access and other areas where required. The drainage system shall comply with the requirements specified in Clause 1.55 on "Earth Control Measures" and subclauses under it.

The area between the temporary site access and the building blocks / multi-storey car park shall be laid with well compacted subgrade with lean concrete surface.

The access shall be provided immediately after the completion of the first storey. The provision of access prior to the completion of first storey shall comply with the requirements specified in Clause 5.1.14 "Access for The Use of Mobile Crane and Piling Machines Next to Built-Up Area". The access shall be maintained in good working condition and free from water stagnation at all times throughout the Contract Period (including any extension thereof), or unless otherwise approved by the Architect.

As part of the housekeeping effort, deploy workers to clear the mud deposits/droppings regularly and maintain the access as clean and dry as practically possible. A heavy duty vehicular washing bay shall also be provided at the main entrance/exit point abutting completed public road. All tyres of vehicles shall be thoroughly clean if necessary before leaving the Site.

The area at the main construction entrance/exit shall be laid with concrete surface to improve the maintainability of the site access. Where the access had been excavated for underground services work (e.g., sewer construction, underground piping system draw pit), use steel plate to temporarily cover these excavated areas and the access shall be immediately reinstated to good working condition upon the completion of the underground services work in accordance to PE design.

1.55.6 Temporary Sanitary Facilities

Within 21 days from the date of the Letter of Acceptance, provide temporary sanitary facilities in suitable structures with adequate lighting, on the Site. Such temporary sanitary facilities shall be subject to approval by the Architect. Use the Employer's Standard Drawings as a guide in designing the temporary sanitary facilities. The temporary sanitary facilities shall comprise water closets and shower compartments in the proportion of one closet and one shower to every 25 workmen, throughout the Contract Period (including any extension thereof). In addition, provide separate sanitary facilities with water closet and shower compartment for the exclusive use of the Employer's officers. Prior written approval by the Architect shall be obtained before commencing the erection of these facilities.

The water closets shall be of the type, make and pattern approved by the MEWR and PUB (Water). Provide and lay glazed wall tiles or other approved material to the internal walls of the temporary sanitary facilities up to a height of 1.8 m from the floor. The doors to the cubicles of the temporary sanitary facilities shall be of approved material.

All waste discharge from the water closets and all waste water from the temporary sanitary facilities and from the Site shall be discharged into a public sewer. Arrange with the MEWR to carry out connection work from the temporary sanitary facilities to the public sewer and pay all charges and maintenance in connection therewith. The Contractor shall be responsible for all damages to and shall indemnify the Employer against all liabilities in respect of such sewer connections.

Where a public sewer is not available or where it is not possible to connect to a public sewer, provide and install temporary septic tanks of the type, pattern and capacity approved by the MEWR, to serve the water closets, showers and baths.

Prior to commencing the installation of the temporary septic tanks on the Site, engage a Licensed Plumber who shall submit his/her proposal to the MEWR and Architect for approval. The proposal shall include the manner and frequency of post installation management and maintenance of the septic tanks on the Site. The Contractor and its Licensed Plumber shall be fully responsible for any mismanagement or misuse of the temporary sanitary facilities, which may result in the pollution of the controlled water course.

1.55.7 Removal of Construction Debris from Building Blocks

Before the commencement of Works on site, submit proposal for the daily removal of the construction debris from the building blocks to the Architect for approval.

1.55.8 Pest Control and Surveillance

Engage an approved Pest Control Operator who is registered with the following to provide comprehensive pest control and surveillance work on the Site:

- (a) BCA, under the Work Head for Pest Control
- (b) NEA, under the Control of Vector and Pesticide Act

In this respect, submit the name of the Pest Control Operator and proof of BCA/NEA registration to the Architect for approval prior to carrying out the Works. The Architect may reject the Pest Control Operator selected by the Contractor and the Contractor shall not be entitled to any claims for compensation and extension of time arising from such decisions. Pest Control measures and surveillance programmes shall fully comply with the requirements of NEA as well as the following:

- (a) The Contractor is required to submit a detailed pest control and surveillance programme inclusive of "Source reduction regime/strategy", "Water bearing receptacle removal team" at the Site to the respective NEAs regional office and the Architect prior to commencement of the Works. The frequency of fogging shall be in accordance to NEAs requirement. Fogging shall be carried out only by licensed Pest Operator using approved chemical.
- (b) The Contractor shall maintain a site register containing an up-to-date record of the pest control and surveillance work that has been carried out. The site register shall be made available and ready for inspection by the Architect when required.
- (c) The Contractor shall submit monthly summarised returns of the site records required by NEA to the respective NEAs regional office.
- (d) On the instruction of the Architect, the Contractor shall seal up all sanitary openings in the dwelling units prior to the handover of the completed Works all at the Contractor's cost and expense.

The works required under this subclause shall include all necessary measures to prevent the Site from becoming conducive to the breeding or harbouring of vectors. Carry out site checks at least once a week to detect and remove all breeding and harbouring grounds. If breeding or harbouring of vectors is found at the Site, enforcement action may be taken against the Contractor by NEA. The Architect may also invoke the provisions of Clause 6 "Nuisance and Irregularities".

1.55.9 Air Pollution by Construction Equipment

Take all necessary measures to abate the discharge of smoke, fumes or obnoxious gases from construction equipment and other equipment on the Site. When notified by the Architect that a particular construction equipment or equipment is discharging excessive smoke, fumes or obnoxious gases, stop the use of that construction equipment or equipment, and replace the same with acceptable construction equipment or equipment. No claims from the Contractor for extension of Contract Period or costs and expenses shall be allowed.

1.55.10 Cleaning of Public and Private Roads and Drains

Ensure that all vehicles used by the Contractor, the Contractors agents, or by the Contractors subcontractors or suppliers and their agents (hereinafter referred to as the "Contractor's Vehicles" for the purposes of this subclause) shall not dirty any public or private roads and drains. In this respect, it is the Contractor's responsibility to ensure that all such Contractor's Vehicles are properly cleaned before they move onto these roads.

Check with the Architect if it is in doubt of any road being a public or private road and the decision of the Architect in this respect shall be final and binding and conclusive against the Contractor.

In the event the Site abuts a public or private road and the Contractor's Vehicles use the road for site access, provide a washing bay to wash and clean Contractor's Vehicles before they move onto the public or private road. Should vehicles of the other contractors also use such public or private road for site access, provide, at the Contractors own cost and expense, similar washing and cleaning facilities and services for these other contractors' vehicles before they move onto the public or private road. Provide also at the Contractors own cost and expense, the same facilities and services for similar purposes in the event a road abutting the Site becomes a public or private road and is used for site access by the Contractor's Vehicles or other contractors' vehicles.

1.55.11 Restriction on The Use of Styrofoam in Construction processes

The use of styrofoam in the course of formwork erection or concreting works shall be disallowed, unless specific approval has been given by Architect.

The Contractor shall also ensure that its subcontractors do not use styrofoam in openings and recesses.

1.56 Material Sample Display Room

Within 21 days from taking possession of the Site, a Material Sample Display Room of 3 m X 5 m (i.e. 15 m²) shall be provided at the Site office and situated beside the meeting room. A new air-conditioner and adequate lighting shall be provided to the Material Samples Display Room.

Appropriate and proper display racks/shelves shall be provided. The display room shall be maintained neat and tidy at all times.

1.57 Audit of M&E Systems

Test the M&E systems and rectify all defects before submitting all M&E systems test reports endorsed by the professional engineers and licensed electrical worker (LEW) engaged by the Contractor. The Employer reserves the right to audit any of the M&E systems installed by the Contractor. Provide the necessary manpower, equipment and means of access for the audit by the Employer. Rectify all defects detected during the audit and report to the Consultant for verification.

For buildings under construction, ensure compliance with the requirements of the FSSD (dry/wet rising mains, etc). Make the necessary arrangements to enable the officers from FSSD, Architect, and/or the Employer to carry out any inspection and testing during the construction stage.

1.58 Environmental Management

1.58.1 Environmental Management Programme

- (a) Implement an effective Environmental Management Programme.**
- (b) The Programme shall include monitoring and tracking to minimise:**
 - (i) electricity consumption**
 - (ii) diesel consumption**
 - (iii) water consumption**
 - (iv) concrete wastage.**
- (c) Submit data to the Architect on a monthly basis and present it as a standing item in the monthly meeting.**
- (d) The programme shall also include measures to be taken to raise awareness and promote environment friendly habits amongst site personnel.**

1.58.2 Environment-Friendly Practices

- (a) Implement a system to facilitate the use recycled water obtained through Earth Control Measure for:**
 - (i) wash bay**
 - (ii) dust control**
 - (iii) tremie piles**
 - (iv) washing of site access.**
- (b) Segregate metal and concrete waste from general construction waste for recycling purpose.**
- (c) Provide recycling bins near the site office to facilitate recycling.**
- (d) Use eco-green concrete, subject to Contractors PE approval where necessary, for the base slab of:**
 - (i) site office**
 - (ii) workers quarter**

- (iii) workers toilet
 - (iv) cube room.
- (e) To reduce energy consumption for the Site Office, the contractor is encouraged to carry out the following:
 - (i) Use aircon with green rating.
 - (ii) Use white colour for the roof of the site office.
 - (iii) Use the east and west end for meeting room or toilet as it has lower occupancy.
 - (iv) Reduce the office ceiling height at about 2.4 m to reduce air conditioning and lighting energy consumption.
 - (v) Provide ultra violet film or blinds at site office windows.
 - (vi) Maintain office temperature at more than 24°C.
 - (vii) Provide door closer at doors where space is air conditioned.
 - (viii) Design the site office toilet such that they do not need mechanical ventilation.
 - (ix) Use pedestal pan integrate with wash basin.
 - (x) Use motion sensor for lights and ventilation fan for toilet.
 - (xi) Orientate the site office in the northsouth facing if feasible.
- (f) The Contractor is encouraged to be familiar and closely follow the BCAs Green and Gracious Builders Guide (e.g. use energy efficient air conditioning system complying with Singapore Energy Labelling Scheme, use T5 lights combined with motion sensors to reduce energy consumption).
- (g) The Contractor is also encouraged to:
 - (i) provide more greening on Site to lower ambient temperature during construction period
 - (ii) eliminate environmentally unfriendly products and packaging.

1.59.1 Security

Take all reasonable measures to ensure that Personal Data held in connection with this Contract is protected against loss, and against unauthorised access, use, modification, disclosure or other misuse in accordance with the procedures set out in this Clause and its subclauses, and that only authorised personnel have access to the data.

Do not vary the security procedures set out in this Contract without the prior written approval of the Architect.

1.59.2 Use

Use any Personal Data held in connection with this Contract only for the purposes of fulfilling its obligations under this Contract.

1.59.3 Disclosure

Do not disclose any Personal Data obtained in connection with this Contract without the written approval of the Architect. Immediately notify the Architect when it becomes aware that a disclosure of Personal Data may be required by law.

1.59.4 Transfer of Personal Data Outside Singapore

Do not transfer Personal Data held in connection with this Contract outside Singapore, or allow parties outside Singapore to have access to it, without the prior written approval of the Architect.

1.59.5 Data Protection Requirements and Undertakings

Ensure that any employee of the Contractor or any subcontractor, requiring access to any Personal Data held in connection with this Contract gives an undertaking in writing to not access, use, disclose or retain Personal Data except in performing their duties of employment and is informed that failure to comply with this undertaking may be a criminal offence and may also lead the Contractor to take disciplinary action against the employee.

In respect of any Personal Data held in connection with this Contract, immediately notify the Architect where the Contractor becomes aware of any breach of the obligations contained herein by itself or any subcontractor, or by their respective employees.

In respect of any Personal Data held in connection with this Contract, cooperate with any reasonable requests, directions or guidelines of the Employer, or Employers nominee/agent, arising in connection with the handling of Personal Data.

All the above Clauses shall continue to have effect after the termination or expiry of the Contract.

1.59.6 Subcontracting

Whether or not the Contract contains clauses that prevent subcontracting or assignment without the consent of the Architect, the written approval of the Architect must still be obtained pursuant to the clauses herein, before any Personal Data can be disclosed to any subcontractor or assignee. Ensure that all clauses relating to protection of Personal Data are included in any Contract between the Contractor and subcontractor or assignee.

2 MATERIALS

2.1 Metric Components

All components for incorporation into the Works shall be in metric units. However, when metric components are not available, their equivalent in imperial units may, subject to the approval of the Architect, be used and such a substitution shall not constitute a variation to the Contract.

2.2 Materials and Workmanship

As directed, furnish the Architect with approved documents to prove that materials are as specified. The documents shall include but not be limited to any or all of the following, such that the authenticity of the materials can be easily ascertained:

- (a) shipping documents
- (b) serial numbers
- (c) warranty certificates

In the event that any documents submitted are not original copies, they shall be duly certified by the originating parties. No information within the documents shall be tampered with, unless it is clearly discernible that the items are not related to the materials specified in the Contract. Where specific brand and model number are specified, or where alternative brands and model numbers are offered by the Contractor and accepted by the Architect, it shall be deemed that the finished products are entirely of original make by the registered manufacturer and fully supported by the manufacturer's warranty. In the event that any alteration is made to the goods by a local agent or any other intermediary, obtain the approval of the Architect shall be sought and the result of the alteration shall be fully supported by the manufacturer such that the manufacturer's warranty is maintained.

Samples of materials shall be submitted to the Architect for approval before order is placed with the supplier.

Such approval by the Architect shall not relieve the Contractor of its obligations under the Contract. Ensure that the materials are free from any defects, damage or any other flaws.

2.3 Sample , Mock-up and Quality Standards

2.3.1 Sample, Mock-up and Quality Standard

All samples shall be provided as per the requirements of each technical section of the Specification.

The cost and expense for inspection, testing and approval of sample and mock-up (as instructed by the Architect), shall be provided by the Contractor. These samples and/or mock-ups shall be truly representative of the actual works to be constructed in every respect, inclusive of all architectural details, architectural and structural features, finishes, services, fittings, etc.

Comply with the quality standards specified under each Section for setting up of sample and/or mock-up. Read the Specification, drawings or details in conjunction with the quality standards specified under each Section. In case of discrepancies between the Specification, drawings or details and the quality standards specified under each Section, obtain approval from the Architect before proceeding with the Works.

Use the approved sample and/or mock-up as reference for the standard and quality of workmanship and materials that are acceptable to the Architect. Ensure that the completed Works (including works that are not listed in the quality standards specified under this clause) are at least of the same standard and quality as that in the samples.

Maintain the sample and/or mock-up in a clean, neat and tidy condition at all times. Adequate artificial lightings shall be provided where possible and as directed by Architect, all at the Contractors cost and expense.

Notwithstanding the approval of the Architect in respect of these sample and/or mock-up units, the Contractor shall not be released from any of the duties and obligations as required of the Contractor under the Contract.

These samples shall be appropriately displayed at the designated area within the Material Sample Display Room upon approval of the said sample by the Architect.

The Architect reserves the right to instruct the Contractor to provide and display the sample for other building materials and components, especially newly introduced items, big ticket items and special items, under the Contract where deemed necessary and fit all at the Contractor's cost and expense. The approved material samples shall be provided and displayed before construction, erection or installation. All approved materials shall be labelled with the supplier's name and materials' type/grade/model.

2.4 Storage Facility for Cement

Where storage of cement is required, provide adequate storage facilities at the Site to accommodate cement up to 2 weeks' requirement for the Works.

The store to accommodate the cement shall be constructed so that each consignment of cement can be separately stacked. Each consignment of cement shall also be used in the same sequence as they are delivered, that is, on a "first-in first-out" basis.

Ensure that the cement stored at the Site is kept dry and properly protected against loss or damage at all times.

2.5 Precautions Against Materials Being Taken Out Of Site

The Contractor shall be responsible for the safe custody of cement and all other materials delivered to the Site and shall therefore ensure adequate protection and prevention of such materials from being taken out of the Site. The Architect will not accept any excuse for materials taken out of the Site by the Contractor, the Contractors foreman or any other individual even without the knowledge of the Contractor who is deemed to have provided for proper control against such malpractice. If it is established that cement or any other material is taken out of the construction Site without specific written approval from the Architect, this shall be deemed to be an irregularity, with penalties to be imposed by the Architect.

2.6 Ready-Mixed Concrete from Approved Suppliers

Obtain ready-mixed concrete from any of the pre-approved suppliers and provide the names and addresses of the ready-mixed concrete suppliers to the Architect. The use of ready-mixed concrete shall be subject to the terms and conditions set by the Architect. All delivery orders for ready-mixed concrete delivered to the Site shall be endorsed by the Employer's Resident Site Staff and submitted to the Architect.

Failure to inform the Architect or non-compliance with the terms and conditions set by the Architect for the use of ready-mixed concrete shall, inter alia, result in the Contractor forfeiting its right under the Contract to claim compensation for price fluctuations for all materials.

2.7 Provision of Spare Materials

Provide all spare materials as specified under each Section.

3 LABOUR

3.1 Labour Laws

Pay workmen (Contractors workmen) promptly, and observe the workmen's working hours and holidays in accordance with current laws and regulations. Keep records and produce them for inspection by the Architect.

3.2 Keeping Records of Workmen

Comply with all labour laws regarding the engagement of non-citizen workmen. Obtain work permits from MOM for these workmen. The Contractor shall be held solely liable for and shall indemnify the Employer in respect of all actions against the Employer for employing foreign workmen without permits.

Keep proper records of all workmen engaged on Site. These records shall include the following information:

- (a) Name of Workmen (and alias if any)
- (b) Identity Card No./Passport No.

- (c) Address
- (d) Work Permit No., if any
- (e) Expiry date of work permit

This information shall be recorded before any workman is allowed to commence duty. Appropriate action shall be taken by the Architect if the Contractor fails to record any of the abovementioned information of any worker found at the Site.

3.3 Employment of Illegal Immigrants (Prohibition)

For the purpose of this Subclause, an "illegal immigrant" shall refer to any person who enters the Republic of Singapore in contravention of the provisions of the Immigration Act or any statutory modification or re-enactment thereof.

The Contractor shall ascertain the legitimacy of all foreign workers employed by itself and/or any subcontractor prior to employment and throughout the Contract Period (including any extension thereof). Clarification as to the legitimacy of Foreign Workers may be made with the Immigration Authority, the Ministry of Manpower and/or the Police.

The Contractor and/or its subcontractors shall not employ any illegal immigrants in the execution of the Works. The Employer shall not be responsible for any such act or acts by the Contractor and/or any of its subcontractors and the Contractor shall indemnify the Employer for all consequences arising thereof.

3.4 Biometric Time Attendance System for Manpower Data Collection

Propose, supply, deliver, install and set up a biometric time attendance system, including testing and commissioning, and subsequent maintenance of a biometric time attendance system for personnel entering or leaving the worksite throughout the Contract Period. Propose the mode of authentication (fingerprint, facial recognition, etc.).

The system shall be located at all worksite entrances and exits for the purpose of electronically monitoring and tracking the manpower usage throughout the Contract Period. Install a CCTV at locations with the biometric time attendance system. The system shall be installed and functional upon completion of the perimeter hoarding and site entrance.

Submit a detailed proposal to the Architect for approval within 14 days from the date of the Letter of Acceptance. The proposal shall include, but not be limited to, the following details:

- (a) Type of system to be implemented
- (b) Track record of proposed system in similar projects and environment in Singapore
- (c) Proposed location(s) of the system at Site
- (d) Type of access barrier (e.g. tripod turnstile, flap barrier, swing barrier etc.)
- (e) Installation method
- (f) Maintenance plan

The system shall be able to accurately monitor and track the manpower under their respective trade.

At each controlled access location, the system shall be able to achieve a maximum clearance time of 1 minute for every 10 persons.

The system shall be able to generate the manpower report according to BCAs current Electronic Productivity Submission System (ePSS) in Microsoft Excel format (Refer to <https://www.bca.gov.sg/epss/>). Refer to BCAs website for the latest requirements on manpower submission to ePSS.

The system shall be able to generate raw data or output in the required format which shall include but not limited to, the following details:

- (a) Employee name
- (b) Date
- (c) Clock in time
- (d) Clock out time
- (e) Total number of working hours at site
- (f) Classification of workers (e.g. tiler, painter)
- (g) Personal identification number (i.e. NRIC/ FIN/ WP no.)
- (h) CoreTrade Registration ID

The system shall be able to generate trend charts to show the total manpower used in man-days under the respective trade over time.

There shall be a real time monitoring and recording device installed at each controlled access point to prevent any fraudulent attempt by the site personnel.

The system shall be equipped with suitable measure(s) (e.g., backup battery supply etc.) such that the integrity of the manpower monitoring data is not affected during power outage. Ensure that the system is protected against unauthorised editing of collected manpower tracking data, virus or malicious software which may otherwise corrupt the system.

In the event of system breakdown, ensure that there are alternative mean(s) to continue to monitor and track the manpower under the respective trades. The Contractor shall bear all costs and expenses in carrying out the necessary repairs and/or replacements to the equipment installed to resume system operation.

Submit the manpower tracking data in the Contract to BCA through the ePSS at monthly intervals or at other frequencies as required by BCA. A copy of the submitted manpower report shall also be given to the Architect.

Extend usage of the system to the Employer and Consultants. The list of personnel required to use the system shall be as agreed with the Architect.

The system shall be able to generate raw data or output which shall include but not limited to, the following details:

- (a) Employee Name
- (b) Company
- (c) Designation
- (d) Date
- (e) Clock-in Time
- (f) Clock-out Time
- (g) RE and RTO registration number

Access rights control shall be given to the personnel as summarised in the table below:

Access Rights	Attendance Record		
	Contractor	Consultant	Employer
Employer	Yes	Yes	Yes
Consultants	Yes	Yes	No
Contractors	Yes	No	No

At the end of every month, the Consultant Project Manager shall generate the manpower data and submit to the Employer.

3.5 Allocation of Man-Year Entitlements

Where materials, goods or products for the Works in the Contract are to be purchased and/or obtained by the Contractor, allocate Man-Year Entitlements to such suppliers and/or subcontractors engaged (by the Contractor) for the supply of such materials, goods or products.

The Contractor shall be deemed to have included in the Contract Sum for all costs and expenses arising from having complied with the requirements stipulated in this subclause.

3.6 Employment of Skilled Workers

Employ workers that are capable of producing good workmanship for all key trades as agreed with the Architect. These workers shall possess Skill Evaluation Certificate from local institutions where available. Submit a list of the workers to the Architect for pre-screening and approval before they are allowed to commence work. These workers are also required to wear identification pass upon approval by the Architect. The pass shall be easily distinguishable from other passes used at the Site, by their colour, size or pattern.

4 CONSTRUCTION EQUIPMENT

Provide information on the construction equipment to be deployed to the Site within 3 months from the date of the Letter of Acceptance to the Architect for approval. Notwithstanding the submission for Architect's approval, when deemed necessary, the Architect may instruct the Contractor to deploy additional equipment to the Site. No claim by the Contractor for additional payment/s will be allowed for these additional pieces of equipment. Similarly, no claim by the Contractor for additional payment will be allowed for additional equipment brought to Site by the Contractor on its accord.

All construction equipment used at the Site as specified herein shall be obtained from reliable source, subjected to the Consultants approval.

Where such construction equipment is used at the Site for a duration of less than a week, the Architect may at his sole discretion, waive the aforementioned requirement. Under such a case, there shall be no adjustment to the Contract Sum.

4.1 Maintenance

Keep all construction equipment provided to the Site in good working order at all times and comply with all statutory regulations in relation to the construction equipment.

4.1.1 Mobile Crane

Before operating a mobile crane on the Site, submit the following:

- (a) Record of latest overhaul servicing of the crane. The latest overhaul servicing of the crane shall be conducted within 1 year before transferring it to the Site.
- (b) Record of checking the connecting devices between parts/components and the condition of parts/components by an AE. Any defect found when checking shall be rectified immediately; and

- (c) Certificate of test/thorough visual examination of lifting equipment by the AE.

Maintain the crane in good working order at all times on the Site. Document and keep all records and certificates of checking and testing in the site office for inspection by the Architect upon request. Attend to the following:

- (d) Engage a licensed crane operator to check the crane daily before operation.
The licensed crane operator shall have a Certificate of Competence.
- (e) Engage a competent mechanic to conduct servicing of the crane once in every 3 months.
- (f) Engage the AE to carry out test and visual examination on the crane once in every 6 months.

4.1.2 Tower Crane

Before operating a tower crane on the Site, submit the following:

- (a) Record of latest overhaul servicing of the crane. The latest overhaul servicing of the crane shall be conducted within 1 year before transferring it to the Site.
- (b) Record of checking the connecting devices between parts/components and the condition of parts/components by an AE. Any defect found in the checking shall be rectified immediately.
- (c) Record of checking the installation and functioning of safety devices by the AE; and
- (d) Certificate of test/thorough visual examination of lifting equipment by the AE.

Maintain the crane in good working order at all times on the Site. Document and keep all records and certificates of checking and testing in the site office for inspection by the Architect upon request. Attend to the following:

- (e) Engage a licensed crane operator to check the crane daily before operation.
The licensed crane operator shall have a Certificate of Competence;
- (f) Engage a competent mechanic to conduct servicing of the crane once in every 3 months;
- (g) Engage the AE to check the installation and functioning of the safety devices once in every 6 months; and
- (h) Engage the AE to carry out test and visual examination on the crane once in every 6 months.

For every extension of height made on the tower mast and before operating the crane with the new height, engage the AE to conduct test and thorough visual examination on the crane.

4.1.3 Passenger Cum Material Hoist

Before operating a passenger cum material hoist on the Site, submit the following:

- (a) Record of latest overhaul servicing of the hoist. The latest overhaul servicing of the hoist shall be conducted within 6 months before transferring it to the Site.
- (b) Record of checking the connecting devices between parts/components and the conditions of parts/components by an AE. Any defect found in the checking shall be rectified immediately.
- (c) Certificate of test/thorough visual examination of lifting equipment by the AE.

Maintain the hoist in good working order at all times on the Site. Document and keep all records and certificates of checking and testing in the site office for inspection by the Architect upon request. Attend to the following:

- (d) Require an authorised hoist operator to check and operate the hoist daily before operation.
- (e) Engage a competent mechanic to conduct servicing of the hoist once in every 3 months.
- (f) Engage the AE to check the connecting devices between parts/components and condition of parts/components once in every 3 months. Any defect found in the checkings shall be rectified immediately.
- (g) Engage the AE to carry out test and visual examination on the hoist once in every 3 months.
- (h) The swing gates are to be maintained, checked and certified to be in good working condition by the AE every month.
- (i) Interlocking gates shall be provided at every lift landing level and they shall comply with the Workplace Safety and Health Act and its Subsidiary Legislation including any amendment or re-enactment thereto.

4.2 Provision and Deployment of Equipment to Improve Site Productivity

4.2.1 Construction Machinery and Equipment to be Deployed at the Site

The Contractor shall provide and deploy suitable construction machinery and equipment to improve site productivity. The Contractor shall submit the Machinery Utilization Plan within 3 months from the date of the Letter of Acceptance to the Architect for approval. The Contractor shall provide for a minimum of one number of ride-on power trowel, one boom lift, one scissors lift and one telescopic handler.

Notwithstanding the foregoing requirements, the Contractor shall provide an Automatic Wheel Washer per site entrance and a Mast Work Platform per building block.

(a) Ride-on Power Trowel

The power trowel shall be used for power floating of finished concrete to achieve a smooth finish in accordance to the Drawings and Specification. The requirement for provision of the power trowel may be waived at the discretion of the Architect if the Contract does not require power floating of finished concrete.

(b) Boom Lift and Scissors Lifts

The boom lift and scissors lift shall be used for any work that is needed to be carried out at soft storey, void deck space and external façade. The boom lift and scissors lift shall also be used for rectification works from the second storey to sixth storey for the building during the handing over stage.

(c) Telescopic Handler

The telescopic handler shall be provided on Site not later than the completion of concreting work for the sixth storey slab of the first building block or any other time as instructed by the Architect and shall not be removed without his prior approval.

(d) Mast Work Platform

The mast work platform shall be used for any external façade works (skimming and painting) for each building block in preparation for handing over. The requirement for provision of the mast work platform may be waived at the discretion of the Architect if the layout of the building block does not allow for erection of mast work platform.

(e) Automatic Wheel Washer

The automatic wheel washer shall be used to replace the manual manpower needed at the site entrance to wash and clean the wheels of the vehicles leaving the Site. The Wheel washer shall be provided onsite upon completion of substructure works or at any time instructed by the Architect and shall not be removed without his prior approval.

(f) Wireless Cleaning Machine

The wireless cleaning machine is a multi-function auto scrubber which delivers effective and efficient floor cleaning performance. It is able to wash and dry hard floors in a single pass, saving labour as compared to the 2-man rotary scrubber and vacuum cleaner method. The wireless cleaning machine shall be provided on site at block handover stage or at any time instructed by the Architect and shall not be removed without the Architect's prior approval.

(g) Electric Sanding Machine

The electric sanding machine is an equipment used to smoothen the wall and ceiling surface. It shall replace the manual sanding method by using sandpaper to smoothen the wall and ceiling surface. The electric sanding machine shall be provided on Site upon completion of superstructure works or at any time instructed by the Architect and shall not be removed without the Architect's prior approval.

5 SITE SAFETY

5.1 Site Safety Measures

5.1.1 General Requirement

The Contractor shall allow for the compliance with the Workplace Safety and Health Act and its Subsidiary Legislation including the provisions of the Workplace Safety and Health (Construction) Regulations and any amendment or re-enactment thereto. The subsidiary legislations are:

- (a) The Workplace Safety and Health (General Provisions) Regulations
- (b) The Workplace Safety and Health (Registration of Factories) Regulations
- (c) The Workplace Safety and Health (First-Aid) Regulations
- (d) The Workplace Safety and Health (Exemption) Order
- (e) The Workplace Safety and Health (Composition of Offences) Regulations
- (f) The Workplace Safety and Health (Incident Reporting) Regulations
- (g) The Workplace Safety and Health (Risk Management) Regulations
- (h) The Workplace Safety and Health (Workplace Safety and Health Officers) Regulations
- (i) The Workplace Safety and Health (Work at Height) Regulations
- (j) The Workplace Safety and Health (Design for Safety) Regulations

Precedent to the commencement of the Works, first obtain a Certificate of Registration, under the Act and its subsidiary legislation, The Workplace Safety And Health (Registration Of Factories) Regulations.

It shall be the duty of the Contractor to comply with all such requirements of the Act and its Subsidiary Legislation, as affect the Contractor or any person or persons in its employ, and as related to any work, act or operation performed or about to be performed by the Contractor. Do not permit any person to do anything not in accordance with the generally accepted principles of safe and sound practice.

Ensure a safe environment on the Site at all times. All safety provisions shall be properly maintained and shall not be removed without the written approval of the SO. Ensure that necessary and sufficient precautions are taken by the Contractors workmen when safety provisions are used. Do not allow any of the safety provisions to be used unless it has deemed the provision safe. Submit a safety management system to the Architect within 14 days from the date of the Letter of Acceptance for approval prior to the commencement of the Works.

The submission of the safety management system shall comply with and be kept in the site office and made available for reference at all times.

Display safety posters at the site office, exit/entry points of buildings and passenger cum material hoist area.

Submit drawings, detailings and calculation for all temporary structures as required, certified by its PE, for approval at least one week before the commencement of the Works unless otherwise specified. The approval of the Architect shall not relieve the Contractor and its PE of the need to ensure the adequacy and sufficiency of the safety provisions.

The Contractor is deemed to have allowed in the Contract Sum for all cost and expense for the safety provisions and for all additional costs that may arise from amendments to the Act and its Subsidiary Legislation or changes in the requirements of MOM.

Ensure that the requirements of the Regulations and the requirements specified hereunder are strictly complied with at all times.

5.1.2 Metal Access Scaffold and Working Platforms

Provide, erect and maintain all metal access scaffold for all buildings other than buildings of 4 storeys and above or 12 m in height and above. This requirement may be waived, subject to approval by the Architect, where industrialised and semi-industrialised methods of construction together with peripheral safety nets are employed. Under such case, there shall be no adjustment to the Contract Sum. Allow free use of the scaffold by all subcontractors, specialists, artisans and other tradesmen employed by the Employer or the Contractor.

The metal access scaffold shall be of the type approved by the MOM. It shall comply with CP 14 and any amendment or re-enactment thereto. The metal access scaffold shall be pre-zinc galvanised or other scaffold approved by the Architect.

The metal access scaffold shall be erected, or substantially extended to, or dismantled, by approved scaffold contractor, in accordance with the Factories (Scaffolds) Regulations. The metal access scaffold and any components therein shall be designed according to the CP14 and Workplace Safety and Health (Scaffolds) Regulations by a PE employed by the Contractor. The metal access scaffold shall be removed only with the permission of the Architect. Submit the PE's drawings and calculations to the Architect for approval prior to the erection and dismantling. The PE shall be satisfied that his proposal shall not duly overload the RC structure. Make the submission before the commencement of the Works.

Erect the metal access scaffold, for access and finishing work ahead of the structural work. The metal access scaffold shall be supported by cantilevered platforms erected in accordance with the drawings of the PE. The cantilevered platforms shall project about 1.1 m from the edge of the building or any other distance approved by the Architect.

The material used for the metal working platform shall be pre-zinc galvanised steel and in compliance with SS 280. The working platform shall be adequately secured to the metal access scaffold frame at the required levels. The connections between the metal working platform and metal access scaffold frame, and between the working platforms shall be subjected to the approval of the Architect. For any portion of the working platform where the use of metal is not suitable, timber working platform may be used, subject to the approval of the Architect. The working platform shall be complete with at least 90 mm high coloured toeboards and metal guardrails of at least 1.1 m above the platform. The vertical distance between any 2 adjacent guardrails shall not exceed 600 mm. Any working platform or workplace and the guardrail immediately above it shall not exceed 600 mm. The working platform shall be at least 500 mm in width and distance between the edge of the platform shall not exceed 300 mm from building edge

Provide, erect and maintain an overlying screening net to cover the entire external face of the scaffold. The installation of the net shall follow the erection of the fence closely. A 90 mm high toeboard shall be provided at the base of the net. After installation, there shall be no opening between separate sets of the net and any torn net shall be replaced or repaired immediately. The net shall comply with the following requirements:

- (a) Maximum mesh size: 15mm square
- (b) Twine No.: Minimum 350D
- (c) Knot type: Single or English knot
- (d) Minimum 12 ply

The overlying screening net shall be installed on the entire external face of the access scaffold and its installation shall follow the erection of the metal access scaffold closely. The Architect shall have the right to decide on the colour of the net all at the Contractors cost and expense.

The metal access scaffold shall be effectively tied to the building structure by means of tie-backs. All tie-backs shall be painted with a bright colour for easy identification.

5.1.3 Prefabricated Mesh Barricade

Provide, erect and maintain a vertical prefabricated mesh barricade (hereafter referred to as "mesh barricade" for the purpose of this Clause, including all subclauses under it) for all peripheral open sides of construction level of building (excluding multi-storey carpark/garage) where a person is liable to fall from height. Mesh barricade shall be of sound construction and produced in the factory and installed at the construction level from the inside of the building. Mesh barricade and its support shall be prezinc galvanised or other approved equivalent by the Architect, easily installed and dismantled, and reusable throughout the construction (super-structure) stage. External works of the building, such as painting, touching up works, repair and redecoration, and other minor works, shall be carried out using mechanical suspended scaffold or other vertical access equipment.

Where the use of mesh barricade is not feasible, as interpreted by Architect, during the construction (super-structure) stage, the Contractor can counter-propose localised alternative system other than the use of metal access scaffold

Mesh barricade / counter-proposals for localised alternative system, its vertical support and any components therein shall be in modular sizes and designed according to the WSH (Construction) Regulations by a PE employed by the Contractor. The PE's drawings and calculation shall then be submitted to the Architect for approval within 6 weeks from the Letter of Acceptance, before installation and use. Trial setting out of the mesh barricade shall be carried out on Site 2 weeks after approval of submission.

The mesh barricade shall be erected ahead of the structural work (including the construction of water tank rooms) from the second storey and held by a supporting system designed by the said PE. The height of the mesh barricade shall be at least 1.1 m above the construction level. Together with the PE, ensure that the substrate to which the mesh barricade is affixed to, can resist the designed imposed loads. The PE shall satisfy himself that his proposal shall not duly overload the RC structure.

Where necessary, provide, erect and maintain an overlying screening net to cover the entire internal face of the mesh barricade. The installation of the net shall follow the erection of the fence closely. Where necessary, a 90 mm high toeboard shall be provided at the base of the net from the inside of the mesh barricade. After installation, there shall be no opening between separate sets of the net and any torn net shall be replaced or repaired immediately. The net shall comply with the following requirements:

- (a) Maximum mesh size (square): 15 mm square
- (b) Twine No.: Minimum 350D
- (c) Knot Type: Single or English knot
- (d) Minimum 12 ply

The vertical supports of mesh barricade shall be effectively anchored to the building structure. All vertical supports shall be painted with a bright colour for easy identification. The mesh barricade shall be erected according to a pre-determined safe work procedure established by the Contractor, or substantially dismantled, by trained erectors, under the immediate supervision of a competent supervisor. The mesh barricade and its components shall only be erected and dismantled by workers using life-line and safety belts or other equivalent, if not better, means of preventing a fall.

Do not use the prefabricated mesh barricade and vertical supports for other purposes.

5.1.4 Personal Protective Equipment (PPE)

Provide and maintain suitable personal protective equipment to all workmen employed at the Site. Ensure that such personal protective equipment comply with the requirements of the Regulations. Ensure that all equipment are properly used by (the Contractors) workmen during the course of their work. The Contractor shall record the issuance of all equipment to the workmen.

The forms shall be kept in the site office and made available for inspection at all times. The colour code of safety helmets provided by the Contractor shall comply with the requirements of the Regulations. Three mirrors of sizes 600 mm x 1500 mm are to be installed for the workers to check their personal protective equipment during Tool Box Meetings. The locations of these mirrors shall be approved by the Architect.

Provide life-lines and safety harness for workers who are required to carry out work within 2 m from any open sides at or near the external of the building blocks, any floor or topmost construction level, lift shafts and void areas or any other locations as directed by the Architect, all at the Contractor's cost and expense.

Approved Personal Protective Equipment (PPE) station shall be set up near the site entrance where PPE is issued/stored.

5.1.5 Safety (Anti-Fall) Net

Provide and maintain a safety net system to catch person(s) falling whilst working in any location from where he/they would be liable to fall.

The safety net system shall be obtained from suppliers approved by the Architect. An alternative system may be proposed to be certified by its PE, and submitted to the Architect for approval.

The safety net shall comply with SS 292 or other approved standards. The net shall be of sufficient size and strength to catch any person for whose protection it is to be used and the net shall be so located to cover the area of the possible fall.

Conduct a sample test on the safety net system, comprising the net and its supporting structures, before it is installed. Subsequent tests shall be carried out when directed by the Architect.

For all building blocks of 4 storeys and above, a peripheral safety net system shall be provided. Initially the net shall be installed at the second storey. As construction progresses, reposition the net to follow the topmost working level but keep at not more than 6.0 m below it. Remove the net only with the approval of the Architect.

Where access scaffolding is used, or any alternative safety measure approved by the Architect is used, a peripheral safety net system is not required.

The colour of the safety netting shall be approved by the Architect. Safety netting of orange colour shall not be used unless such colour is specifically decided by the Architect, all at the Contractor's cost and expense.

5.1.6 Working Platforms for Lift Shafts, Central Refuse Chute and Voids

Provide working platforms, according to the design of the Contractors PE, for the erection of lift shafts and void walls except for central refuse chute. The lift shaft and central refuse chute platforms shall effectively cover the voids at alternate storeys.

The lift shaft, central refuse chute and void wall platforms shall be left in place until approval is given by the Architect to remove them.

5.1.7 Protective Shelter as Overhead Shelter

Provide, erect and maintain protective shelter as overhead shelter at every point of entry/exit to buildings of 2 more storeys height. The protective shelter shall be constructed immediately below the second storey. It shall protrude at least 3.0 m from the building edge. It shall have a clear width of at least 1.5 m and a clear height of at least 2.0 m as shown in the drawings. If the protective shelter is intended for access by forklift, it shall have a clear width of at least 2.0 m and a clear height of at least 3.0 m.

Ensure that the protective shelter rest on a rigid base. The protective shelter shall be aesthetically pleasing, free of rust and does not trap water. The access to, along and egress from the entry/exit points shall be kept free from obstructions and accumulation of oil, grease, water and other substances that may cause slipping and tripping.

The protective shelter shall be strong enough to support a point load of at least 75 kg. It shall be endorsed in accordance with the relevant statutory requirements by a PE. The PEs drawings, detailing and calculations shall be submitted for the approval of the Architect.

The protective shelter may be made of curved metal roofing with a diameter of at least 1.5m or pitched metal roofing with a slope of greater than one in 2, with timber boarding below supported by steel pipes.

5.1.8 Peripheral Overhead Shelters

Provide peripheral overhead shelters for buildings of more than 15 m in height. They shall be erected in place when the construction reaches the fourth storey slab. The overhead shelter shall be at least 2 m wide and erected at a height not more than 5 m from the base of the building, and inclined so that the outer edge is at least 150 mm higher than the inner edge. The overhead shelter shall be sufficiently strong to support a weight of at least 75-kg point load.

5.1.9 Barricades to Lift Openings, Voids, The Open Sides of Buildings and Excavations

Barricade all lift openings, internal voids and the open sides of buildings and excavations where a person is liable to fall. The barricade shall be at least 1.1 m high with 90 mm high toeboard and shall have sufficient strength and rigidity to withstand a lateral point load of 50 kg. All services openings shall be fully covered and secured to prevent unauthorised removal.

5.1.10 Mechanical Suspended Scaffold

Mechanical suspended scaffold system shall only be used for touching up, repair and redecoration and minor work. Where mechanical suspended scaffold system is to be used, first obtain a Certificate of Registration under the Workplace Safety and Health Act from MOM and a written approval from the Architect prior to its installation and usage. The mechanical suspended scaffold system shall comply with the requirements of the SS 598 and any amendment or re- enactment thereto. Where the use of access scaffolding is not stipulated, suspended scaffold may be used for finishing works. Provide life-lines for the mechanical suspended scaffold users to anchor their safety belts.

5.1.11 Authorised Operators for Machinery and Vehicles

Employ only qualified operators for its site machinery. The operator for the machinery shall possess a Skill Evaluation Certificate (SEC) from the BCA Academy or other approved training centre. For the machinery whereby BCA Academy or other approved training centre does not conduct courses or practical tests for machinery operator, only authorise an experienced and trained operator who has at least a minimum of 2 years experience in operating the machinery.

In the case of vehicles, which are operated within the Contract boundary, the authorised operator shall possess a minimum valid Class 3 driving licence from the Registrar of Vehicles (Singapore) or its equivalent. The equivalent of a minimum Class 3 driving licence shall first be verified by the respective embassy in Singapore and thereafter submitted to the Architect for approval.

Record the particulars of the operators for the machinery and vehicles in the prescribed form and submit to the Architect for approval 1 week before the commencement of the Works. The prescribed form shall be updated and kept on the Site and made available for inspection at all times.

5.1.12 Safety Training

5.1.12.1 Safety Orientation Course

Employ workmen who possess valid Safety Orientation Course Certificates. The Contractor shall be required to ensure that its workmen attend a prescribed safety refresher course at an interval of time decided by the Architect.

5.1.12.1 Safety Training Course

When directed by the Architect, send employees/staff in the Contractors employ to MOMs accredited training providers for the appropriate safety trainings. The safety training shall be applicable to all levels of employees/staff stipulated in this subclause including top management at the site.

Give particular attention to the needs of young employees/staff. Further training shall be required where:

- (a) Employees/staff are transferred or where employees/staff take on new responsibilities or where a change in the work activity or work environment could arise; and
- (b) There is a change in the work equipment or systems of work in use.

Training shall be repeated periodically to ensure continued competence.

5.1.13 Tower Cranes and Other Tall Construction Equipment

Comply with all height restrictions on the use of tower crane or other tall construction equipment, imposed by the Civil Aviation Authority of Singapore and Ministry of Defence. In addition, the height clearance of tower crane or other tall construction equipment shall be submitted to the Architect for approval before they are brought to the Site. Force limiting device, speed limiters and moment limit switches shall be installed for all cranes.

Submit detailed layout drawings and safety requirement of the tower cranes to MOM and the Architect for approval at least one month prior to their installation. The Safety Factor for tower crane shall have a minimum of 1.3, which includes the built-in factor of safety for the tower crane. The lifting load shall include the weight of the component, the spreader beam and the lifting device. The tip-load shall have the capacity to hoist the heaviest component including the necessary lifting appliances. The slewing radii of the tower cranes shall not overlap, unless the tower cranes are equipped with an anti-collision system. It is not permitted to be hoisted over temporary building structures, outside the contract boundary and other sensitive areas. The slewing limit switch shall be activated to stop the slewing action before the jib slews into the overlap zone.

The jib of a tower crane shall not be allowed to slew outside the Contract boundary lines without the written approval of the Architect. The free-standing mast of the tower crane must be certified by the Contractor's PE prior to its use on the Site.

Submit detailed drawings and calculations of the type of foundation support and the tie-back for the tower crane, duly endorsed by its PE, together with technical information to the Architect for approval. The Contractor's PE shall certify that the free-standing height of the mast is structurally adequate and sound before the tie-back is installed. No tower crane shall be installed and supported on the constructed RC structure of a building.

5.1.14 Access for The Use of Mobile Crane and Piling Machines Next to Built-Up Area

Where the Contractor uses mobile cranes and piling machines on the Site which is next to existing buildings or public roads or MRT lines, the access for the mobile cranes and piling machines shall be of steel plates or reinforced concrete or bituminous pavement as approved by the Architect. All such access shall be provided over adequate compacted hardcore base.

Provide full access for the movement of the cranes and piling machines and for their lifting or pile driving operations. The access shall be able to distribute the load so as not to exceed the bearing capacity of the underlying materials.

Engage a PE to design the access. The drawings and calculations endorsed by the PE shall be submitted for approval by the Architect before the construction of the access. The access shall be constructed according to the approved drawings and maintained in a good condition at all times throughout the Contract Period (including any extension thereof). The access shall be inspected by the Contractor's PE prior to its use.

5.1.15 Warning Signs and Lights

Display warning signs of size 900 mm x 600 mm at strategic points around the periphery of the Site where trespassing is likely to occur. Such signs shall have the words "DANGER KEEP OUT" in the 4 official languages in red on white background with reflective material and approved by the Architect. Warning lights shall be placed at similar positions at night to serve as a warning.

If work is carried out near public roads, all signage shall comply with the recommendations of the Temporary Road Signage Manual issued by the LTA.

5.1.16 Mobile Crane

Submit layout and details of the crane access to the Architect for approval prior to the use of the crane on the access. Ensure and check that the crane access is properly constructed. Keep all records of inspections of the crane access at the Site and produce them for examination when requested by the Architect. The boom of the mobile crane with hoisted load shall not be allowed to swing outside the contract boundary without the written approval of the Architect. All hoisting areas must be effectively barricaded.

Ensure the installation of barriers to warn the crane operator of depressions, excavated areas and other obstructions.

Moment limiters shall be installed for all cranes. The safety factor for mobile crane shall have a minimum of 1.3, which includes the built-in factor of safety for the mobile crane. The lifting load shall include the weight of the component, the spreader beam and the lifting device. The tip-load shall have the capacity to hoist the heaviest component including all necessary lifting appliances. A Permit-To-Hoist must be obtained before any hoisting operation is carried out. Station a lifting supervisor on the Site to oversee and guide the crane operator during positioning, hoisting and slewing. The cranes shall be tested by an AE before its use on the Site irrespective of any valid test certificate. Ensure daily checks are carried out by the crane operator and maintenance checks conducted once every 3 months. The crane must have overhaul checks before it is used on the Site. Test certificate, overhaul certificates, maintenance certificates, inspection records by the crane operator, data on the AE and the Contractor's site engineer shall be properly documented, kept on the Site and produced for inspection by the Architect.

5.1.17 Crane Operator, Lifting Supervisor, Rigger and Signaller

Comply with the Workplace Safety and Health (Operation of Cranes) Regulations 2011. Appoint at least one full-time lifting supervisor to supervise all lifting operations of any crane for the Site. However, where more than one crane is used on the Site, the number of lifting supervisors employed by the Contractor shall be increased as required by the Architect. No lifting activity shall be allowed without the supervision of the lifting supervisor.

The lifting supervisor shall have a minimum of 3 years experience in construction work and lifting operations. He must be a site foreman or site engineer and possesses a certificate on Safety Instruction Course for Lifting Supervisor. He shall spend his time fully on all lifting activities and ensure that unsafe conditions are rectified.

For lifting operations within the Site not next to existing buildings, public roads or MRT lines, the crane operators shall have a minimum of 2 years experience in the operation of cranes.

The Contractor can employ crane operators with less than 2 years experience for lifting operations on site but subject to the following conditions and approval by the Architect:

- (a) The site must be situated in a non-built-up area and not next to existing buildings, public roads or MRT lines.
- (b) The crane operator shall be enrolled for the BCA Building Specialist Sponsorship (Crane Operations) programme at the On-the-Job Training (OJT) stage and be subject to the passing requirement of the programme.
- (c) Other measures as and when instructed by the Architect, including the removal of such crane operator if the crane operator is found to be not operating the crane in a safe manner.

Notwithstanding other provisions within this Clause, the employment of such crane operator will not subject the Contractor to cost omission.

The Contractor can also employ apprentices from BCA Building Specialist Sponsorship (Crane Operations) programme for lifting operations on site but subject to the following conditions and approval by the Architect:

- (d) The site must be situated in a non-built-up area and not next to existing buildings, public roads or MRT lines.
- (e) Contractor and crane supplier shall brief the Employer and Consultants on the risk assessment and control measures prior to deploying an apprentice on Site.
- (f) Tower crane is preferred to be sited on the inner side of building so that the building acts as a buffer.
- (g) Cranes collapse zone must not overlap with existing buildings or public facilities when it is free standing.
- (h) Apprentice shall operate the crane from the beginning of the construction. In the first few months, he will get used to the crane without involving heavy lifting of precast components.

- (i) Apprentice can only operate in the same crane on site till project completion and not allowed to switch crane.
- (j) Apprentice shall not operate in a crane serving a building under construction with storey height exceeding 25 storeys.
- (k) Apprentice shall pass a competency assessment under the BCA Building Specialist Sponsorship (Crane Operations) programme before being allowed to lift heavy precast components for installation.
- (l) A maximum of one apprentice can be employed on each site.
- (m) Other measures as and when instructed by the Architect including the removal of the apprentice if the apprentice is found to be not operating the crane in a safe manner or/and not complying with the safety measures listed above.

Notwithstanding other provisions within this Clause, the employment of apprentices from the BCA Building Specialist Sponsorship (Crane Operations) programme will not subject the Contractor to cost omission.

For lifting operations within a site which is next to existing buildings, public roads or MRT lines, the crane operators shall have a minimum of 5 years experience in crane operation.

Nevertheless, upon the approval of the Architect, the Contractor is allowed to employ crane operators with a minimum of 3 years experience in crane operation instead but shall subject to the following conditions and approval by the Architect:

- (n) The crane operators shall pass an assessment by BCA on their competency.
- (o) The Contractor shall carry out risk analysis based on the positions of the cranes to decide which cranes would be suitable for deploying such crane operators. Generally, this means that such operators should operate tower cranes that are at least 50 m away from any existing buildings and facilities, and the collapse zone of the crane does not overlap with existing buildings.
- (p) Other measures as and when instructed by the Architect.
- (q) Riggers and signalmen shall also be appointed for all lifting operations and they must have completed an approved training course.
- (r) The crane operator, lifting supervisor, rigger and signalman shall carry out their duties strictly according to the relevant regulations and other duties as the SO deems necessary from time to time.

Submit a list of crane operators, lifting supervisors, riggers and signalmen with their names, identification card or passport numbers, qualifications and years of experience to the Architect for approval 1 week before the use of the crane. The list shall be updated and kept on site at all times. The Architect reserves the right to examine the list as and when required.

5.1.18 Temporary Staircases

Provide and maintain 0.8 m minimum wide temporary metal staircases from one working floor to another. Place the staircases against the adjacent staircase walls or formwork of the staircase walls that are under construction. Provide the outer sides of the staircases with metal handrails 1.1 m above the outer staircase strings. The bottom of the staircases shall be covered fully with metal plate.

Engage a PE to design the staircases. Submit the PEs drawings, details and calculations for approval by the Architect before the construction of the staircases.

5.1.19 Gas Cylinders and Related Equipment

Use gas cylinders fitted with a low pressure gauge and a high pressure gauge, a reducing valve with pressure regulator, and safety relief device. The gas cylinders shall not be kept in the same room where welding, cutting or heating is being carried out or placed within 5 metres of any source of heat. The gas cylinders must always be kept upright in a wheeled-trolley.

The hose connecting a gas cylinder to an apparatus for cutting, welding, heating or other related works shall be of good construction and sound material, free from defect, properly maintained, and not entangled or kinked.

A flashback arrester or any other similar device which stops flashback that is acceptable to the Commissioner for Workplace Safety and Health must be fitted at every outlet of a gas cylinder and every inlet of an apparatus.

The gas cylinders and hoses shall be colour-coded to conform to SS 152: Specification for Identification of Contents of Industrial Gas Cylinders or any amendments thereof.

Engage a competent person to check the safety devices referred herein once in every 6 months. The competent person is any person who is competent by education, training and experience on the safety and operational aspects of the use of gas cylinders and related equipment.

5.1.20 Socket Outlet Assembly

Provide, install and maintain the socket-outlet assembly (hereinafter referred to as "SOA" for the purpose of this subclause) for all temporary electrical installations. The SOA shall be manufactured in accordance with the latest edition of SS 650-1. It shall be designed for wall mounting or fitted with castors so that it can be moved around on the Site. Every electrical equipment used shall be plugged directly into the industrial SOA.

5.1.21 Others

Provide and maintain guards or fences or barriers around excavations, lift pits or other similar potential places of danger to prevent accidents. The guards, fences and barriers shall be of sound material, good construction and possess adequate strength.

At the site entrance gate, provide a gantry fitted with a height control device and a siren to control the height limit of construction vehicle/machinery when the vehicle/machinery leaves the Site. This limit shall comply with the requirements of LTA.

The Contractor shall provide and maintain storey number indicators of size 400 mm x 400 mm at every staircase area and 900mm x 900mm at the metal scaffold enclosing passenger cum material hoist. The indicators shall be displayed at alternate storeys starting from the second storey.

5.2 Safety Infringement

Include in the Contract Sum for all costs and expenses for complying with the safety requirements.

The Architect shall conduct periodic inspections on the provision of safety measures with the Contractor's site safety supervisor or the Contractor's Representative. The Contractor shall rectify immediately any contravention of or non-compliance with the Workplace Safety and Health Act and its Subsidiary Legislation, Workplace Safety and Health (Construction) Regulations or safety measures specified. All Works or part of the Works may be stopped when the Architect considers the working environment or procedure is unsafe for Works to continue. In such event, the Architect may invoke the provisions of Clause 6 "Nuisance and Irregularities" and the Contractor shall not be entitled to any claims for compensation or extension of Contract Period.

If the contravention is not rectified by the subsequent inspection, the Architect may invoke the provisions of the clause on "Nuisance and Irregularities".

Upon any accident or dangerous occurrence, occurring on site, the Architect, the Employer or any Competent Authority may order a total or partial stoppage of the Works, depending on the nature and extent of the accident/dangerous occurrence, to allow for investigations and/or to carry out remedial measures. Under such cases, the Contractor shall not be entitled to any claims for compensation or extension of Contract Period.

The Architect may, at its absolute discretion, also invoke the provisions of Clause 6 "Nuisance and Irregularities" for the following type of incidents occurring in the course of or arising out of or in consequence of the Works:

- (a) Fatal accident, if the Architect or Competent Authority is of the opinion that the accident is the result of the defaults, acts, omissions or negligence, in part or in whole, of the Contractor.
- (b) Other accident which the Architect, the Employer or Competent Authority is of the opinion that the accident is the result of failure of the Contractor to provide necessary and sufficient safety measures stipulated in the Contract or the Workplace Safety and Health Act and its Subsidiary Legislation, the Workplace Safety and Health (Incident Reporting) Regulations.

- (c) Dangerous occurrence as classified in the Subsidiary Legislation, Workplace Safety and Health (Incident Reporting) Regulations, Part II if the Architect, the Employer or the Competent Authority is of the opinion that the dangerous occurrence is the result of failure of the Contractor to provide necessary and sufficient safety measures stipulated in the Contract or the Workplace Safety and Health Act and its Subsidiary Legislation, the Workplace Safety and Health (Incident Reporting) Regulations.

5.3 Reporting of Accidents and Dangerous Occurrence

In the case of an accident or dangerous occurrence as classified under the Workplace Safety and Health (Incident Reporting) Regulations, the Contractor shall notify the Employer and relevant Authorities within one hour of an incident. After being informed of it, the Architect or the Employer may at his discretion make a preliminary investigation of the circumstances and record its findings.

Notwithstanding the aforementioned requirements, make an incident investigation and prepare/submit an incident investigation report to Architect and the Employer within 10 days of the incident. Upon submitting this report, arrange for the injured workman, witnesses and an interpreter, if necessary, to report to Architect to furnish evidence relating to the incident.

If the Contractor fails to give any required notice or fails to furnish evidence of the incident as required in this Clause, the Architect may at his discretion invoke the provisions of Clause 6 "Nuisance and Irregularities".

6 NUISANCE AND IRREGULARITIES

6.1 Irregularities

If the Contractor is found to have committed any of the following irregularities:

- (a) Omitting building materials or labour, reducing the sizes of the materials, using inferior materials; or materials constructed not according to the Specification or Drawings;
- (b) Creating nuisance at the Site thereby causing inconvenience to the Architect or the public or committing similar acts (such as not complying with site safety requirements, etc.) which are likely to bring the Employer into disrepute;
- (c) Non-compliance with any part of the Specification or Drawings, or non-fulfilment of any contractual obligation.

The Architect or Employer is empowered to respond in one the following ways:

- (i) Order any irregular work to be removed and made good to the satisfaction of the Architect or Employer at the Contractor's own cost and expense.
- (ii) In lieu of correcting work not done in accordance with the Contract, the Architect or the Employer may allow such work to remain and shall recover any cost differences between the specified requirements and the non-compliance.

6.2 Nuisance

For nuisance committed on the Site, take immediate action to cease the nuisance committed upon instruction given by the Architect or Employer.

7 SPECIAL CONDITIONS ON SURVEY WORKS

7.1 General Requirements for Land Survey Services

The Contractor shall engage a registered surveyor at its own cost and expense to provide Land Survey Services to facilitate construction works and to carry out surveys for record purposes or for submission to authority as and when requested by the Architect during construction and post construction stage.

The cost incurred shall include the purchase of information and any equipment required for the survey works. The Contractor shall be held fully responsible for the accuracy of all the survey works carried out by its Registered Surveyor and for ensuring the Works fully comply with the following:

- (a) Technical requirements and standards in the conduct of the surveys as specified in the latest version of the land surveyors board directive on engineering and hydrographic survey practices.
- (b) Technical requirements and standards in the conduct of the surveys as specified in the latest Singapore Land Authority (SLA) directive on cadastral survey practices;
- (c) Circulars that are issued from time to time by the Chief Surveyor, Singapore, SLA.
- (d) A field works and office works are executed by the Registered Surveyor or qualified staff under the registered surveyor direct supervision and direction.
- (e) All documents and survey works pertaining to the survey are certified and dated by the registered surveyor supervising the survey.
- (f) Latest SLAs Standard and Specification for 3D Topographic Surveying (Mapping) in Singapore

7.1.1 For Projects with Contract Sum of \$50 Million and more

For projects with contract sum of \$50 million and more, the Contractors Resident Surveyor or Lead Surveyor performing land surveying works on site must be a registered Technical Member of Singapore Institute of Surveyors and Valuers (SISV) from 1 Jan 2017 onwards.

7.2 Pre-condition Survey

Where applicable, prior to and upon completion of the Site Works, carry out a condition survey to adjacent buildings in accordance with the requirements of Section C01-020 "Condition Survey". Submit all records to the Architect and adjacent property owners where directed. The influence zone due to the excavation works with the sheet piles as support system shall be according to BCA requirement. Keep a copy of the survey report on site ready for inspection.

7.3 Engineering Survey Services (Construction Stage)

All forms of land survey services required for the purpose to facilitate the construction works or survey works requested by the Architect in relation to the construction of the projects shall be performed by the Contractors Registered Surveyor. Such surveys shall include the following:

- (a) Setting out of parcel boundaries, grids, piles position, building blocks, minor sewer and service roads alignments, etc.
- (b) Piles eccentricity checks survey.
- (c) Topographical survey of surrounding services and roads.
- (d) As-built survey of services and preparation of setting out plans, cross-sectional and longitudinal plans and surveys to monitor ground settlement, where applicable.
- (e) Last inspection chamber/sewer manhole.
- (f) SPPG electrical substation

The Registered Surveyor engaged by the Contractor to prepare the pre-computation plan shall ensure the approved pre-computation plan tallies with the Consultants drawings. The Contractor receiving the approved pre-computation plan shall also check that it tallies with the Consultants drawings. Prior to the setting out of the piles position, the Contractor shall ensure that the distance between the piles position and the parcel boundary, the distance between the piles position and the building block, and the distance between the piles position and the gridlines are according to the Consultants drawings.

7.3.1 Additional Site Investigation

Carry out additional ground investigation where additional information is needed for the Works or when directed by the Architect. Carry out the Works in compliance with Section C02-010 "Ground Investigation" and BCA requirement.

The permeability, strength of the subsoils and the groundwater level are key design parameters to be ascertained to determine the required penetration depth of the sheet pile wall to ensure overall stability and seepage cut-off.

Carry out the boreholes pregressively, prior to commencement of the Works in areas according to the Contractor/s construction programme. On completion of drilling, backfill the boreholes with a suitable bentonite/cement mix.

Submit the location and schedule for the boreholes to the Architect's acceptance prior to carrying out the Works. On completion, prepare the site investigation report and submit to the Architect for acceptance.

The Contractor shall report immediately to the Architect any circumstance which indicates that in the Contractors opinion, the ground conditions differ from those reported in or which could have been inferred from the subsurface investigation reports.

8 CONTRACTOR TO VISIT SITE

The Contractor shall be deemed to have taken note of all conditions for the construction and completion of the Contract, in particular, the following conditions pertaining to this Contract and satisfy itself on and make provision in the Contract Sum:

- (a) The nature of sites and soils both above and below ground with respect to various stages of construction in particular the possible existence of boulders/granite underground and other buried materials which have to be removed from site.
- (b) The provision of temporary access for traffic diversion while work is in progress to ensure uninterrupted movement of traffic at all times.
- (c) The effect of existing properties, building structures / foundations.
- (d) The availability, supply of and conditions affecting labour within the Contract Period.
- (e) The effect of other contractors or persons approved by the Architect, working within the contract area.
- (f) The probable adverse effect of the weather on the execution of the Contract.
- (g) The effect of execution of works due to the presence of hard soil strata, existing services, etc.
- (h) The means of access to facilitate the transportation and movement of construction equipment.
- (i) The general ground levels, spot levels of the work site.

- (j) The provision of earth drains; silt traps and the requirements to deal with drain diversion.
- (k) All aspects of local conditions, physical or otherwise, at the site that pertains to or affects in any way the construction works required at the Site concerned.
- (l) The effect of encountering various existing cables, pipes, sewers, etc. which may require diversion.
- (m) The effect of heavy vehicular and pedestrian traffic.
- (n) The necessary re-instatement of all affected turfing areas and works affected by this contract.

The Contractor must also ascertain for itself the most convenient and expeditious method of carrying out the Works. The working conditions and the space to be made available as a work site should be inspected and no claims shall be allowed on the ground of lack of knowledge of the conditions under which the work will be executed.

The Contractor shall note that all information regarding existing levels given in the drawings only serves as a guide and it shall obtain its own information whenever it is doubtful.

No claim by the Contractor for additional payment will be allowed on the ground of any misunderstanding or misinterpretation in respect of any such matter nor shall the Contractor be released from any risks or obligations imposed on or undertaken by itself under the Contract on any such ground or on the ground that it did not or could not foresee any matter which might affect or have affected the execution of the Works.