Tender

for

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

at

7/F office area - Renovation tender schedule of rate (SOR)

Mar-2023

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

Contents

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

Form of Tender

FORM OF TENDER

for

Chu Hai College Of Higher Education 7/F Office Area - Renovation

To : .....

Having inspected the Site, examined the Drawings, General and Particular Specification and Schedule of Works for the .....
...... I / We offer to construct, carry out, complete and maintain the whole of the works in accordance with the Drawings, General and Particular Specifications for the sum of Hong Kong Dollars .....
.....(HK$ .....). I / We undertake to complete and deliver the whole of the work within the period of .....
.....days.

I / We agree to abide by this Tender for a period of .....
..... (not less than days) from the date fixed for receiving tenders and it shall remain binding on me / us and may be accepted at any time before expiration of that period.

I / We submit the following particulars: -

(i) Business Registration No. is ..... Date .....

(ii) Registered General Building Contractor No. is .....
(Buildings Ordinance 1995) (if applicable)

(iii) WB Approved Specialist Contractor Group .....
(if applicable)

Signed ..... Date .....

In the capacity of .....

duly authorised to sign tenders for and on behalf of .....
.....
(Registered Name of Company)

Registered address of company: .....
.....

PARTICULAR SPECIFICATION

1. Scope of Contract

1.1 This Contract comprises the provision of all necessary materials and labour to carry out the works of .....

at .....

.....all as detailed on the Drawings, General Specifications and this Specification.

2. Site of Works

The site of Works is located at .....

.....

3. Terms of Payment

3.1 Payment will be made in full within 30 days upon satisfactory completion of works as certified by the NGO subject to the submission of a final account from the Contractor.

PRELIMINARIES

4. Preliminary Items

4.1 The Preliminary Items included hereunder apply to the whole of the Works contained in this Specification and the amount inserted by the Contractor in the Summary of Tender shall be deemed to apply to the whole of the Works carried out under this Contract.

4.2 In event of no amount being inserted by the Contractor in respect of Preliminaries, in the Summary of Tender, the value thereof will be deemed to have been included in the cost of the work specified hereinafter following and no separate amount whatsoever will be certified for payment.

5. Contractor to visit the Site

5.1 Before tendering, the Contractor should visit the site and satisfy himself as to the accessibility of the site and the extent and character of the operations as no claim due to any neglect in this respect will be entertained.

5.2 The Contractor should contact the supervisor of the NGO *Mr / Miss / Mrs ..... on Tel. No ..... for permission to visit the site.

6. Programming and Completion of the Work

6.1 The Contractor's particular attention is drawn to the fact that the works to the premises under this Contract must be carried out in co-operation with and agreement of the supervisor of the premises to allow the reasonable operation of the premises and completed within the period stated on the Form of Tender.

7. Work included in Contract

7.1 The Contractor's prices for the items contained in the Contract shall be deemed to include the cost of all incidentals of labour, materials, all cutting and waste, packings, cartage, risk, moving, hoisting and fixing in the required position, scaffolding, plant, ladders, platforms, supervision, profit and all things and matters necessary for the carrying out of and for the timely and satisfactory completion of the entire works contained in the Contract and Specification, such be expressed or not.

7.2 All the materials to be used in permanent works described in this Specification shall be taken as new.

8. Lump Sum Tender

8.1 The tender shall be "Lump Sum" for the carrying out of the whole of the Works in conformity with the Specifications and Drawings.

8.2 Tenderers must include an itemised breakdown in their tenders and a detailed & comprehensive Schedule of Works required and included in the tender.

8.3 The Employer will not be liable for any expense incurred by the Contractor in connection with the measurement of variations or the adjustment and settlement of accounts.

9. General Specifications

9.1 The Contractor shall be deemed to have examined the following General Specifications applicable to this Contract:

(a) "General Specification for Building, 2012 Edition" published by the Architectural Services Department;

(b) "General Specification for Electrical Installation in Government Buildings the Hong Kong SAR, 2012 Edition" published by the Building Services Branch of the Architectural Services Department.

9.2 Allow for any financial obligations imposed by the Preliminaries of the General Specification.

9.3 Copies of the General Specifications are obtainable from the Government Publications Centre G/F., Lower Block, Queensway Government Offices, 66 Queensway, Hong Kong.

10. Leave Premises Clean

10.1 The Contractor shall clean off any dirt and clear any rubbish periodically and on completion of works.

11. Other Restrictions / Requirements

(To be specified by the NGO if applicable).

MATERIALS AND WORKMANSHIP

12. Material General

12.1 All materials shall be of an approved brand and type fixed and applied strictly, in accordance with the manufacturer's instructions and to the NGO's satisfaction. Materials shall be submitted to the NGO for approval whenever required.

12.2 The Contractor shall submit colour and tint cards and all colour schemes shall be approved by the NGO before the work is commenced.

12.3 The Contractor shall also submit a sample board of electrical accessories proposed to be used in the electrical work for the approval of the NGO prior to the commencement of the work.

13. Compliance with Specifications

13.1 Unless otherwise overridden by this Particular Specification or Drawings, all materials and workmanship shall comply with all the relevant sections of the General Specifications as stated in Clause 9.1 above and all the subsequent amendments issued prior to the date of tendering.

SCHEDULE OF MATERIALS AND EQUIPMENT

14. The tenderer is required to state the type, model and make of all materials / equipment proposed to be used in this Contract. The tender may be considered invalid without submission of such information from the tenderer.

SCHEDULE OF DRAWINGS (if applicable)

20. (List the numbers and titles of all the drawings attached to this document).

DESCRIPTION OF WORKS

21. (Describe in details the works required to be carried out by the Contractor item by item).

Remarks:
The Contractor shall pay attention to the site protection from any injury or theft happened during the works period as the Center Building shall be in operation as normal and usual.

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

Standard Form of Contract

For Minor Works
(R.I.C.S. Hong Kong Branch)

STANDARD FORM OF
Contract for Minor Works

First Edition 1992
First amendment published in January 2003

This Contract has been approved for use by the following bodies:

The Hong Kong Institute of Surveyors

The Hong Kong Institute of Architects

The Hong Kong Institution of Engineers (Building Division)

The CHARTERED INSTITUTE OF BUILDING (HONG KONG)

The Chartered Institute of Building (Hong Kong Branch)

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THIS AGREEMENT is made on ..... 20 .....

BETWEEN .....

of .....

..... ~~("the Employer")~~

and .....

of .....

.....

..... ~~("the Contractor")~~.

WHEREAS

Recitals

The Employer wishes to enter into a contract ("the Contract") for the following .....

Setting up an Office Base of On-site Pre-school Rehabilitation Services ("the Works") to be carried

out under the supervision and direction of .....

("the Contract Administrator") and has had prepared drawings numbered ..... as per drawing list.

.....

.....

("the Contract Drawings") and/or a specification ("the Specification"). These documents showing and describing the work to be undertaken together with these Articles of Agreement and attached Conditions are called "the Contract Documents";

The Contractor has priced the Contract Documents;

The Contract Documents have been signed by and on behalf of the Employer and the Contractor.

IT IS AGREED AS FOLLOWS

Article 1

In consideration of the sum stated in Article 2 the Contractor will, in accordance with the Contract Documents, carry out and complete the Works.

Article 2

The Employer will pay to the Contractor the sum of Hong Kong Dollars .....

..... (HK$ .....) or such other sum as shall become payable at the times and in the manner set out in the Contract Documents ("the Contract Sum").

Article 3

The term "Contract Administrator" in the Conditions shall mean .....

.....

of .....

.....

..... or, in the event of his death or ceasing to be the Contract Administrator for the purpose of this Contract, such other person as the Employer shall, within fourteen days of the death or cessation, appoint for that purpose. No person subsequently appointed to be the Contract Administrator under this Contract shall be entitled to disregard or overrule any certificate or instruction given by the Contract Administrator for the time being.

SIGNED(1) for and on behalf of _____

the Employer _____
(Position/Title)

in the presence of _____

Signature, name and address _____

_____

_____

SIGNED for and on behalf of _____

the Contractor _____
(Position/Title)

in the presence of _____

Signature, name and address _____

_____

_____

(1) for Contracts under seal, refer to Guidance Notes.

Remarks:
"Employer" - Aberdeen Kai-fong Welfare Association Limited
"Architect" / "Contract Administrator" - Lu Tang Lai Architects Ltd.
"Contractor" - The Contractor to be appointed to carry out the Works

Conditions

1.0 Documents, Obligations and Duties

1.1 Contract Documents

1.1.1 The Articles of Agreement and these Conditions shall take precedence over all other Contract Documents. In the event of any discrepancy between the Contract Drawings and the Specification, the Contract Drawings shall take precedence.

1.1.2 These Conditions are written in both English and Chinese language texts, and shall be construed and interpreted in the English text, which language shall prevail in the event of any discrepancy between the texts.

1.1.3 The Table of Contents, the headings in these Conditions and the Guidance Notes shall not be deemed to be part of or be taken into consideration when interpreting these Conditions.

1.1.4 Any inconsistency within the Contract Documents shall be corrected by the Contract Administrator.

1.1.5 Any correction in accordance with clause 1.1.4 which results in an addition, omission or other change shall be treated as a Variation under clause 3.5.

1.2 Contractor's Obligations

The Contractor shall in accordance with the Contract Documents carry out and complete the Works with due care and diligence within the time for completion allowed under clause 2.0. The Contractor shall provide all that is necessary for the proper execution of the Works and for the performance of his obligations under clause 2.5.

1.3 Contract Administrator's Duties

1.3.1 The Contract Administrator shall be responsible to the Employer and his duties are to observe and supervise the carrying out of the Works. He shall issue all certificates and all instructions in accordance with these Conditions and any further information necessary for the proper carrying out of the Works.

1.3.2 The Contract Administrator may carry out checks and inspections on the Works as are necessary in the course of his duties.

1.3.3 The Contract Administrator may issue instructions in respect of the Works with which the Contractor shall comply. If directions are given orally they shall, within two days, be confirmed by the Contract Administrator as an instruction and shall take effect from the date of such confirmation.

1.3.4 If the Contractor does not comply with an instruction within a reasonable period, the Contract Administrator shall issue a notice requiring compliance. If within 7 days of receipt of such notice the Contractor does not comply, the Employer may employ and pay other persons to carry out any work required by the instruction. All costs reasonably incurred by the Employer may be deducted from any monies due or to become due to the Contractor under this Contract or shall be recoverable from the Contractor as a debt.

2.0 Commencement and Completion

2.1 Commencement and Completion

The Works may be commenced on ....to be confirmed by the Architect.... and shall be completed by ....45 days from the Commencement Date including General Holiday.... ~~"the Completion Date".~~

2.2 Extension of Time for Completion

If, for reasons beyond the Contractor's control, it becomes apparent that the Works will not be completed by the Completion Date or any later date fixed in accordance with this clause, the Contractor shall notify the Contract Administrator accordingly. The Contract Administrator shall promptly extend the time for completion as may be reasonable.

2.3 Damages for Non-Completion

If the Works are not completed by the Completion Date (or by any later date fixed under clause 2.2), the Contractor shall pay or allow to the Employer liquidated damages at the rate of HK$ .....$1,000.00.....[i] per day for every day or part of a day between the Completion Date (or by any later date fixed under clause 2.2) and the date of completion certified by the Contract Administrator under clause 2.4. The Employer may deduct such liquidated damages from any monies due or to become due to the Contractor under this Contract or he shall be entitled to recover them from the Contractor as a debt.

2.4 Completion

The Contract Administrator shall certify the date when, in his opinion, the Works have reached completion.

2.5 Defects Liability

Any defects, excessive shrinkages or other faults, which appear ~~within three months~~ within twelve months from Completion Date / ~~months~~[ii] of the date of completion certified by the Contract Administrator under clause 2.4 and which are due to materials or workmanship not in accordance with the Contract, shall be made good by the Contractor within a reasonable time entirely at his own cost, unless otherwise instructed by the Contract Administrator.

The Contract Administrator shall certify the date when, in his opinion, the Contractor's obligations under this clause have been fulfilled.

3.0 Control of the Works

3.1 Assignment

Neither the Employer nor the Contractor shall, without the written consent of the other, assign the whole or any portion of this Contract.

3.2 Sub-Letting

3.2.1 The Contractor shall be permitted to sub-let the whole or any part of the Works. The Contract Administrator shall be entitled to reasonably reject any sub-contractor and shall have full powers to remove any sub-contractor from the Works.

3.2.2 The Contractor shall indemnify the Employer against any damage, liability, claim or loss arising from any breach of contract, repudiation, default or failure on the part of any sub-contractor and shall make good any damage or loss suffered by the Employer.

3.2.3 The Contractor shall ensure that it shall be a condition in any sub-contract that the sub-contract shall terminate immediately upon the termination (for any reason) of the Contractor's employment under this Contract.

3.3 Contractor's Representative

The Contractor shall keep a competent representative on site, or at any other place where the Works are being performed. Any instructions given to him by the Contract Administrator shall be deemed to have been issued to the Contractor. The appointment of the Contractor's representative shall be subject to the approval of the Contract Administrator.

3.4 Exclusion from the Works

The Contract Administrator may (but not unreasonably or vexatiously) issue instructions requiring the exclusion of any person from the carrying out of the Works.

(i) Rate to be inserted should be a genuine pre-estimate, and not a penalty.
(ii) If a different period is required delete three months and insert the desired period.

3.5 Variations

3.5.1 The Contract Administrator may issue instructions requiring a Variation and he may confirm in writing any Variation made by the Contractor.

3.5.2 The term "Variation" means one or more of the following:

3.5.2.1 the alteration of the design, quality or quantity of the Works as described by the Contract Documents;

3.5.2.2 the addition, omission or substitution of any work necessary for the completion of the Works;

3.5.2.3 the alteration of the kind or standard of any of the materials or goods to be used in the Works;

3.5.2.4 a change in the order or period in which the Works are to be carried out.

3.5.3 The value of all Variations shall be ascertained promptly by the Contract Administrator on a fair and reasonable basis using, where relevant, prices in the Contract Documents. Such valuation shall include any direct loss and/or expense incurred, if any, by the Contractor due to the regular progress of the Works being affected by compliance with such Variation.

3.5.4 Instead of the valuation referred to in clause 3.5.3, the price of the variation may be agreed between the Contract Administrator and the Contractor.

3.6 Provisional Sums

The Contract Administrator shall issue instructions for the expenditure of any provisional sums included in the Contract Sum and the work required by such instructions shall be valued or the price agreed in accordance with clause 3.5.3 or 3.5.4.

3.7 Coordination

The Contractor shall closely liaise with any suppliers and contractors directly engaged by the Employer, and shall ensure that the interface between his operations and these suppliers and contractors is maintained to the satisfaction of the Contract Administrator.

4.0 Certificates and Payments

4.1 Interim Certificates and Payments

4.1.1 The Contract Administrator shall, at intervals of one month, issue Interim Certificates stating the amount due to the Contractor from the Employer.

4.1.2 The Employer shall pay to the Contractor the amount stated as due in Interim Certificates within fourteen days of the date of each certificate.

4.1.3 The Employer shall inform the Contractor when exercising any right of deduction under this Contract from monies due, or to become due, to the Contractor. The Employer shall inform the Contractor of the reason for such deduction.

4.2 Ascertaining the Amount Due in Interim Certificates

4.2.1 For the purpose of ascertaining the amount due in Interim Certificates the Contract Administrator shall satisfy himself as to:

4.2.1.1 the estimated value of the Works properly carried out, calculated in accordance with the sums or rates, if any, contained in the Contract Documents;

4.2.1.2 any amounts ascertained or agreed under clauses 3.5, 3.6, 5.1, 6.3 and 8.1, including on-account payments, where those amounts are not finalised;

4.2.1.3 the estimated value of any materials and goods which have been reasonably and properly brought to the site for the purpose of the Works provided they are properly stored and adequately protected against the weather and other damage.

4.2.2 The total ascertained under clause 4.2. 1 shall be subject to the deduction of:

4.2.2.1 a retention of 10%/ ..... %[i];

4.2.2.2 any previous payments made by the Employer;

4.2.2.3 any amounts recoverable by the Employer under clauses 1.3.4 and 2.3.

4.3 Penultimate Certificate

4.3.1 The Contract Administrator shall, within fourteen days after the date of completion certified under clause 2.4, issue the Penultimate Certificate. For the purpose of ascertaining the amount due in the Penultimate Certificate the following shall be included:

4.3.1.1 the value of the Works properly carried out, calculated in accordance with the sums or rates, if any, contained in the Contract Documents;

4.3.1.2 any amounts ascertained or agreed under clauses 3.5, 3.6, 5.1, 6.3 and 8.1.

4.3.2 The total ascertained under clause 4.3.1 shall be subject to the deduction of:

4.3.2.1 a retention of 5%/..... %[ii],

4.3.2.2 any previous payments made by the Employer;

4.3.2.3 any amounts recoverable by the Employer under clauses 1.3.4 and 2.3.

4.3.3 The Employer shall pay to the Contractor the amount stated as due in the Penultimate Certificate within fourteen days of the date of that certificate.

4.4 Final Certificate

within twelve months from Completion Date

4.4.1 The Contractor shall supply ~~within three months / ..... months~~[iii] from the date of completion certified under clause 2.4, all documentation reasonably required for the calculation of the amount to be finally certified by the Contract Administrator.

4.4.2 The Contract Administrator shall, within one month of receipt of such documentation, issue the Final Certificate, provided that the Contract Administrator has issued the certificate under clause 2.5. The Final Certificate shall state amounts remaining due to the Contractor or due to the Employer as the case may be.

4.4.3 The sum stated in the Final Certificate shall, from the fourteenth day after the date of that certificate, be a debt payable by the Employer to the Contractor or by the Contractor to the Employer as the case may be.

4.5 Fixed Price

No account shall be taken in any payment to the Contractor of any change in the cost to the Contractor of the labour, materials, plant and other resources employed in carrying out the Works.

(i) If a different retention percentage is required delete "10%" and insert the desired percentage.
(ii) If a different retention percentage is required delete "5%" and insert the desired percentage (which should usually be half of the percentage inserted under clause 4.2.2.1).
(iii) If a different period is required delete three months and insert the desired period (refer to clause 2.5).

5.0 Statutory Obligations, Notices, Fees and Charges

5.1 Fees and Charges

5. 1.1 The Contractor shall pay any fees and charges (including any rates or taxes) legally demandable and shall indemnify the Employer against liability in respect of any such fees and charges. The amount of any such fees and charges shall be added to the Contract Sum unless they:

5.1.1.1 arise out of any default, delay or failure by the Contractor in complying with any legal or contractual requirements;

5.1.1.2 are a levy or tax on the cost or value of the Works or any part thereof, to the extent that such levy or tax was legally demandable at the date for submission of tenders for the Works;

5.1.1.3 are a levy or tax on the profits of the Contractor.

5.2 Statutory Requirements

5.2.1 Subject to clause 5.2.6, the Contractor shall comply with and give all notices required by any statutory requirement.

5.2.2 If the Contractor finds any discrepancy between any statutory requirement and the Contract Documents or any instruction of the Contract Administrator, the Contractor shall immediately give to the Contract Administrator notice specifying the discrepancy.

5.2.3 If the Contractor gives notice under clause 5.2.2 or if the Contract Administrator discovers a discrepancy between any statutory requirement and the Contract Documents or any instruction, the Contract Administrator shall, within seven days of the discovery, issue an instruction in relation to the discrepancy. If such instruction requires the Works to be varied, it shall be treated as a Variation, and valued in accordance with clause 3.5.

5.2.4 If, in any emergency, compliance with any statutory requirement requires the Contractor to supply materials or carry out work before receiving instructions under clause 5.2.3, the Contractor shall supply such materials and labour as are reasonably necessary to immediately comply with such statutory requirement. The Contractor shall immediately inform the Contract Administrator of the emergency and of the steps that he is taking.

5.2.5 Work and materials supplied by the Contractor under clause 5.2.4 shall be treated as a Variation, provided that the emergency arose as a result of a discrepancy between any statutory requirement and the Contract Documents or any instruction, and provided the Contractor has complied with clause 5.2.4.

5.2.6 The Contractor shall not be liable to the Employer if the Works do not comply with any statutory requirement provided that the Contractor has carried out work in accordance with the Contract Documents or with any instruction, and has complied with clause 5.2.2.

6.0 Injury, Damage and Insurance

6.1 Injury To or Death of Persons

6.1.1 The Contractor shall be liable for and shall indemnify the Employer against any expense, liability, loss, claim or proceedings arising under any statute or at common law in respect of personal injury to or death of any person, arising out of or caused by the carrying out of the Works, except to the extent that the same is due to any act or neglect of the Employer or of any person for whom the Employer is responsible.

6.1.2 Without prejudice to his liability to indemnify the Employer, the Contractor shall take out and maintain insurance to comply with the Employees Compensation Ordinance and to cover any other liability for personal injury or death as is necessary. The Contractor shall ensure that all sub-contractors shall take out and maintain their own insurance to comply with the Employees Compensation Ordinance.

6.2 Injury or Damage to Property

6.2.1 The Contractor shall be liable for and shall indemnify the Employer against any expense, liability, loss, claim or proceedings in respect of any damage to any property real or personal (other than injury or damage to the Works) arising out of or caused by the carrying out of the Works, except to the extent that the same is due to any negligence, breach of statutory duty, omission or default of the Employer, his servants or agents.

* 6.2.2 Without prejudice to his obligation to indemnify the Employer, the Contractor shall take out and maintain insurance in respect of the liability referred to in this clause, which shall be for a minimum amount of HK$ $20,000,000.00 .. [i] for any one occurrence or series of occurrences arising out of any one event.

6.3 Insurance of the Works - Fire etc

(A) New works[ii]

The Contractor shall insure against loss and damage by fire, lightning, explosion, storm, tempest, flood, typhoon, bursting or overflowing of water tanks, apparatus or pipes, earthquake, aircraft and other aerial devices or articles dropped therefrom, riot and civil commotion, all work executed (including temporary works) and all unfixed materials and goods intended for, delivered to, placed on or adjacent to the Works until the date of completion. The insurance shall be in the joint names of the Employer, the Contractor and all sub-contractors and shall be for the full reinstatement value plus 15% to cover professional fees together with the cost of the removal and disposal of any debris.

After any inspection required by the insurers in respect of a claim under the insurance mentioned in this clause, the Contractor shall, with due diligence, restore or replace work or materials or goods damaged and dispose of any debris and proceed with and complete the Works. The Contractor shall not be entitled to any payment in respect of work or materials or goods damaged or the disposal of any debris other than the monies received under the insurance (less the percentage to cover professional fees). Such monies shall be paid to the Contractor under certificates of the Contract Administrator at the periods stated in clause 4.

(B) Existing property[iii]

The Employer shall insure against loss or damage to the existing property (together with the contents owned by him and for which he is responsible) and to the Works and all unfixed materials and goods intended for, delivered to, placed on or adjacent to the Works by fire, lightning, explosion, storm, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, earthquake, aircraft and other aerial devices or articles dropped therefrom, riot and civil commotion. If any loss or damage as referred to in this clause occurs, the Contract Administrator shall issue instructions for the reinstatement and making good of such loss or damage in accordance with clause 1.3 and such instructions shall be valued under clause 3.5.

6.4 Evidence of Insurance

The Contractor shall produce such evidence as the Employer may reasonably require that the insurances referred to in clauses 6.1 and 6.2 and, where applicable, 6.3(A) have been taken out and are in force at all times. Where clause 6.3(B) is applicable, the Employer shall produce such evidence as the Contractor may reasonably require that the insurance referred to has been taken out and is in force at all times.

*Remarks: All risks insurance bearing the names of the contractor and the NGO is requested to be ready prior to the work's commencement.

(i) Complete as appropriate.
(ii) Delete 6.3(A) or 6.3(B) whichever is inapplicable.
(iii) Delete 6.3(A) or 6.3(B) whichever is inapplicable.

7.0 Determination

7.1 Determination by Employer

7.1.1 The Employer may (but not unreasonably or vexatiously) determine the employment of the Contractor under this Contract if the Contractor:

7.1.1.1 wholly suspends, without reasonable cause, the carrying out of the Works before completion;

7.1.1.2 fails to proceed regularly and diligently with the Works;

7.1.1.3 refuses or persistently neglects to comply with a notice from the Contract Administrator requiring him to remove defective work, improper materials or goods;

7.1.1.4 becomes insolvent or bankrupt or is likely to have a petition presented for a winding up or bankruptcy order;

7.1.1.5 shall have offered or given or agreed to give to any person any gift or consideration of any kind in connection with the award or performance of this Contract or if the Contractor shall have committed any offence under the Prevention of Corruption Ordinance;

7.1.1.6 shall have been found to have employed any person who is not lawfully employable as defined in the Immigration Ordinance in connection with the performance of the Works or otherwise on site.

7.1.2 In the event of the Employer determining the employment of the Contractor under clause 7.1.1, the Contractor shall immediately give up possession of the site of the Works. The Contract Administrator shall carry out a valuation at the date of determination. The Contractor shall be entitled to be present at such valuation. The Employer shall not be bound to make any further payment to the Contractor until after completion of the Works. The Employer may engage and pay other persons to complete the Works and shall be entitled to use all materials and goods brought onto the site by the Contractor for the purposes of incorporation in the Works.

7.1.3 The Contract Administrator shall ascertain and certify the amount of expenses properly incurred by the Employer in completing the Works and the amount of damage suffered by the Employer because of the determination.

7.1.4 The Contractor shall then be entitled to payment of such amount (if any) as the Contract Administrator shall certify would have been payable to the Contractor upon completion by him of the Works after deduction of the amount certified in clause 7.1.3. If the amount certified in clause 7.1.3 exceeds the amount the Contract Administrator certifies would have been payable to the Contractor upon completion by him of the Works, the excess shall be recoverable by the Employer from the Contractor as a debt.

7.1.5 The rights set out in clause 7.1 shall be without prejudice to any other rights or remedies the Employer may possess.

7.2 Determination by Contractor

7.2.1 The Contractor may (but not unreasonably or vexatiously) determine his employment under this Contract if the Employer:

7.2.1.1 does not pay the amount properly due to the Contractor on any Certificate within fourteen days from the issue of that Certificate;

7.2.1.2 interferes with or obstructs the issue of any Certificate due under this Contract;

7.2.1.3 or any person for whom he is responsible interferes with or obstructs the carrying out of the Works or fails to make the site available for the Contractor within seven days from the commencement date as specified in clause 2.1;

7.2.1.4 prevents the carrying out of the Works for a continuous period of at least one month;

7.2.1.5 becomes insolvent or bankrupt or is likely to have a petition presented for at winding up or bankruptcy order.

Provided that the employment of the Contractor shall not be determined under this clause unless the Employer has continued the default as referred to in clauses 7.2.1.1 to 7.2.1.4 for seven days after receipt of a notice from the Contractor specifying such default.

7.2.2 In the event of the Contractor determining the employment of the Contractor under clause 7.2.1 the Employer shall pay to the Contractor, after taking into account amounts previously paid, such sum as shall be ascertained by the Contract Administrator as fair and reasonable for the value of work begun and executed, materials on site and the removal of all temporary buildings, plant, tools and equipment. The right of determination shall be without prejudice to any other rights or remedies which the Contractor may possess.

7.3 Notice of Determination

Any notice of determination shall be given by registered post or by hand delivery to the address stated in the Articles of Agreement or such new address as shall have been notified in writing.

8.0 Loss and Expense

8.1 Disturbance to the Progress of the Works

8.1.1 The Contractor shall notify the Contract Administrator if, for reasons beyond the Contractor's control, the Contractor has incurred any direct loss and/or expense, for which he would not be reimbursed by a payment made under any other provision of these Conditions by reason of the progress of the Works being materially affected by:

8.1.1.1 the Contractor not having received in due time necessary instructions, drawings, details or levels from the Contract Administrator; or

8.1.1.2 any Variation ordered in accordance with clause 3.5; or

8.1.1.3 the opening up for inspection of any work covered up or the testing of any materials or goods unless the inspection or test showed that the work, materials or goods were not in accordance with the Contract; or

8.1.1.4 delay on the part of suppliers, contractors or others engaged by the Employer in supplying goods or carrying out work not forming part of the Works; or

8.1.1.5 Contract Administrator's instructions issued in regard to the postponement of any work forming part of the Works,

then the Contract Administrator shall promptly ascertain the loss and expense incurred, if any.

9.0 Settlement of Disputes

9.1 Negotiation

The Employer and the Contractor shall attempt in good faith to resolve promptly through negotiation, any dispute or difference arising out of or in relation to the Contract. Within ten days after execution of the Contract the Employer and the Contractor shall each designate a senior person preferably not involved in the day to day administration of the Contract, with authority to settle disputes. If a dispute or difference should arise, the senior persons shall meet at least once and attempt in good faith to resolve the dispute or difference. For such purpose either senior person may request in writing to meet the other, within ten days of the date of the request, at a mutually agreed time and place. If the senior persons are unable to resolve the dispute or difference either within twenty-one days of the date of the first meeting or if no meeting has taken place within twenty-one days of the date of the written request, then either the Employer or the Contractor may refer the matter to mediation in accordance with clause 9.2.

9.2 Mediation

If the dispute or difference has not been resolved within the time scale in clause 9.1 then either the Employer or the Contractor may request to resolve the matter through mediation. The mediator, once mutually agreed upon, shall determine the mediation procedure in consultation with the Employer and the Contractor who shall bear equally the fees and expenses of the mediator.

9.3 Arbitration

9.3.1 The Employer or the Contractor may refer a matter to arbitration, conducted by a single arbitrator in accordance with the "Hong Kong International Arbitration Centre Short Form Arbitration Rules" in effect at the time of the arbitration, if:

9.3.1.1 the dispute or difference has not been resolved within twenty-eight days of the commencement of mediation;

9.3.1.2 there has been no reference to mediation within twenty-one days of the date of the first meeting held in accordance with clause 9.1;

9.3.1.3 no meeting has taken place within twenty-one days of the date of the written request referred to in clause 9.1.

9.3.2 The Arbitrator shall, without prejudice to the generality of his powers, have power to:

9.3.2.1 rectify this Contract so that it accurately reflects the true agreement made by the Employer and the Contractors;

9.3.2.2 direct such measurements and/or valuations as may in his opinion be desirable in order to determine the rights of the Employer and the Contractor;

9.3.2.3 ascertain and award any sum which ought to have been the subject of or included in any certificate, instruction, opinion, decision, requirement or notice;

9.3.2.4 determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, instruction, opinion, decision, requirement or notice had been given.

9.3.3 The award of such Arbitrator shall be final and binding on the Employer and the Contractor. For the purposes of Section 2M of the Arbitration Ordinance, all disputes shall be arbitrated as domestic disputes under Part II of the Arbitration Ordinance.

9.4 Time Periods

9.4.1 Any time period referred to in clauses 9.1 and 9.3 can be extended by written agreement between the Employer and the Contractor.

9.4.2 A reference under clauses 9.1, 9.2 and 9.3 above may be made during the currency of the Contract. Neither the Employer nor the Contractor shall be released from continuing performance of his obligations under this Contract by reason of such reference.

10.0 Notices

10.1 Giving of Notices

All notices under this Contract shall be given in writing. Any notice sent by courier, telex or facsimile shall take effect on the date of confirmation of receipt or successful transmission. Any notice sent by ordinary pre-paid post shall take effect three days after posting.

Guidance Notes

1. Overview

The Standard Form of Contract for Minor Works comprises a simple set of conditions suitable for projects for an agreed lump sum, where a Contract Administrator has been appointed to supervise the Contract on the Employer's behalf.

2. Usage

This Form of Contract should not be used where any of the following circumstances prevail:

(i) The Employer wishes to nominate sub-contractors or suppliers. Although it may be permissible to name a person or a company in the tender documents for instructions on the expenditure of a provisional sum, there are no provisions in this Form of Contract for dealing with the consequences of what is in effect the nomination of a sub-contractor;

(ii) Where the duration of the Contract is such that full labour and materials fluctuations are required, or where the works are of a complex nature, or involve complex services, or require more than a short period for the time of their execution;

(iii) Where it is envisaged that partial possession of the Works may be required by the Employer;

(iv) Where a large proportion of the value of the Works may be tied up in the manufacture or supply of specialist goods for which the Contractor may be entitled to expect a stage payment. There is no provision in this Form of Contract for payment for unfixed materials and goods off site;

(v) This Form of Contract is not intended for design and build contracts.

This Form of Contract should be completed in either the English language text or Chinese language text but not both.

3. Contracts Under Hand and Under Seal

For contracts executed under hand (by simple signature by an authorized representative), the limitation period for commencing proceedings for breach of contract is six years from the date on which the cause of action arose. If a contract is executed under seal this limitation period is prolonged to twelve years.

If the Parties wish or are required to execute under seal, the following format is suggested. The corporate seal of a Hong Kong Limited Company must usually be applied in the presence of two directors or a director and the company secretary. This will depend upon its articles of association which empower the directors to execute documents under seal. In the case of a foreign corporation, partnership or private individual, the personal seal of the signatory suffices, provided the signatory has express authority (i.e. power of attorney) to seal and deliver the deed on behalf of the foreign corporation or partnership.

3. Contracts Under Hand and Under Seal *(Cont'd)*

Format:

The parties have signed, sealed and delivered these Articles of Agreement

In the case of a Hong Kong Limited Company

The Common Seal of XYZ Limited was affixed by:

_____ (Director)

_____ (Secretary)

In the presence of:

_____ (Witness)

In the case of a Partnership

Signed, sealed and delivered on behalf of XYZ and Partners by:

_____ (Partner)

In the presence of:

_____ (Witness)

In the case of a Foreign Corporation or Private Individual

Signed, sealed and delivered by:

_____ (Individual)

In the presence of

_____ (Witness)

4. Insertions

Since the Employer is under an obligation to give possession of the site to the Contractor and the Contractor will wish to know the date of commencement so that he can programme his works, it is very important that the date for commencement and the Completion Date are entered accurately in clause 2.1 of the Conditions. The parties should also be sure to execute the Articles of Agreement so that the description of the Works, the Specification, the Contract Drawings, the appointment of the Contract Administrator and agreement on the Contract Sum are all confirmed in writing in one document.

5. Payment

The implication of the word 'promptly' in clause 3.5.3 is that the evaluation of Variations should be dealt with as close as possible to the time at which the variation work is carried out. If the value of Variations cannot be finalised an on-account payment should be included in the subsequent Interim Certificate.

6. Extensions of Time

Extensions of time should be determined by taking into account the details of the delay, the Contract duration and time left to completion. The Contract Administrator should deal with extensions of time as soon as the Contractor notifies the Contract Administrator under clause 2.2. As far as possible, the Contract Administrator should avoid granting retrospective extensions of time.

Section A

Preliminaries

PRELIMINARIES

P-1 General

The preliminary items included herein apply to the whole of the works contained in these Tender Documents and the tender sum shall be deemed to include for all costs in connection with such preliminary items, overheads, supervision and other expenses.

P-2 The Site of Works

Renovation Works (Address):

P-3 Scope of the Works

The works to be carried out under this contract are as described in the specification and indicated on the drawings, which includes but not be limited to the following:

(a) The contractor shall prepare the Shop Drawings, Material submission and Master Programme prior to commencement of work for the approval of the architect. Overall Works for the whole Centre shall not be more than **45 days** including Sundays, public holidays; wet days and days with exceptionally inclement weather falling and overnight work within the Contract Period.

Tentative Schedule (45 Working Days) :

Tentative Commencement Date : Early of May, 2020

Tentative Completion Date : Late of May, 2020

(b) Scope of works on Carpentry including but not limited to following:
- Site precaution works, Hoarding and Setting out
- Demolish and remove away all the unnecessary furniture, fixture, finishes & BS service.
- All Door, Wall, Floor & Ceiling fixture and finishes as per drawings.
- New entrance and ramp for main Entrance base on the BFA requirement.
- Make good/ new window guard of existing window.
- All Signage, Plaque & Graphic print out on wall (including preparing art work (Ai file) from design drawing)
- All M&E service and Making good works according to the services installation as specified from the Tender drawing.

(c) The M&E works (Lighting, Electrical, MVAC, PA system and internal fire services and P/D provision) can be carry out by their own contractor under the fitting-out contract as specified on the drawings.

- All the interfacing of new Fire service install must be carried out by building's Nominated sub-contractor. And prior approval by HD/ Estate Management.

- **Optional Sprinkler provision to be installed inside premises and provide plug off at the site boundary for further connection (According to FSD's requirement) Contractor shall provide optional extra cost and time for the provision of Improvised sprinkler system (including all the builder's works, preliminary works, protection, connection of tee-off of existing FH & submission to FSD and provide certificate subject to the additional FSI) for further reference.**

(d) Apply water-proofing membrane system to 1.5m High dado and with 25mm thk. Water-proofing cement sand screening laid to fall for Toilet & Pantry. Contractor shall conduct water test for at least 24hr before apply finish and provide report with photo for record.

(e) The Specifications for the **sanitary fitment, lighting fittings, and A/C units** on the schedule indicate the bench mark of standard in aesthetical and technical terms.

(f) The Specifications for the **material items** on the finishing schedule indicate the bench mark of standard in aesthetical and technical terms.

(g) Contractor shall follow the requirement of Government department for strict compliance of building regulation.

(h) Contractor shall prepare and submit the drawings and form for Minor Works to Buildings Department before and after completion of the works which have been included as **Minor Works** subject to the control under the Minor Works control system (MWCS) ***if any***.

(i) Contractor shall provide all related certificate (e.g.: Certificate of WR1, FS251/FS314A/FS314/FS161, operable panel etc.), O & M manual for BS installation and as fitted drawings after completed of work.

(j) Windows/ external wall to be retain and make good and modification to be make according to the alteration works for M&E service.

(k) Protection and hoarding to be provide to the Public Area for the alteration works of external wall *(Installation of external wall signage, New main, rear entrance door and additional ramp with hand rail at entrance as per Tender drawing).*

******Remarks:***

- *Contractor shall include the coordination works for the Nominated Sub -contractor Nominated FS contractor for interfacing works / Main FS system Contractor for SI equipment at multi- purpose room. (supporting steel frame work for SI equipment)*
- *Nominated CAR insurance company from NGO to be included from tender.*
- *Contractor shall provide 24hr contact person during renovation works.*
- *Contractor shall provide the provision of temporary electrical and water supply during renovation works.*
- *Contractor shall provide proper protection of public area as per fitting-out guide from management during renovation.*

P-4 Possession and Completion

The Contractor's attention is drawn to the following timing:

a) The Date of Possession of the site shall be on the 7th day after receipt of the Architect's written instruction to take possession of the work area and commencement of works.

b) The Date for Completion for the Works shall be calculated in **45** calendar from the Date for Possession of the Site and shall be inclusive of Sundays and Public Holidays.

P-5 Contractor Site Visit

a) The Contractor is advised to visit and inspect the site to ascertain for himself the general work area conditions, condition and content of the buildings, accessibility, storage space, etc.

b) No claim will be allowed on the grounds of ignorance of the conditions under which the work is to be carried out.

P-6 Specifications

The Contractor shall carry out the works and comply with the Particular Specifications annexed and Architectural Services Department General Specifications for Building 2012 Edition, all manufacturers' technical specifications for materials as specified in the drawings and finishing schedule, unless otherwise specified.

P-7 Type of Contract

a) The tender is to be a LUMP SUM for the carrying out of the whole of the works in conformity with the Drawings and Conditions of Contract.

b) Authorized Variations and Provisional Items will be measured and valued in accordance with the provisions of the Conditions of Contract as amended herein.

c) No adjustment will be made to the contract sum for a rise or fall in the cost of labor or materials.

d) The Contractor will be held responsible entirely for the costs of any delays or remedial works arising from or during the execution of the works whatever the reason for such delays or remedial works, except for those reasons allowable under clause 2.2 and 2.3 of the Conditions of Contract.

P-8 Conditions of Contract

The Standard Form of Building Contract for Minor Works will be those issued under the sanction of the Royal Institution of Chartered Surveyors (Hong Kong Branch) The Society of Builders, Hong Kong. A copy is enclosed herewith. The Contractor should study the Conditions of Contract.

P-9 Overtime

The Contractor, if he considers that it may become necessary to cause overtime to be worked in order to complete the Works by the Date for Completion, he should allow for such a contingency in his tender price. No claim for any extra in this connection will be considered.

P-10 Protection of Public and Occupants

The Contractor is to take every precaution necessary to protect the public from injury or death during the course of the Works.
The Contractor shall provide sufficient protection to the people who are using the premises.

P-11 Protection of Property

The Contractor shall maintain and protect all properties and bear all costs incurred making good and damage caused thereto.

P-12 Scaffolding, Plant, etc.

The Contractor shall follow the requirement of NGO to erect and maintain all necessary Hoarding, scaffolding, fans, staging, fencing and all other temporary works such as working platforms, decking bridges, *(Hoarding Protection)* etc., that may require for the erection and completion of the Works.

* The Contractor are required to dismantle and remove from Site all scaffolding and temporary works and clear all debris generated during the execution of the Works.

P-13 Maintenance of Existing Services

The Contractor shall ensure that any existing services such as electric power, telephone, water or drainage, etc., are maintained during the course of the Works.

Where alterations to services are necessitated by the Works, the Contractor requires to employ registered contractor of relevant trades to carry out such diversion.

If, in the Architect's opinion, damage may be caused during the execution of the Works, the Contractor shall be responsible for any damage, accidental or otherwise, and shall make good such damage as required at his own expenses.

P-14 Restriction of Nuisance of Dust and Noise

The Contractor is to take all necessary steps to restrict the nuisance of dust and noise. Noise levels emitted by mechanical / electrical plant / requirement shall comply with the relevant regulations / requirements of the Environmental Protection Department. The Contractor shall take care to abate the nuisance caused by dust and shall sprinkler dusty areas with Water frequently.

P-15 Workmen living on Site

No Workmen will be allowed to live on site.

P-16 Stop Works Instructions

The Architect is empowered to stop all work or any part of the Works if such Work is not accordance with the Architect's Specifications, Drawings and Installations or in his opinion, the Work may jeopardize the safety of the general public and create danger to adjoining lands and buildings.

P-17 Safety Precautions

The Contractor shall allow for complying with all regulations of the Labour Department in relation to safety on work site.

The Contractor shall allow for complying with all aspects of the Construction Site (Safety) Regulations and all amendments thereto.

The Contractor shall allow for complying with all aspects of the Industrial Safety Regulations and all amendments thereto.

The Contractor shall provide and maintain all necessary protective and Safety clothing and equipment for his work people and site staff.

P-18 Shop Drawings

Shop drawings, Working Program and color samples which are to be submitted by the Contractor for the approval of the Architect shall be furnished **within 14 days after the award of the Contract** or such time as may be approved by the Architect. The Contract or such time as may be approved by the Architect. The Contractor shall allow sufficient time in his programme for any disapproval or amendment and resubmission of shop drawings and samples for approval as no claim in any way whatsoever for extra costs and expenses arising out of such disapproval or amendment and resubmission.

Shop drawings and samples submitted by the Contractor may at the discretion of the Architect be checked and approved only on the basis of certain elementary check. This basic approval does not relieve the duties and responsibilities of the Contractor to execute the Works in accordance with the Drawings and to notify the Architect immediately specifying and discrepancy or divergence between the Drawings and the Contractor's shop drawings and details.

No approval in any form or otherwise by the Architect of any shop drawing shall relieve the Contractor in any way of his responsibility and obligation to perform the Works instruct accordance with the Architect's drawings or for the proper execution of the Works to the satisfaction of the Architect.

P-19 Working Hours, Rates and Wages, etc.

The Contractor shall comply with any current legislation or regulation regarding working conditions, working hours or rates for costs to employees and shall accept the risk of any impending legislation or other condition which alter any obligation or impose new obligation.

Section B

Particular Specification of M&E Works

CONTENTS

PART A - GENERAL

CONTENTS

1. DETAILS AND SCOPE OF WORKS

1.1 This Contract shall include the building services installations as described in this Specification and as shown on the Drawings, comprising the following: -

i) Electrical Installation
ii) Air-conditioning Installation
iii) Fire Service Installation
iv) Plumbing and Drainage Installation

1.2 The work to be carried out is generally shown on the accompanying drawings and specified in the Schedule of Equipment and shall comprise, but not be limited to the following items :-

i) Coordination with Client operational staff on all matters concerning relocation / modification / re-provision and installation.

ii) Examination, inspection and test to the witness and satisfaction of the Consulting Engineer, the performance of the system and associated equipment and obtaining all necessary approval for the operation.

iii) Allow for painting of all new / replaced / existing piping, hanger, brackets and support etc for aesthetic purpose for the installation exposed to view. All new/replaced installation must be painted with one coat of priming paint.

iv) Dismantle/diversion/relocation of existing system as shown on drawings.

v) The branch-off point indicated on Drawings is for reference only, the Contractor shall obtain the Architect's approval to determine the appropriate points of connection from the existing installations on Site.

vi) Provide all necessary equipment (e.g. scaffolding etc.) for installation.

vii) The quantities stated by the tenderer in the Schedule of Rates shall be deemed as indicative for tender evaluation purpose only and shall not be used for contractual measurement. The successful tenderer shall provide all necessary materials and labour for the satisfactory completion of the whole installation to effect and efficiently operational and functional system as called for whether implicitly or explicitly in the specification and drawings.

viii) Unless otherwise specified, steel conduit shall be used for this project expect those to be concealed in new wall or new partition. Conceal PVC conduit shall be used in new wall or new partition.

ix) All building works including allowing holes through wall and floor slabs for E&M Services and making good and re-instate afterwards. The Contractor shall also be responsible for providing pipe sleeves and puddle flanges, marking and setting out all holes required on site to ensure conformity with installation requirements. Checking of all the holes shall be the sole responsibility of the Contractor. The Contractor shall also be responsible to fill and seal up all gaps between his services and the sleeves through which the services pass to the same fire resistance as the relevant walls and slabs where they are installed, and externally with waterproof mastic sealant to prevent water ingress pipe chases and shafts.

x) Provide necessary information as for complying with requirements of Code of Practice for Energy Efficiency of Building Services Installation (2018 edition) issued by EMSD and submit the necessary document to EMSD according to the "Building Energy Efficiency Ordinance".

1. DETAILS AND SCOPE OF WORKS (cont'd)

1.3 The Contractor's obligations and the general requirements on materials and workmanship for the building services installations shall comply, where applicable, with the following latest Hong Kong Government Specifications and Standards, statutory obligations, regulations and requirements, together with any amendments made thereto, unless otherwise specified on the Drawings or in this Specification.

i) General Specification for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition - issued by Building Services Branch, Architectural Services Department (hereinafter referred to as the Electrical General Specification or EGS).

ii) General Specification for Air Conditioning, Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition - issued by Building Services Branch, Architectural Services Department (hereinafter referred to as the Air Conditioning General Specification or A/C GS).

iii) General Specification for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition - issued by Building Services Branch, Architectural Services Department (hereinafter referred to as Fire Service General Specification or FS GS).

iv) General Specification for Plumbing and Drainage Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition - issued by Building Services Branch, Architectural Services Department (hereinafter referred to as Plumbing and Drainage General Specification or PD GS).

v) General Specification for Broadcast Reception Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition - issued by Building Services Branch, Architectural Services Department (hereinafter referred to as BRI General Specification or BRI GS).

vi) Code of Practice for the Electricity (Wiring) Regulations issued by Electrical and Mechanical Services Department, the Government of the HKSAR;

vii) The current requirements of FSD, including those specified in the FSD Circular Letters and the current edition of the "Codes of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment";

viii) Code of Practice for Energy Efficiency of Building Services Installation, 2018 Edition, issued by Electrical and Mechanical Services Department, the Government of the HKSAR;

ix) BSB Standards and Standard Details issued by Building Services Branch, Architectural Services Department.

x) The Standard Requirements and Circular Letters issued by Water Authority.

xi) All the subsequent amendments for the above documents prior to the date of tendering unless otherwise specified on the Drawings or in this Specification.

2. COORDINATION

The Contractor shall carry out proper site co-ordination for all building services works as described in the Specification and Drawings. The retained material/equipment shall be kept and stored in good condition to avoid any damage caused. The dismantling work and abandon work shall be proceeded after accepted by Client / Architect / Consultants.

The Contractor shall coordinate and liaise closely with authorities and utility companies on the works related to the provision of all necessary utility services to the Premise.

The Contractor should entertain Client's request. Night work shall be included in your tender offer.

Provide attendance and co-ordination for all services termination for installation.

3. BUILDER'S WORKS RELATED TO BUILDING SERVICES

3.1 The Contractor shall be responsible for coordinating and providing all the builder's works required for the completion of building services installations. The works shall include but not be limited to the following:

i) All building works including allowing holes through wall and floor slabs for E&M Services and making good afterwards shall be included. The Contractor shall however be responsible for providing pipe sleeves, marking and setting out all holes required on site to ensure conformity with installation requirements. Checking of all the holes shall be the sole responsibility of the Contractor. The Contractor shall also be responsible to fill and seal up all gaps between his services and the sleeves through which the services pass to the same fire resistance as the relevant walls and slabs where they are installed, and externally with waterproof mastic sealant to prevent water ingress. Making good and seal up works for all gaps between the pipe sleeve and the structure openings shall be provided by the Contractor.

ii) Provide touch-up and make good works for the wall, floor with tile for aesthetic purpose.

iii) Wall chasing for concealed conduit installation as required by Architect.

iv) Openings on walls/floor slabs/structural beams for penetration of services and the fire seals/barriers of appropriate rating where required.

v) Holding facilities such as ceiling hooks, fixing brackets, etc for installation of ceiling mounted equipment & facilities.

vi) Fire-rated enclosures.

vii) External wall air louvre.

viii) Transfer air louvre.

3.2 The following are the general requirements on the builder's works for building services installations.

i) The remaining spaces at the wall chases and openings after installation of services shall be patched up and made good to Architect's satisfaction.

4. RECORD OF ORDERING AND DELIVERY OF APPROVED EQUIPMENT AND MATERIAL

Upon the request of the Architect, the Contractor shall submit updated schedule of ordering of the approved equipment and material for review and record from time to time.

5. PAYMENT OF COSTS RELATED TO STATUTORY INSPECTION & CERTIFICATES

The Contractor shall be responsible for all submissions including preparation of required documents and calculations and any payment relating to statutory inspections for obtaining all necessary approvals and certificates at his own cost.

6. TESTING AND COMMISSIONING

6.1 The Contractor shall be responsible for carrying out the testing and commissioning works on the building services installations according to the following: -

i) Testing and Commissioning Procedure for Air-conditioning, Refrigeration, Ventilation and Central Monitoring & Control Systems Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

ii) Testing and Commissioning Procedure for Electrical Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

iii) Testing and Commissioning Procedure for Fire Service Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

iv) Testing and Commissioning Procedure for Plumbing and Drainage installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

v) Testing and Commissioning Procedure for Burglar Alarm and Security Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

vi) Testing and Commissioning Procedure for Broadcast Reception Installation in Government Buildings of the Hong Kong Special Administrative Region, 2017 Edition.

6.2 The Contractor shall, at his own cost, allow for the attendance on testing and inspection of the building services installations to be conducted by the utility companies and/or government authorities / housing authorities so as to ensure that compliance with their requirements will be achieved in such a good time to the satisfaction of the Architect.

7. DISMANTLING/MODIFICATION/DIVERSION

The Contractor shall be responsible for the necessary dismantling / modification / diversion of the existing building services installations within and related the sites. The Contractor shall carry out site surveys to identify any existing services of the Premise to be diverted and submit the method statements, diversion proposal and shop drawings of the dismantling / modification / diversion works to the Architect for approval prior to the commencement of the works.

The dismantling / modification / diversion works shall be performed step by step and by all means so as to keep the interruption to the normal operation of the Premise to minimum. In case of doubt, the Contractor shall seek for the advice from the Architect before the dismantling / modification / diversion to the existing building services installations being carried out.

No dismantling of existing services shall be commenced unless the items to be disposed of or handed over to the Premise have been agreed with the Architect.

7. DISMANTLING/MODIFICATION/DIVERSION (cont'd)

The Contractor shall take all necessary precautions in carrying out dismantling of the existing building services installations to ensure the work safety and the integrity of the equipment required to be handed over to the Premise. The Contractor shall be responsible for removing all the unusable equipment/materials taken down from the existing installations off the site and for disposal in a proper manner.

8. DATE COMPLIANCE

No values for current or future date/ time will cause any interruption to operation which will affect the performance or functionality of all or part of the systems and/or equipment (including any supplied or supported embedded systems, hardware, software, firmware, micro-code and programmes).

9. INTELLECTUAL PROPERTY RIGHTS

The Client shall become the absolute and exclusive owner of the O&M Manuals and the User Manual and all intellectual property rights subsisting therein free from all encumbrances.

In the event that the beneficial ownership of any intellectual property rights subsisting in the above Manuals are vested in anyone other than the Contractor, the Contactor shall procure that the beneficial owner shall grant to the Employer a transferable, non-exclusive, royalty-free and irrevocable licence (carrying the right to grant sub-licnces) to utilize the intellectual property rights in the manuals for the purposes contemplated in the Contract. For the avoidance of doubt such purposes shall, but not limited to, include providing free copying of the materials in the manuals by any subsequent owner or user of the installation, and/or any party responsible for the operation and maintenance of the installation in connection with any subsequent alteration, extension, operation and maintenance of the installation.

10. OPERATION & MAINTENANCE (O & M) MANUALS

The Contractor shall, after the building services installation is completed, provide to the Employer, 4 sets of O & M Manuals, each of which shall comprise the following :-

i) A cover giving :-
   a) the name of the development,
   b) the title of the document, and
   c) the name and address of the installation contractor.

ii) Inside page giving similar information to the cover but including contact telephone numbers for normal and emergency use.

iii) Contents page.

iv) Description of the installation.

v) Scheduled details of all equipment and plant.

vi) Test reports and commissioning records.

vii) List of equipment and plant with manufacturer's name and address and local agent, if applicable.

viii) Manufacturer's literature suitably indexed to include shop drawings, etc.

ix) List of as-installed drawings.

10. OPERATION & MAINTENANCE (O & M) MANUALS (cont'd)

x) Manual should be produced on A4 size paper, all sections should be suitably separated and readily identifiable or pages should be numbered consecutively and pages numbers included in the contents page. Approved manuals should be submitted in loose leaf ring binders with hard covers to facilitate storage. As-installed drawings may be folded and accommodated in the O&M Manual if appropriate. As-installed drawings should include a diagrammatic layout of the complete installation with major items of plant suitably referenced to the schedules (item v above). Existing and new installation should be in detail highlighted in the as-installed drawings. A set of the as-installed drawings should be provided for each copy of the O&M Manual required to be provided. In addition one set of electronic file in AutoCAD of as-fitted drawings in CD-Rom should be provided.

PART B - ELECTRICAL INSTALLATION

CONTENTS

1. SCOPE AND SPECIFICATION OF WORK

1.1 INSTALLATION / SYSTEMS

(a) All equipment, materials and workmanship shall fully comply with the specifications as stated in the Section Part A of Particular Specification and all current amendments thereto, unless otherwise specified on the Drawings or in this Particular Specification.

(b) The Contractor shall be responsible to complete the contract works in accordance with the requirement state in the Building Energy Efficiency Ordinance (BEC) 2018, but not limited to the following:-

1) Lighting Power Density
2) Power Distribution Loss

(c) The electrical system is generally shown on the accompanying drawings and specified in the Schedule of Equipment and shall comprise, ***but not*** be limited to, the following items:-

1) Sub-main distribution and final circuit system.

2) General lighting and power installation.

3) Earthing and equipotential bonding system

4) Broadcast reception installation.

5) Closed circuit television (CCTV) system installation.

6) Preparation and submission of application forms for electricity supply for both landlord and liaison with the Power Company i.e. Hong Kong Electric Company Limited for tests and meter installation.

7) Cable containment and cat. 6 cable wiring for IT system.

8) Cable containment and cat. 6 cable wiring for Telephone system.

9) Dismantling / Diversion / Modification Works of existing installation and minimize any disturbance to daily operation.

10) Prepare and submit samples, catalogues, shop drawings, as-built drawings, test results and all necessary form to relevant parties for approval.

11) Provide 4 sets of operation and maintenance manual and maintenance during the Maintenance Period.

The testing and commissioning for the above works which were shown on the accompanying drawings shall be done by the contractor.

1.1.1 Incoming Electricity Supply

(Not Used)

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.2 Main Supply and Sub-Main Distribution

(a) General

1) The Contractor shall supply and install the sub-main distribution systems as shown on the Drawings and as described in this Specification and the EGS.

2) The Contractor shall supply, install, modify and connect sub-main distribution system comprising, MCB boards, cables, cable glands, conduits, trunkings and all other necessary accessories to complete the system as shown on the Drawings. All supplied equipment and materials shall comply with EGS.

(b) Technical and Performance Requirements

1) The Contractor shall be responsible for checking on site all the existing electrical installation as shown on the Drawings at commencement of the Contract and inform the Architects for any deviation from that shown on the Drawings within one week after the award of the contract.

2) For dismantling and/or modification works on the existing electrical installation, any claims of delay due to insufficient time for dismantling and/or modification works of the existing electrical installation will not be entertained. The Contractor shall also be responsible for discarding all dismantled items. The Contractor shall verify and ensure all cable containment facilities are sufficient to cater for all cables (including both existing and new cables); if necessary the Contractor shall modify the existing and/or provide new cable containment.

3) The Contractor shall provide adequate protection to any cables for electricity supply to the existing building during construction period. The cable protection provided shall be to the satisfaction of both the power supply company and the Architect.

4) Locations of existing and new sub-main distribution installations and electrical services routes shown on the Drawings are indicative only. The Contractor shall verify the exact locations on site and include the extra cost for additional modification or adjustment required in his price to complete the system installations.

5) Routing of cable trays, trunkings, cables, conduits, etc shown on the Drawings are diagrammatic only and subject to minor variation on site.

6) Wall mounted switchgear shall be fixed onto the wall with rag bolts grouted into the wall and secured by hexagon nuts and washers.

7) Unless otherwise specified, all MCB boards shall be surface mounted on wall in positions as indicated on the Drawings while the outgoing conduits shall be surface mounted and then conceal in the new concrete slab.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.2 Main Supply and Sub-Main Distribution (Cont'd)

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

(d) Others

1) The Contractor shall provide complete set of as-fitted schematic wiring diagrams of at least A3 size drawn in permanent ink and each housed in a wooden frame with glazed front panel showing the complete electrical installation including the existing installation, to the approval and satisfaction of the Architect and mounted adjacent to the main distribution board.

2) The Contractor shall be responsible for co-ordination with the Power Company to test and energise the electrical installation for proper operation matching with the programme as well as the testing and commissioning schedules of all installations for the whole project, and with all electrical installations fully completed, tested and commissioned in each stage to facilitate the use of the permanent supply by all concerned parties as required. Any cost for such testing and commissioning to the satisfaction of the Power Company and the Architect shall be deemed to have been included in the Contractor's tender sum.

1.1.3 Lighting and Power Final Circuits

(a) General

1) The Contractor shall supply, install and perform testing and commissioning on the lighting and power final circuits as shown on the Drawings and as described in this Specification and EGS.

2) Unless otherwise specified, all existing electrical installation shall be dismantled. Prior to the removal of the existing electrical installation, the Contractor shall discuss with the premise and the Architect to confirm items to be retained. The Contractor shall check on site to ensure that the circuits intended to be dismantled shall not have adverse effect on other rooms/equipment.

3) The Contractor shall supply, install and connect a complete wiring system with concealed or surface conduits comprising power cables, conduits, electrical accessories, light fittings, etc for the lighting and power final circuits as shown on the Drawings.

4) The Contractor shall supply and install the emergency lightings in this Contract as shown on the Drawings. Fire resistance cable having low smoke zero halogen emission approved by FSD shall be laid in steel conduit or trunking for the power supply of exit signs according to the FS GS.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.3 Lighting and Power Final Circuits (Cont'd)

(b) Technical and Performance Requirements

1) The positions of switches, sockets, MCB distribution boards, light fitting, etc as shown on the Drawings are diagrammatic only, their exact positions will be subject to adjustment to suit site condition. Extra claim for such adjustment will not be allowed.

2) Unless otherwise specified on the Drawings, all light switches shall be rated at 10A. All luminaries shall be controlled by local light switches at between 750mm and 1200mm AFFL.

3) Watertight switch to IP56 shall be provided for outdoor air conditioning unit and as shown on Drawings.

4) The fused connection unit shall be an integral type with double pole switch and pilot light.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

(d) Others

1) The positions and cable routes of all lighting and power points as well as trunkings/conduits and boxes etc. are indicative only and subject to variation on site. The Contractor shall submit coordinated layout plans, reflected ceiling plans and floor plans etc., and shall make all these positions on site after coordination with all other services installed in the same spatial zone, for the approval of the Architect prior to commencement of work. No claim due to such variation shall be entertained. For lighting/power points etc. installed on false ceilings as well as power/telephone/computer points, junction and services boxes etc. on floor level, the Contractor shall refer to the actual ceiling, floor and furniture layouts and installing levels for the final locations of the points. No claim for additional payment shall be entertained if the work is executed without the approval of the Architect. The Contractor shall be responsible for final adjustment of the installed points to suit the actually installed ceiling or floor so as to produce a sightly and neat appearance as well as a well coordinated arrangement to the satisfaction of the Architect.

2) The Contractor shall also liaise and co-ordinate closely with other parties with reference to the architectural layouts, the furniture layouts and the combined services layouts to ensure that no conflict exists between the locations of the power supplies to the electrical appliances or equipment, locations of telephone and computer points etc. and the locations of sinks, racks or furniture, etc.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.3 Lighting and Power Final Circuits (Cont'd)

d) Other (Cont'd)

3) Should a conflict exist, the Contractor shall submit the proposal on the revised location of the services to the Architect for comment and acceptance before the Contractor execute the installation work.

4) The Contractor shall also through the liaison with all parties be responsible to design and arrange his actually offered material and provision for the installation, taking into account of the required installation features and functions, and have all the other services been coordinated and possible obstructions like beams, walls, been considered, so that a workable and a tidy installation layout can be produced to provide the optimum performance and effect, and to facilitate the case of future inspection, servicing and addition of provisions.

5) The contractor shall be responsible for any diversion work due to the change of layouts, whatever which is architectural or BS installations. The contractor shall verify on site and submit proposal for the architect's acceptance.

6) The contractor shall be responsible for the rectification of any damage caused to the existing installation, including concealed works due to the construction works.

1.1.4 Classroom Lighting Control System

(Not Used)

1.1.5 Control System For Ventilation / Air Conditioning & Lighting By Occupancy Sensor

(Not Used)

1.1.6 Call Bell System

(Not Used)

1.1.7 Extension Of Existing Class Changing Bell System

(Not Used)

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.8 Luminaries

(a) General

1) The Contractor shall supply, install and perform testing and commissioning on the luminaries as shown on the Drawings and as described in this Specification, FS GS and the EGS.

(b) Technical and Performance Requirements

1) Unless otherwise specified, all fluorescent lamps shall be T5 energy saving type in white colour (having colour temperature of 4000K) completed with electronic ballast to the EGS requirements. Multiple lamps fluorescent luminaries shall be fitted with separate control gear for each lamp.

2) The proposed installations method of the fittings shall be submitted to the Architect for approval. Pendant type fluorescent fittings shall be installed in line with soffit of beam with reference to the bottom of luminaire's reflector or diffuser and be agreed on site by the Architect. The pendant fluorescent fittings shall be securely mounted on the ceiling.

3) All emergency luminaries (including exit signs as well) shall be of self-contained type in compliance with the FS GS. The luminaries shall be of maintained type and the battery shall have ample capacity to maintain the output of the luminaire for up to a minimum of 3 hours after the mains supply fails. The light output from the luminaire shall not be less than 50% of the nominal light output throughout the discharging period in the rated duration at emergency mode.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

(d) Others

1) Internal wiring of minimum 1.5mm2 heat resistant copper cable shall be provided, appropriately colour coded, neatly wired and properly terminated. Terminal blocks shall be capable of accepting looping in cable up to 2.5mm2. All luminaires shall be equipped with earthing and bonding points, and shall be properly earthed and bonded to the requirements of this part of Specification.

2) Movable parts of luminaires shall generally be made so that gravity assists in retaining them in a safe position or by other specified or approved means. Locking devices shall be positive. Movement shall not cause any straining of chafing of insulated wiring.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.8 Luminaries (Cont'd)

d) Other (Cont'd)

3) Each luminaire shall be supplied as a complete set comprising the main part, reflector, diffuser, controlgear, lamp holder, internal wiring, fused terminal blocks, integral earth and bonding terminals, lamp tubes or bulbs, proprietary lamp pole and bracket as specified in the lighting schedule, fixing bolts and nuts, protective gears, cable entry box, change box, and other accessories as appropriate.

4) The Contractor shall provide all relevant catalogues, photometric data, curves, technical literatures in English languages and certificates for each luminaire offered with the Tender for reference and perusal. After the award of the Tender, the Contractor shall provide the relevant catalogues, photometric data, calculations for lighting selection and levels, etc., certificates and samples of all luminaires offered to the Architect for approval prior to order and installation, meeting with the overall building program. The Contractor shall also provide calculated and/or computer generated coloured illumination level plans and drawings for all rooms/areas showing the illumination levels in lux and effects under various control conditions at all locations within the rooms/areas, taking into account of the layout and provisions such as furniture, equipment, ceiling/floor/wall finishing etc. to the Architect for study and approval prior to order and installation. The Contractor shall allow for any re-arrangement of the lighting installation and re-submit the layout and illumination plans as necessary until they are satisfactory accepted by the Architect before installation.

5) The contractor shall demonstration the performance of selected area as required by the architect while the submission of material.

1.1.9 Electricity Supplies & Cable Containment for Various Systems

(a) General

1) The Contractor shall supply, install, and perform testing and commissioning on cable containment (including conduits, trunkings and all necessary accessories etc.) for the following systems as shown on the Drawings and as described in this Specification and the EGS where applicable: -

i) Telephone System
ii) IT System

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.9 Electricity Supplies & Cable Containment for Various Systems (Cont'd)

(b) Technical and Performance Requirements

1) The Contractor shall provide adequate draw wires inside all conduits where the wiring is to be carried out by other specialist Contractors under this Contract or by others.

2) The items (i) and (ii) in above will be supplied and installed by other specialist Contractors under this Contract. The Contractor shall be responsible for the attendance and coordination on the provisions of electricity supplies and cabling facilities among his various specialist Contractors.

3) Unless otherwise specified, steel conduit shall be used for this project.

4) Surface mounted conduit shall be used except concealed type conduit shall be for all conduits installed on floor level.

5) The trunking and conduit system for computer network shall be provided as shown on the Drawings and as per this Specification. Blank plastic cover plate shall be provided for each LAN point outlet .

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.10 Broadcast Reception Installation (BRI)

(a) General

1) The Contractor shall design, supply, install and perform testing and commissioning on the BRI as shown on the Drawings and as described in this Specification, the BRI GS and the EGS.

2) The Contractor shall supply and install a complete wiring system including conduits, coaxial cable, TV outlets, splitter/tee units, amplifier, outlet boxes and cover plates, etc for integration with the existing BRI system as an integral system where applicable as shown on the Drawings.

3) The Contractor shall carry out coordination and ensure that the existing BRI will function properly after all the modification and additional works as shown on the Drawings are completed.

4) The Contractor supply and install all necessary equipment, devices, cable, etc. for receiving High-definition television signal.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.10 Broadcast Reception Installation (BRI) (Cont'd)

(b) Technical and Performance Requirements

1) Location of existing BRI main unit shown on the Drawings is for information only. The Contractor shall check the actual location on site for installation of connection facilities for interface between the new and/or modified BRI outlets and the existing BRI system. The Contractor shall include in his price any pre-amplifier, amplifier, etc (including power supply points for the amplifiers) required to be added to the existing system to ensure adequate signal strength can be obtained in each relocated and new TV outlet.

2) The Contractor shall select the BRI equipment and components to match with the existing components to ensure that the system conforms to the specified performance requirements. In the event that these requirements cannot be met due to the use of improper, incorrect or inconsistent components, the Contractor shall replace all such components and shall re-design the broadcast reception installations to the satisfaction of the Architect. All extra costs thus incurred shall be borne by the Contractor.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.11 Closed Circuit Television (CCTV) System

(Not Used)

1.1.12 Emergency Call Bell System

(a) General

1) The Contractor shall be responsible for the complete design, supply, installation, testing and commissioning on the emergency call bell system for interview room, accessible toilet, lavatory and training area. The system shall comprise an emergency call monitoring panel with a power supply unit, call bell push buttons, local alarm bells, alarm reset switches for interview room, accessible toilet, lavatory, wiring, conduit system and all necessary accessories required to complete the system as shown on the Drawings and as described in the Specification and the EGS.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.12 Emergency Call Bell System (Cont'd)

(b) Technical and Performance Requirements

1) The emergency call bell system shall be designed to provide visual and audible indication for emergency calls initiated by pressing the call bell push buttons in interview room, accessible toilet, male and female lavatory. When an emergency call is initiated, the emergency call monitoring panel shall give a visual indication by means of LED indication lamp and also an audible alarm by means of buzzer. The audible alarm and visual indication on the monitoring panel can only be turned off by pressing the "RESET" push button on the emergency call bell monitoring panel after the call bell push buttons have been turned off by using the reset switch inside the New Bath and Toilet for the disabled in Dormitory 1 & 6, New Toilet for the disabled in Activity Room 2, New Toilet for the disabled in New Isolation Room.

   Emergency calls occurring simultaneously or consecutively shall be registered by the monitoring panel and no call shall be lost.

2) The system shall be operated at 24V d.c. and equipped with weatherproof push buttons to IP56 in interview room, accessible toilet and lavatory for activating alarm in an emergency call bell panel at the office as indicated in the Drawings.

3) The emergency call bell panel shall be microprocessor-based and be provided with LED indication lamps and audible alarm for emergency calls. The emergency call bell panel shall be constructed by minimum 1.5mm thick hairline stainless steel for the cover plate and Ventilation slots with wire mesh shall be provided at both sides of panel.

   All electronic components used in the system shall comply with the relevant General Specification issued by Electrical and Mechanical Services Department, HKSAR Government

   Separate LED indication lamp with label shall be provided to identify the location of each calling point. A "RESET" push button shall be provided on the emergency call monitoring panel to reset an alarm call and turn off the corresponding LED indication lamp.

   The panel shall be provided with a buzzer with adjustable sound level. The sounding period of the buzzer can be adjusted from intermittent mode to continuous mode.

   A label with letter "Emergency Call Bell System Panel for Accessible Toilet" engraved in both Chinese and English shall be fixed on surface of the panel. Labels in both Chinese and English shall be provided and engraved on the panel for all indication lamps, push buttons and buzzer. The Contractor shall submit shop drawings of the panel for the approval by the Architect prior to the construction of the panel.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.12 Emergency Call Bell System (Cont'd)

b) Technical and Performance Requirements (Cont'd)

3) (Cont'd)

The panel layout shall be submitted for approval before construction. The emergency call monitoring panel shall include a power supply unit. The power supply unit shall operate from an a.c. single phase supply and give an output of d.c. at extra low voltage.

The power supply unit shall comprise of a double-wound isolation transformer to BS EN 61558 or equivalent of suitable rating, rectifier, charger and sealed type rechargeable nickel metal hydride batteries.

The power supply unit shall provide the power required by the whole emergency call bell system. The capacity of the rechargeable batteries shall support the normal operation of the system for 2 hours when the mains supply fails. The time for charging the batteries to full capacity from total discharge state shall not be more than 12 hours.

Under mains supply, the batteries shall be charged to maintain in a fully charged state ready to supply power required by the system. When a failure of mains supply occurs, the power supply unit shall switch instantaneously to battery powered operation. Upon restoration of the mains supply, the power supply unit should switch back to mains supply and the batteries shall be re-charged again. The whole operation shall be performed automatically.

All components shall be readily accessible and all wiring terminals shall be labelled. The wires to and from the terminals shall be identified with numbered ferrules.

All interconnecting cables between system equipment shall be in PVC copper cable of not less than 1.5mm^2.

4) The call bell push button shall be of waterproof type to IP 56 and fixed to a cast-in steel wall box to IEC 60670 box. The push button shall be located at a height of 1000mm above the finished floor level and shall be conveniently accessible. The push button shall be connected to the emergency call monitoring panel and shall initiate the buzzer and an indication lamp on the panel.

The call bell push button shall have a current rating of not less than 5A at extra low voltage d.c.

A notice engraved with "Emergency Call" (in both English and Chinese) shall be fitted next to each emergency call bell push button.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.13 Earthing System & Supplementary Bonding

(a) General

The Contractor shall supply, install and perform testing and commissioning on the earthing system as shown on the Drawings and as described in this Specification and the EGS.

(b) Technical and Performance Requirements

1) All metalworks associated with the electrical installation but not forming part of a live conductor, including exposed conductive parts and extraneous conductive parts, shall be solidly and effectively bonded and earthed in accordance with IEC 60364-1:2009 and the associated parts of the standard and Code of Practice for the Electricity (Wiring) Regulations.

2) Whenever conduits, trunkings and cable trays are installed across expansion joints of building, the Contractor shall allow suitable provisions to the conduits, trunkings and cable trays in order to maintain the integrity of circuits / cables and the continuity of earthing.

The cable for forming supplementary bonding of extraneous conductive parts shall be run in conduits. All trenching works on slabs, floor, wall, etc. shall be included.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.14 Public Address System

(a) General

1) This outline specification sets out the minimum functional requirements of the Public Address System, hereinafter termed the PA System. The tenderer shall submit his proposal giving full details and catalogues of the Public Address System offered in his Tender for the Consulting Engineer's tender evaluation at the time of tendering.

2) Various design parameters such as functions, types and locations of control consoles, and loudspeakers, etc. are stipulated hereinafter. The Contractor shall be responsible to select and determine the sizes, operation characteristics and arrangements of all offered equipment and cabling as well as loudspeaker mounting heights and angles and carry out all necessary work to ensure good audibilities and intelligibilities of normal speeches and background music conveyed through the Public Address System to relevant areas.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

a) General (Cont'd)

3) The Contractor shall carry out all necessary work and provide all necessary technical advice to avoid any acoustic feedback and echo effect in the system.

4) The Contractor shall provide all necessary equipment and materials and complete all necessary work required, whether stipulated in this specification or not, to comply with requirements of authorities having jurisdiction over the Public Address System, namely, the Principal Government Electrical and Mechanical Engineer, Post Master General, etc., without further charge to the Employer.

(b) Description & Extent Of Work

1) The Work consists of the complete supply and installation of the Public Address System. The PA System shall comprise, but not be limited to the following items:-

i) PA system workstation with microphone, multi-disc DVD / CD player, AM / FM tuner, monitor, software programme and all necessary accessories.

ii) PA system with pre-amplifiers, power amplifiers, all necessary accessories.

iii) Loudspeakers.

iv) All necessary sundries including transmission devices, plugs, sockets, cabling, power supply units.

2) The tenderer shall provide all necessary materials and labour for the satisfactory completion of the whole installation to effect an efficiently functional system as called for in the specification and drawings.

(c) System Requirement

1) Announcement / paging from PA system workstation to separate but linkable zones.

2) Background music broadcast from PA system workstation to separate but linkable zones.

3) The PA system shall be able to perform localized paging, if any zones are being selected for paging, other zones shall be muted.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

c) System Requirement (Cont'd)

4) The PA system shall be able to operate in 2 different modes, namely Normal Mode and Evacuation Mode. The PA system shall operate in the Normal Mode, however, during emergency or triggered by fire alarm panel, the controller shall automatically switch into Evacuation Mode and activate Voice Alarm within 3 sec.

5) The PA system and amplifier shall be minimum capable of additional 20% spare power of the whole system to support the spare zone(s) for future extension.

(d) Microphone

1) General

The microphone shall comprise, but not be limited to the following items:-

i) on-axis frequency response not to vary by more than +6 dB, -10 dB over the frequency range 100 to 10000 Hz, relative to 1 kHz.

ii) sensitivity not to be less than 1.0 mV/Pa (-77 dB ref. 1 V/ubar) at 1 kHz.

iii) distortion to be less than 0.5% at 1 kHz at 30 Pa sound pressure level input,

iv) front-to-back discrimination ratio to be greater than 15 dB for 300 to 5000 Hz for unidirectional microphones,

v) balanced, low impedance in the range 200 to 600 ohm at 1 kHz.

2) Microphone Desk Stand & Flexible Gooseneck Shaft

i) The desk stand shall be similarly constructed as the floor stand but with a short satin chrome pillar, with adjustment by means of a clamping ring designed to support the microphone 100 to 200mm above desk top.

ii) The flexible gooseneck shaft shall be a stainless steel flexible tubing of not less than 300mm and permit easy bending in any direction of 45°.

iii) The gooseneck shall be fitted with a thread insert and a XLR-type connector for easy mounting onto a desk stand on one end and a microphone on the other.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

(e) Mixer-Power Amplifier

1) The mixer-power amplifier shall be fully solid-state, and provided with balanced floating outputs of 70V and 100V for loudspeaker connections.

2) As a minimum requirement, the mixer-power amplifier shall be provided with the following facilities:-

   i) Power on / off switch.

   ii) Mains 'on' indicator lamp.

   iii) Independent mixing volume control for each input.

   iv) Master volume, bass and treble tone controls.

   v) Three-core flexible cord and correctly fused plug for mains supply and earth connection.

   vi) AC and DC fuse protection.

   vii) Standard sockets complete with plugs and locking rings for each input and terminals for loudspeaker output.

3) Microphone input sensitivity not to be greater than 0.5 mV for rated output for source impedance of 200 to 600 ohm balanced.

4) High level input sensitivity not to be greater than 400 mV for rated output for source impedance up to 50 kohm.

5) Preamplifier provided at least 60 dB signal range from noise to clipping.

6) Frequency response not to vary by more than ±3 dB over the frequency range 50 to 15000 Hz, at rated output power.

7) Total harmonic distortion at rated output not to exceed 2% between 50 and 15000 Hz, distortion shall not increase at lower power output.

8) Noise level to be better than 65 dB below rated output with input shorted, over the frequency range 50 to 15000 Hz, unweighted.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

(f) Mixer-Preamplifier

1) The mixer-preamplifier shall be fully solid-state and provided with the following facilities:-

   i) power on / off switch.

   ii) independent mixing volume for each.

   iii) master volume, bass and treble tone controls.

   iv) flexible cord and correctly fused plug for mains supply connection.

   v) AC and DC fuse protection.

2) Microphone input sensitivity not to be greater than 0.5 mV for rated output for source impedance of 200 to 600 ohm.

3) High level input sensitivity not to be greater than 400 mV for rated output for source impedance up to 500 ohm.

4) R.M.S. output level not to be less than 0 dBm.

5) Output impedance : 600 ohm balanced.

6) Preamplifier provides at least 60 dB signal range from noise to clipping.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

(g) Loudspeaker

1) Ceiling Mount Speaker

i) The speaker shall be either suitable for flush mounting to a false ceiling of any configuration, or for surface mounting if there is no false ceiling. It shall be equipped with a multiple tapping matching transformer to provide easy control of speaker sound volume. A dust proof bag or metal box shall be provided to protect the speaker. Supporting brackets to mount the speaker onto false ceilings of different configurations shall be provided.

ii) It shall satisfy the following performance characteristics:-

- On-axis frequency response not to vary by more than ±10 dB over the frequency range 200 to 8000 Hz.
- Sensitivity not to be less than 90 dB/W.

(h) Relay Control Box

1) The relay control box shall be made of 1.6mm stainless steel or 3.2mm anodised aluminium.

2) The relay control box shall be equipped with adequate relays sets to provide inhibit circuits to microphone inputs. The tenderer / contractor shall be required to submit a schematic diagram to show the operation of the circuit.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

(i) Equipment Cabinet

1) The cabinet shall be standard 483 mm and of compatible height and sufficient strength and rigidity to house the equipment. It shall be complete with locking door and three-pin power sockets.

2) The cabinet shall be constructed from either teakwood of at least 15 mm thick or stainless steel of at least 1.29mm thick, depending on individual system requirements.

3) Facilities shall be provided for good free ventilation and easy access of connecting cables from outside for maintenance.

(j) Microphone Cable

1) The microphone cable shall be flexible twisted pair of tinned annealed copper conductors, PVC insulation, tinned copper braided shield, and PVC outer sheath.

2) The cable shall satisfy the following minimum characteristics:-

i) At least 16 strands per conductor.

ii) Strand diameter not to be less than 0.15mm.

iii) Nominal outer diameter not to be greater than 50mm.

iv) Capacitance between conductors not be more than 110 pF/m.

v) Inner conductor d.c. resistance not to be more than 36 ohm/km at 20°C.

vi) Insulation thickness not to be less than 0.25mm.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.14 Public Address System (Cont'd)

(k) Loudspeaker Cable

1) The loudspeaker cable shall be flexible pair of tinned, annealed copper conductors, PVC insulated, and white or grey PVC sheath. For surface wiring, the cable shall be a parallel pair. For conduit run, the cable shall be a twisted pair.

2) The cable shall satisfy the following minimum characteristics:-

i) at least 19 strands per conductor.

ii) strand diameter not to be less than 0.21mm.

iii) nominal outer diameter not to be greater than 8mm.

iv) insulation thickness not to be less than 0.5mm.

(l) Connector & Accessories

1) All audio connectors for wall panels, mixer inputs, microphones, etc. shall be Cannon XLR type.

2) Each indoor loudspeaker shall be terminated through a 2A threepin plug and socket complying with B. S. 546 to facilitate easy removal of the loudspeaker. Locally made plug and socket of equivalent standard is also acceptable. The Contractor shall be responsible for properly mounting the socket base plate onto any existing adaptable box provided by others as instructed by the Engineer. Outdoor speakers shall be terminated through weatherproof type plugs and sockets provided with a pushon cap and cap retaining ring.

1.1.15 Other Electrical Equipment and Appliances

(Not Used)

1.1.16 Lightning Protection System

(Not Used)

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.17 Video Doorphone System

(Not Used)

1.1.18 Site Measurement of Electrical Demand

(a) The Contractor shall provide all necessary staff, labour, materials and instruments to carry out on-site measurement for the existing electrical demand. The instruments shall be calibrated by laboratories accredited by the Hong Kong Laboratory Accreditation Scheme (HKLAS) or other recognised accredited laboratories. The Contractor shall ensure that the on-site measurement will not disrupt the normal operation of the Premise.

(b) The Contractor shall carry out the on-site measurement of the existing electrical demand during the testing and commissioning of the entire building services installation as specified on the Drawings and as described in this Specification.

(c) The Contractor is responsible for arranging their works in the shortest time period and to advise Architect and the Premise about the anticipated on-site measurement period in advance for approval. Prior to the on-site measurement, the Contractor shall **coordinate** with the Premise responsible person to ensure that all the existing electricity demand equipment are under operation. The Contractor shall allow the price in the Tender for providing all necessary staff and labour to operate the existing electricity demand equipment.

(d) **The** Contractor shall submit the result of the on-site measurement to the Architect within one week after the measurement works.

1.1.19 Security System

(a) Electric Door-Lock System

1) The electric door lock system shall comprise electric door-latch device, mechanical door lock, magnetic door contact, and control panel with power supply unit.

2) The electric door-latch device shall be of robust design and fitted into the door frame. When the tenant pushes the door release button on their handset, the electrical door- latch device shall operate and the door can be opened. When the door is closed, the latch will hold the door in the locked position. A timer is built into the control circuit with a range of settings between 2 to 30 seconds. When the electric latch has been operated either by the Tenant's Access Panel, or by the push button in the doorphone, or caretaker's push button, or at the door-latch and the door has not been push open, the electric latch will relock the door again after the preset time has expired to prevent unauthorized entry.

1. SCOPE AND SPECIFICATION OF WORK (CONT'D)

1.1 INSTALLATION / SYSTEMS (CONT'D)

1.1.19 Security System (Cont'd)

3) The electric door-latch device shall be of robust design and fitted into the door frame. When the tenant pushes the door release button on their handset, the electrical door- latch device shall operate and the door can be opened. When the door is closed, the latch will hold the door in the locked position. A timer is built into the control circuit with a range of settings between 2 to 30 seconds. When the electric latch has been operated either by the Tenant's Access Panel, or by the push button in the doorphone, or caretaker's push button, or at the door-latch and the door has not been push open, the electric latch will relock the door again after the preset time has expired to prevent unauthorized entry.

4) The electric door-latch device shall be designed to comply with the Fire Services Department Regulations.

5) The operation of the electric door lock system shall be by digital code number system. Four digital code numbering system shall be employed. The digital code mechanism shall be housed in the lockable control box located in the caretaker's office. The combination code number can be easily changed by unskilled authorized personnel.

6) A key operated mechanical door lock shall be fixed into the entrance door. A push paddle shall be provided for releasing the lock mechanically from inside the lobby. Three keys shall be provided for caretaker's office. The Sub-Contractor shall include the cost of supplying the keys in the sub-contract sum.

7) The electric door lock system shall be operated on totally enclosed nickel cadmium batteries and 12 or 24 V trickle chargers for 2 hours emergency period.

8) Electric door locks shall be supplied and connected, by the Sub-Contractor and installed by the Door Supplier. The lock shall be Adam-Rite latch 4510 and peddle device 4590.

   Sample of the electric door-latch and lock proposed shall be submitted for the approval before ordering.

9) The electric door locks in the residential tower shall be operated by the access control system which shall able to distinguish tenant form other towers.

10) One set of concealed magnetic door contact shall be installed at the entrance door to monitor the status of the entrance door of the residential tower. LED indicators shall be provided and built-into caretaker's video phone to indicate the door status whether it is opened or in proper closed position.

1.2 DESIGN RESPONSIBILITIES

The Contractor shall be responsible for the design of the following system(s) and selection of equipment and components. Particular attention shall be paid to ensure compatibility between different equipment / components to meet the specific performance requirements. The Contractor shall submit all design works comprising the followings to the Architect for approval.

(a) Trunking and Conduit system
(b) Earthing system and supplementary Bonding

1.3 COMPLIANCE WITH GENERAL SPECIFICATION

The Contractor shall use the suitable type of cables for fire service installation according to the FS G.S.

1.4 OTHERS

(Not used)

2. CONSTRAINTS APPLICABLE TO THE INSTALLATION

(a) Requirement of off-site fabrication shall be in accordance with E.G.S or as recommended by the manufacturer.

(b) General methodology of the electrical installation shall be in accordance with E.G.S. and recommended by the respective manufacturer.

(c) The Contractor shall ensure that the noise emission from the process of site installation, test or commission shall complies with the "Noise from Places other than Domestic Premises, Public Places or Construction Sites" under the Noise Control Ordinance.

3. TESTING AND COMMISSIONING

3.1 COMPLIANCE WITH TESTING AND COMMISSIONING PROCEDURES

The Contractor shall test and commission the Electrical Installation in compliance Testing & Commissioning Procedures stated in the Preliminaries unless otherwise specified on the Drawings or in this Particular Specification apply to all installations.

3.2 TESTING AND COMMISSIONING PROCEDURES FOR SPECIAL ITEMS

The Contractor shall follow the manufacturer's recommendation on the testing and commissioning of any proprietary system and product included in the installation
The Contractor shall submit the procedures for testing and commissioning of the following items to the Architect for approval:-

- Earthing system and supplementary Bonding

3.3 PARTICULAR REQUIREMENTS ON TESTING AND COMMISSIONING SCHEDULES/SEQUENCES

(a) All submissions as required under these procedures are to be submitted to the Architect at least 2 weeks prior to the commencement of testing and commissioning work.

(b) The Contractor shall allow for the attendance on testing and inspection of the Electrical Installation to be conducted by the local electricity supply company so as to ensure that permanent electricity supply will be energized in such good time to the satisfaction of the Architect.

3.4 OTHERS

(a) The Contractor shall, at his own cost, allow for the attendance on testing and inspection of the building services installations to be conducted by the utility companies and/or government authorities so as to ensure that compliance with their requirements will be achieved in such a good time to the satisfaction of the Architect.

3. TESTING AND COMMISSIONING (CONT'D)

3.4 OTHERS (CONT'D)

(b) The Electrical Installation shall be tested and commissioned fully in accordance with Part D of the "EGS" and "Testing and Commissioning Procedure For Electrical Installation In Government Buildings of Hong Kong Special Administrative Region, 2017 Edition". The Contractor shall follow the manufacturer's recommendation of the testing and commissioning of any proprietary system and product included in the installation.

(c) The Contractor shall provide all labour, instruments and materials necessary for the performance tests and make all necessary adjustments, including measurement of illumination level and checking of operation and submits test results.

(d) The Contractor shall be responsible for the submission of the Electrical Work Completion Certificates including Form WR1 and/or Form WR1 (A). All parts of the Forms shall be completed and all the Forms should be duly signed.

4. MAINTENANCE AND TRAINING

(a) Maintenance Requirements

The Contractor shall allow for and carry out full comprehensive maintenance of the entire Electrical Installations within the Maintenance Period. The commencement date of the maintenance will be directed by the Architect. The Contractor shall allow cost in the tender.

(b) Training Requirements

The Contractor shall provide full comprehensive training for government staff or his designated personnel on operational and maintenance aspects in accordance with E.G.S and the manufacturer's recommendation / requirement.

(c) Others (Not used)

5. EQUIPMENT SCHEDULES INCLUDED IN PARTICULAR SPECIFICATION [ES(PS)]

The Contractor shall complete the Particular Equipment Schedule and submit for the approval of the Architect according to the timing and sequence of submissions as stipulated in the approved programme pursuant to the General Conditions of Contract.

6. SCHEDULE OF APPLIANCE / EQUIPMENT SUPPLIED BY THE EMPLOYER

(Not used)

PART C - AIR-CONDITIONING INSTALLATION

CONTENTS

1. SCOPE AND SPECIFICATION OF WORK

1.1 INSTALLATION / SYSTEMS

(a) All equipment, materials and workmanship shall fully comply with the specifications as stated in the Section Part A of Particular Specification and all current amendments thereto, unless otherwise specified on the Drawings or in this Particular Specification.

(b) The Contractor shall be responsible to complete the contract works in accordance with the requirement state in the Building Energy Efficiency Ordinance (BEC) 2018, but not limited to the following:-

i) Thermal Insulation
ii) Air-Conditioning Equipment Efficiency
iii) Motor Performance
iv) Power Quality

(c) The HVAC system is generally shown on the accompanying drawings and specified in the Schedule of Equipment and shall comprise, ***but not*** be limited to, the following items:-

i) Supply and install air conditioning units complete with ductworks, pipeworks, thermostate, control, wiring and necessary accessories.

ii) Supply and install ventilation system complete with air fan, ductworks, air grille, control, wiring and necessary accessories.

iii) Supply and install acoustic treatment including duct linning etc. to suit the relevant noise criteria.

iv) Dismantling / Modification Works of existing installation.

v) Checking for the existing air conditioning units and retain the existing air conditioning units with good condition.

vi) Prepare and submit samples, catalogues, shop drawings, as-built drawings, test results and all necessary form to relevant parties for approval.

vii) Provide 4 sets of operation and maintenance manual and maintenance during the Maintenance Period.

The testing and commissioning for the above works which were shown on the accompanying drawings shall be done by the contractor.

1.1.1 Split Type DX Air-conditioning System

(a) <u>General</u>

1. The Contractor shall be responsible for the supply, delivery and installation of the split type DX air-conditioning system as shown on the Drawings. The system shall comply with this Specification and the A/C GS.

(b) <u>Technical and Performance Requirements</u>

1. The complete packages shall be manufactured from a single proprietary manufacturer and the components are specially designed to work as a package.

2. All installation shall be carried out to ensure satisfactory operation of the units under all conditions and in accordance with the manufacturer's recommended method unless otherwise approved or directed by the Architect.

1.1.1 Split Type DX Air-conditioning System (cont'd)

(b) Technical and Performance Requirements (cont'd)

3. The air-conditioners shall employ refrigerant free of CFC and HCFC with zero ozone depletion potential. Each package shall consist of an outdoor unit and an indoor unit.

4. The Contractor shall submit technical catalogues with dimensions of selected equipment to prove that the outdoor units are suitable to be installed at the location as indicated in the tender drawing / particular specification without any deterioration in the performance of outdoor units. The Contractor shall follow the manufacturer's recommendation to install the outdoor units so that all parts shall be accessible and removable for maintenance.

5. The refrigerant pipes and control wiring linking the outdoor and indoor units shall be carried out by the Contractor according to the manufacturer's recommendation. The electrical installations exposed to weather shall be waterproof. The installation shall be carried out by competent technicians.

6. Unless otherwise specified, the conduit and associated accessories for power and control wiring system after the power points (ie isolators, switches, fuse spurs, etc) shall be provided under the MVAC work of this Contract. The power supply shall be provided under the electrical work of this Contract.

7. The electricity supply to outdoor units will be provided under the Electrical Work of this Contract terminated at an isolating switch adjacent to the units. The Contractor shall supply and install necessary wiring to connect the isolator switch and the outdoor condensing units. The Contractor shall be also responsible for supplying and installing wiring comprising concealed/surface conduits, cables and connector unit for the connection between the indoor and outdoor units under MVAC work of this Contract. Emergency stop push button shall be installed adjacent to the unit.

8. Safety and operational control shall be installed at both the high and low-pressure sides of the refrigerant circuit for A/C unit according to the A/C GS.

9. The air conditioner shall be restarted manually after the power failure.

10. The outdoor and indoor units shall be mounted on two layers of neoprene pads vibration isolators with a total thickness not less than 16 mm. The holding down bolts shall have neoprene grommets to isolate the bolts from the machine.

11. The Contractor shall submit manufacturer's calculations and technical catalogues to prove that the submitted brand and model of split type DX air-conditioning system are suitable for this application.

12. The remote controller for the indoor unit shall be of wireless type, completed with liquid crystal display (LCD) and programmable timer control. The controller shall consist of an on-off switch, operational features including fan speed selection, timer setting, temperature setting, self-diagnosis function, auto-swing and auto restart function. All controllers should be handed over to the client's representative of the Premise.

1.1.1 Split Type DX Air-conditioning System (cont'd)

(b) Technical and Performance Requirements (cont'd)

13. All outdoor and indoor units should be labelled for indication.

14. Drain pipes c/w air traps with thermal insulation and finishes shall be provided to convey the condensate from the indoor unit to the nearest drain stack as shown on the drawings / particular specification or as directed by the Architect on site. Condensate drain pipes shall be covered by finishes as selected by the Architect. The thermal insulation and finishes of the drain pipes shall be submitted to the Architect for approval.

15. All units shall achieve the ratings given as shown on the Drawings.

16. In all air-conditioned areas, the noise level shall be less than the value specified in the particular specification when all the A/C equipments are in operating. The Contractor shall submit calculations with supporting documents proving that the selected equipment will comply with the above-mentioned noise level requirement for the Architect's approval prior to the ordering of equipment.

17. For all A/C indoor units and ductworks mounted under ceiling, additional steel U-channels/hangers for mounting of A/C indoor units and duct works shall be provided and fixed to the roof structure. Mounting method and calculation shall be submitted to the Architect for approval prior to installation.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.2 Window Type Air-conditioner

(a) General

1. The Contractor shall be responsible for the supply, delivery and installation of the single (window type) package air-conditioner system as shown on the Drawings. The system shall comply with this Specification and the A/C GS.

(b) Technical and Performance Requirements

1. The complete packages shall be manufactured from a single proprietary manufacturer and the components are specially designed to work as a package.

2. All installation shall be carried out to ensure satisfactory operation of the units under all conditions and in accordance with the manufacturer's recommended method unless otherwise approved or directed by the Architect.

3. The Contractor shall submit technical catalogues with dimensions of selected equipment to prove that the units are suitable to be installed at the window. The Contractor shall follow the manufacturer's recommendation to install the units at the windows such that all parts shall be accessible and removable for maintenance

. 1.1.2 Window Type Air-conditioner (cont'd)

(b) Technical and Performance Requirements (cont'd)

4. Unless otherwise specified, the conduit and associated accessories for power and control wiring system after the power points (i.e. isolators, switches, fuse spurs, etc.) shall be provided under this Contract. The power supply shall be provided under the electrical work of this Contract.

5. The units shall be mounted on neoprene pads vibration isolators. The holding down bolts shall have neoprene grommets to isolate the bolts from the machine.

6. The controller shall consist of an on-off switch, operational features including fan speed selection, temperature setting, self-diagnosis function, auto-swing and auto restart function.

7. Drain tray and pipes c/w air traps with thermal insulation and finishes shall be provided to convey the condensate from the unit to the nearest drain stack as shown on the Drawings or as directed by the Architect on site. Condensate drain pipes shall be covered by finishes as selected by the Architect. The thermal insulation and finishes of the drain pipes shall be submitted to the Architect for approval.

8. All units shall achieve the ratings given as shown on the Drawings.

9. The Contractor shall supply and install air filters of the A/C units.

10. In all air-conditioned areas, the noise level shall be less than NC40 when all the A/C equipments are in operating. The Contractor shall submit calculations with supporting documents proving that the selected equipment will comply with the above-mentioned noise level requirement for the Architect's approval prior to the ordering of equipment.

11. For all A/C units mounted at the window, additional steel channel/hangers for mounting of A/C units shall be provided and fixed to the window. Mounting method and calculation shall be submitted to the Architect for approval prior to installation.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.3 Refrigeration Pipeworks and Fittings

(a) General

1. The Contractor shall supply, install, commission and test all refrigeration pipework, fittings, and all necessary accessories etc. for the complete air-conditioning installation as well as all required safety devices, controls, refrigerant and lubricating oil circuits, completed with insulation, plastering, and finishing as described in the Drawings, this Specification, the A/C GS and as required by the Architect and as recommended by the manufacturer of air-condition units. The Contractor shall provide the tools for the installation and testing of the complete refrigerant piping system as recommended by the manufacturer of air-condition units.

1.1.3 Refrigeration Pipeworks and Fittings (cont'd)

(a) General (cont'd)

2. The Contractor shall ensure all the metal mounting and fixing brackets to be pre-fabricated off site.

(b) Technical and Performance Requirements

1. Refrigerant piping system shall be arranged and sized (including wall thickness) as recommended by the manufacturer of A/C units. The Contractor shall submit the catalogue of the refrigerant piping material together with the written acceptance of the manufacturer of the air-condition units for the Architect's approval.

2. Approved types of flexible connections shall be installed in the pipework where the pipes run across the expansion joints of the buildings; for anti-vibration functions; or as considered necessary and essential for the system, to the complete satisfaction of the Architect.

3. Where pipework passes through building fabric, sleeves shall be provided and cast in positions by the Contractor at good time to match well with the building program for the project. Each sleeve shall be of the same material as the pipe and shall allow a maximum clearance of 6 mm all around. The space between the pipe and its sleeve shall be tightly caulked with a suitable fire resisting material. The sleeves shall be oversized to allow the insulation to be carried out. The making good of any openings between the building fabric and each sleeve shall be carried out under the Building Work of this Contract.

4. Installation of pipes and sleeves through fire barriers shall be of designs approved by the Fire Services Department.

5. All pipework and fittings of the same type and/or material shall be supplied from a single manufacturer to ensure uniformity of standards and composition, unless otherwise accepted by the Architect under individual consideration.

6. For all pipework, fittings and accessories, joints and jointing media used shall be suitable for the applications and for the substances to be conveyed in the pipes and shall not deteriorate due to chemical, physical or atmospheric actions. They shall also be suitable for the corresponding system test pressure as relevant.

7. Design shall ensure correct refrigerant distribution to evaporators; no liquid refrigerant drainage into compressor during shutdown nor liquid entry during operation; avoidance of lubrication accumulation and slugging in the suction line. All arrangements shall maintain a clean and dry system. Excess superheat of suction line gas at compressor inlet shall be prevented.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.4 Thermal Insulation

(a) General

1. The Contractor shall supply and install thermal insulation on refrigerant pipes, condensate drains, supply/exhaust air ducts, equipment and parts to prevent condensation and loss of cooling/heating effect. All ducting thermal insulation shall be applied externally.

(b) Technical and Performance Requirements

1. All thermal insulation shall be installed in accordance with the recommendations of manufacturer. The thermal insulation and the painting, finishing, and protective treatment to be employed in this Contract shall comply with this Specification, the A/C GS and the Code of Practices for Energy Efficiency of Building Services Installations.

2. Thermal insulation for ductwork and pipework shall be installed by qualified and certificated workers as stipulated in the A/C GS. The certificates proving workers' qualification shall be produced for inspection by the Architect before any thermal insulation work is undertaken.

   The Architect shall be notified of any change of personnel for the thermal insulation work in this part of the Contract works. The certificates of any new or additional workers for thermal insulation work shall be submitted for inspection.

3. The refrigerant and condensate drain pipes shall be insulated with fire retardant, closed cell, flexible elastomeric thermal insulation in continuous length with factory applied talc on the inner surface. The elastomeric thermal insulation shall have a flame spread rating of 25 or less and a smoke developed rating of not over 150 for a sample of 12 mm thickness, in accordance with ASTM E 84 test method. The insulation shall be applied by inserting the pipe through the tubular insulation. Cutting open the insulation, wrapping it round the pipe, jointing it with adhesive and securing it with GI clips shall only be used where insertion method is not possible.

4. Insulation Types and Extent of Insulation

   (i) Type I insulation:-

   CFC free flexible closed cell elastomeric insulation complete with approved finish coating.

   (ii) Type II insulation:-

   Factory produced laminated boards with CFC & HCFC free phenolic foam insulation (density: 40 kg/m^3) faced on one side with glass tissue and on the other side with 8-layer aluminum vapour barrier, co-polymer matt white mastic coatings, reinforcing membrane between coats.

   (iii) The painting, finishing, and protective treatment to be employed in this Contract shall comply with Sections B11.8 of A/C G.S.. The colour of painting shall be approved by the Architect.

1.1.4 Thermal Insulation (cont'd)

(b) Technical and Performance Requirements (cont'd)

4. Insulation Types and Extent of Insulation (cont'd)

(iv) Schedule of insulation types for outdoor pipeworks on the external wall and A/C platform:

Item	Insulation Type
Refrigerant pipe, valve and fitting	Type I insulation completed with painted galvanized steel cladding (the painting shall be of matt colour with surface coefficient of h=13.5. The colour of the painting shall be approved by the Architect)
Condensate water pipes and fitting	Type I insulation completed with painted galvanized steel cladding (the painting shall be of matt colour with surface coefficient of h=13.5. The colour of the painting shall be approved by the Architect)

(v) Schedule of insulation types for indoor pipeworks and ductworks which are exposed to view:

Item	Insulation Type
Refrigerant pipe, valve and fitting	Type I insulation complete with aluminium foil water vapour barrier and fabricated sheet aluminium cladding.
Condensate water pipe and fitting	Type I insulation complete with aluminium foil water vapour barrier and fabricated sheet aluminium cladding
Ductwork for air-conditioning system and running across air-conditioned areas	Type II insulation complete with aluminum foil vapour barrier

(vi) Schedule of insulation types for pipeworks and ductworks in ceiling voids, bulk head or pipe risers:-

Item	Insulation Type
Refrigerant pipe, valve and fitting	Type I insulation complete with aluminium foil water vapour barrier
Condensate water pipe and fitting	Type I insulation complete with aluminium foil water vapour barrier
Ductwork for air-conditioning system	Type I insulation complete with aluminium foil water vapour barrier

1.1.4 Thermal Insulation (cont'd)

(b) Technical and Performance Requirements (cont'd)

5. Insulation Thickness

(i) The Contractor shall generally comply with the A/C General Specification by making due consideration of operating conditions and sufficient insulation to be selected in order to avoid surface condensation.

(ii) The thickness of the insulation shall be at least 25 mm for rchilled water pipe and condensate drain pipes unless otherwise specified.

(iii) The Type II air duct insulation shall be at least 25 mm in thickness unless otherwise specified.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.5 Condensate Drain Pipes

(a) General

1. The Contractor shall supply, install and perform testing and commissioning on the condensate drain pipeworks in accordance with the specific requirements as stipulated in the Drawings, this Specification and the A/C GS.

2. The Contractor shall also supply and install the required condensate drain systems including pipes, fittings, insulation, finishes, etc., and connected to the nearest drains as shown on the Drawings, comply with the A/C GS and as accepted by the Architect.

(b) Technical and Performance Requirements

1. The Contractor shall install and connect the condensate drain pipe completed with thermal insulation and air trap to the nearest drain in the building. Actual routing of the condensate drain pipe shall suit the site condition and shall be arranged to the satisfaction of the Architect.

2. Condensate drain pipe shall be of uPVC made with standard BS EN ISO 1452-1 to 1452-5.

3. Condensate drain pipe shall be adequately insulated to prevent sweating.

4. Where the pipes pass through walls, floors, etc, the Contractor shall provide pipe sleeves. All sleeves are to be of short pipe lengths and to be of sufficient size to allow free movement of pipe. Where sleeves are fitted through floors they shall extend to at least 25mm clear of finished surface.

1.1.5 Condensate Drain Pipes (cont'd)

(b) Technical and Performance Requirements (cont'd)

5. The gap between pipe and its sleeve is to be firmly packed with fibreglass blanket material. However, for pipes/sleeves through fire barriers, the gaps must be firmly sealed with soft packing having a period of fire resistance equal to the fire barriers. The ends of sleeves are to be caulked with non-hardening mastic to the Architect's approval.

6. Installation of pipes and sleeves through fire barriers shall be of designs approved by the Fire Services Department.

7. Condensate drain pipe shall be installed with correct falls to ensure adequate draining and shall be adequately insulated to avoid sweating.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.6 Mechanical Ventilation System

(a) General

1. The Contractor shall supply and install a complete ventilation system comprising ventilation fans, acoustic air box, air duct, air grilles, fire damper, flexible cord, control system etc. as shown on the Drawings and as specified in this Specification and the A/C GS.

(b) Technical and Performance Requirements

1. The Contractor shall supply, install and connect all ventilation fans, as shown on the Drawings, complete with sufficient length of flexible cable to the power outlets provided under the electrical work of this Contract. The size of the flexible cables, from each fan to the adjacent fused connector unit, shall be compatible with the circuit protection device.

2. The fans shall be produced by reputable manufacturers complete with totally enclosed motor.

3. The Contractor shall check and verify that the offered equipment is capable to deliver the specified air flow against the actual system resistance supported with full fan duty calculation before ordering of equipment.

4. All propeller fans shall comply with the A/C GS.

5. Domestic Exhaust Fans

All domestic exhaust fans shall comply with the A/C GS.

1.1.6 Mechanical Ventilation System (cont'd)

(b) Technical and Performance Requirements (cont'd)

6. In-line Centrifugal Duct Fans

(i) The fans shall comply with the A/C GS.

(ii) Centrifugal fan wheel of the in-line duct fan shall be of the arrangement with direct driven single inlet forward curved or backward curved type as specified in the Drawings. Motor position and fan discharge arrangements shall be indicated on the Drawings.

Fan housing shall be fabricated by precision rolling, stamping and lock forming machine from heavy gauge galvanized steel sheet. Fan wheel shall be directly driven by external rotor motor.

Fan impeller, which is made of galvanized sheet and fan motor, shall be mounted on detachable mounting cover for the convenient of accessing and servicing. Flanges of the same manufacturer shall be provided to ensure proper ducting connection.

(iii) When the fan assembly cannot satisfy the noise criteria as stipulated in A/C GS, a pre-fabricated fan acoustic cabinet shall be provided. The cabinet shall be made of hot dipped galvanized steel and aluminum frame and double skin acoustic panels, which are detachable on four sides. The acoustic panels shall be made of galvanized steel sheet of 1.2mm thick solid outer skin and 0.8mm thick perforated inner skin and 20mm thick scrim cloth covered fiberglass insulation. The fan acoustic cabinet shall also be provided.

7. Mechanical Ventilation Fan Control

The ventilation fans shall be controlled by control panel installed at the location as indicated on the Drawings. The other fans without any control panel shall be controlled by the local ON / OFF switch provided under the electrical work of this Contract. The Contractor shall connect the wiring to the fuse spur unit adjacent to the fan.

The local control panel shall be constructed by 1.6mm thickness stainless steel with front lockable hinged door.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.7 Air Duct and Distribution System

(a) General

1. The Contractor shall supply, install, connect and perform testing and commissioning on the air duct distribution systems comprising sheet metal ductwork and fittings, flexible duct joints, air dampers, fire dampers, mounting brackets, air diffusers, air grilles and associated accessories in accordance with the requirements as stipulated in the Drawings, this Specification and the A/C GS.

1.1.7 Air Duct and Distribution System (cont'd)

(a) General (cont'd)

2. Duct dimensions indicated in the Drawings shall be used for guidance only. The Contractor must provide detailed drawings showing the exact ducting layout and method of fabrication and installation to the Architect for approval prior to fabrication.

3. The Contractor shall ensure at least 80% of the air duct works and all the metal mounting and fixing brackets to be pre-fabricated off site.

(b) Technical and Performance Requirements

1. Ductwork

(i) All ductwork shall be manufactured as far as practicable to site dimensions taken by the Contractor. Where site dimensions cannot be taken in advance, dimensions shall be taken from architectural/structural detail dimensioned drawing and the Contractor shall make suitable provision to accommodate any discrepancies that may occur between the Drawings and the site dimensions. The Contractor shall carefully note the obligations pertaining to the co-ordination of services.

(ii) All ductwork shall be constructed and erected so as to be rigid and free from sway, drumming and movement. Ductwork shall be true-to-size and accurately lined-up. The material for all ductworks shall be of galvanized sheet steel.

(iii) All air duct system shall be constructed, installed and testing in accordance with the U.K. Heating and Ventilation Contractor's Association (HVCA)'s publication DW/144 "Specification For Sheet Metal Ductwork", DW/143 "A Practical Guide to Ductwork Leakage Testing and all of the subsequent amendments. The air leakage testing of ductwork system on any section of a completed installation shall be carried out in accordance with the A/C GS. The leakage rate shall not exceed the limits specified in Table 17 of DW/144. The Contractor shall be required to carry out leakage test on every installed ductworks of length greater than 10 m.

(iv) All ductwork and fittings delivered to site shall be new, clearly and indelibly stamped to identify different grades, materials and manufacturers.

(v) Reasonable provision shall be made by the Contractor for dismantling of ductwork by means of bolted, flanged joints and shall in all cases, be approved prior to fabrication.

(vi) The Contractor's special attention is drawn to the requirements in HVCA Specification DW/144 for sealant to be used on all cross joints.

(vii) All ductwork and materials including linings, adhesives, flexible ducts, flexible connections, gaskets, sealant, etc. shall fully comply with all requirements of the FSD and shall satisfy C.P. 413: 1975 in respect of the resistance to the penetration of fire and the spread of flame and smoke.

1.1.7 Air Duct and Distribution System (cont'd)

(b) Technical and Performance Requirements (cont'd)

2. External Louvres

(i) Unless otherwise indicated, external louvres will be included in Builder's Work. However, the Contractor shall provide bird screen with pore size of not less than 6mm and not more than 12mm behind each fresh air intake louvre. The Contractor shall be responsible for connection of the ductwork with the external louvres.

(ii) For all areas of external louvre not required for the fresh air intake/exhaust of the air handling equipment and fans, the hot-dip galvanized mild steel blanking plates will be provided under the Builder's Work of this Contract.

(iii) Aluminium washable pre-filter with 25 mm thickness shall be installed to the outside air intake.

3. Internal Louvres and Door Louvres

(i) Unless otherwise indicated, internal louvres and door louvres will be included in the Builder's Work.

(ii) All internal louvres and door louvres shall be provided of the types and duties as shown on the Drawings complying with the A/C GS. The Contractor shall be responsible for locating all internal louvres and door louvres to the exact positions according to the Drawings and aesthetic requirements of the Architect.

4. Air Grilles and Diffusers

(i) All grilles, diffusers, registers shall be supplied by a manufacturer. The Contractor shall submit test reports from independent testing authority to certify the NR rating complying with the equipment in the specification.

(ii) Keys are to be provided for adjustment vanes. No projecting adjusting device is permitted.

(iii) Before any diffusers, etc. are ordered or manufacturing of fittings commences, confirmation must be obtained from the Architect about the exact position and finishes of fittings required. Samples of every type of grilles, diffusers, etc. shall be submitted to the Architect for approval before orders are placed.

(iv) Unless otherwise specified, the Contractor shall provide washable type aluminum filters with 25mm thickness on all fresh air supply and on the other locations as shown on the Drawings. The filter shall comply with the A/C GS.

1.1.7 **Air Duct and Distribution System** (cont'd)

(b) Technical and Performance Requirements (cont'd)

5. Dampers

(i) Dampers are to be provided where required for the proper regulation of the air conditioning system whether shown on the drawings or not. In general, dampers are to be provided as follows :-

- At the fresh air inlets of all air handling plants.
- At branching offs for balance of flow.
- At branching offs for balance/reduction of pressure.
- In all main supply and extract ducts.
- Behind all supply/return grilles or supply / return connections to grilles.

(ii) Dampers for pressure reduction or balancing shall be of the factory made adjustable orifice type.

(iii) Dampers for flow balancing may be of the single sheet splitter damper type.

(iv) Dampers for fine volume control shall be of the factory made multi leaf opposed blade type.

(v) Dampers are to be mounted in built-up frames inserted in the ductwork and bolted thereto. Blades shall be of double construction fitted round square mild steel spindles with ends housed in bronze bushes and the edges of blades shall be folded and left smooth. Sides of blades in all cases are to be felted to give a good fit against sides of duct.

The group of blades forming the damper is to be linked to a hand operated mechanism, which is to be controlled by a quadrant at an accessible point

(vi) Dampers are to be rigid in construction, free from vibration in any position and are to be substantially air tight when closed. Dampers shall be accurately installed in relation to their quadrants so as to permit free movement of 90 degrees. Materials for dampers in all cases are to be mild steel galvanized.

(vii) After final testing and adjustment, all dampers are to be clamped in their correct positions which are to be marked on the quadrant in a permanent manner and stops fitted.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.8 Noise and Vibration Control

(a) General

The Contractor shall design, supply, install, commission and test the noise and vibration control system for the A/C system complying with the A/C GS unless other specified in particular specification and drawings.

(b) Technical and Performance Requirements

1. The Contractor shall be responsible for the design of the noise and vibration control system and selection of equipment and material to ensure that the noise and vibration system conforms to the specified performance requirements.

2. The Contractor shall submit all relevant information, data, calculation and shop drawings to the Architect for approval.

3. The Contractor shall provide the noise and vibration control system as detailed in this Specification and the A/C GS.

4. Notwithstanding the provision of the noise control and vibration isolation system, the Contractor shall minimize the generation of noise and vibration by the ventilation and air conditioning system at their sources by proper selection of equipment with respect to rigid equipment construction, low operating characteristics, balancing of equipment components, equipment mounting and alignment of driving and driven units, etc.

5. System generated noise in ductwork shall be minimized by rigid construction of ductwork, proper transformations, smooth bends, guide vane, etc. and also by proper balancing of the air distribution system by using balancing dampers and volume control dampers of low operating noise types at appropriate locations whether shown or not shown on the Drawings. Equipment shall not be selected to operate under unstable conditions that lead to unnecessary additional generation of noise and vibration.

6. The Drawings provide a general guideline and illustrate in general the Architect's design concept and intent in the basic provision of major noise control and vibration isolation equipment and materials for major noise generating equipment including fans pertaining to meet the specified noise criteria for various occupied spaces.

7. The incorporation of such additional treatment shall include any supplements required for the Contractor's ductwork construction and various air handling fittings and accessories including dampers, grilles etc. as well as sealing work for floor and wall penetrations as required for noise and vibration treatments. Personnel details of the specialists shall be submitted to the Architect for approval.

8. The Contractor shall note that it is his responsibility in the application design and provision of the comprehensive noise control and vibration isolation system to ensure and guarantee that the specified noise design limits shall not be exceeded by the operation of the ventilation and air conditioning installations. The general guideline provided on the Drawings by the Architect shall not relieve nor limit the Contractor's responsibility and liability for the said work.

1.1.8 Noise and Vibration Control (cont'd)

(b) Technical and Performance Requirements (cont'd)

9. The acoustic treatment for the A/C system shall be made in a way that the requirements stipulated in the latest Noise Control Ordinance and the statutory requirements of Environmental Protection Department shall be fully met. After the acoustic treatment have been installed, the operating sound level at the nearest noise sensitive receivers shall be 5dBA below the acceptable noise level of area sensitivity rating set out by the Environmental Protection Department and below the prevailing background noise.

10. Before ordering any air grilles, the Contractor shall submit to the Architect the certified independent laboratory test reports about the performance characteristics including noise levels of the proposed supply air diffusers. All performance tests shall be carried out in accordance with Air Diffusion Council Code 1062R4, or equivalent.

11. Ductwork Silencers shall comply with the A/C GS.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.9 Electrical and Control Wiring

(a) General

1. All electrical wiring shall comply with the EGS, A/C GS, the supply rules of the electricity supply authority and to the satisfaction of the Architect.

(b) Technical and Performance Requirements

1. The electrical wiring shall be installed in trunking and conduit system as specified in Section A of Particular Specification, unless otherwise specified or approved by the Architect. Conduit system shall be installed for the system in the Premise. Trunkings and conduits shall be completely separated from those of other services, and the trunking and conduit system for the air-conditioning installation shall be used exclusively and solely for the purpose with no wiring of other services present in the same trunking and conduit system, unless otherwise specified.

2. The Contractor shall submit conduit run drawings for his electrical work, in addition to other drawings required as specified in A/C GS and this part of Specification to the Architect for approval before installation.

3. All circuits and equipment shall be so designed and selected that they are not susceptible to external electrical and magnetic interference as well as to supply harmonics on their normal operations and performances. On the other hand, they shall not cause interference, harmonics or other adverse effects to the normal and essential electrical supply system as well as to other electrical equipment.

1.1.9 Electrical and Control Wiring (cont'd)

(b) Technical and Performance Requirements (cont'd)

4. The electrical supply for the air-conditioning and ventilation equipment and control panels shall be provided as part of the Electrical Work of this Contract and the supply shall be terminated in the respective switchgear or connector units as shown on the Drawings. The Contractor shall carry out the final wiring from the respective switchgear / connector units to the corresponding air-conditioning and ventilation equipment and control panels.

5. The Contractor shall liaise with all involved parties and with the Architect's representative on the exact locations of terminations of switchgear or connector units on site to suit his requirements and produce a neat and tidy arrangement with the shortest possible cable runs.

6. All conductive moving parts such as hinged front doors of instruments/control panels, battery and charger cabinets etc. shall be properly and sufficiently bonded by suitably sized flexible insulated cables to the fixed conductive parts of the panels which are in turn electrically earthed as necessary.

7. Where it is approved to be supplied and installed, all electronic circuits and components shall comply with the latest requirements issued by Electrical & Mechanical Services Departments and all their amendments issued up to the date of tendering.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.10 Variable Refrigerant Volume Air-conditioning System

(Not used)

1.1.11 Oscillating Fan (wall or ceiling mounted)

(a) General

1. The Contractor shall supply, install and perform testing and commissioning of the following Oscillating Fans as shown on the Drawings.

   (i) 400mm diameter oscillating fan complete with three speed regulator and mounting accessories as described in A/C GS.

(b) Technical and Performance Requirements

1. The Contractor shall conform the actual locations of all oscillating fans (wall or ceiling mounted) on site prior to the installation. The power supply points required for these equipment and appliances shall be included in Electrical Work in this contract.

1.1.11 Oscillating Fan (wall or ceiling mounted)

(b) Technical and Performance Requirements (cont'd)

2. The Contractor shall mark the proposed mounting points of wall mounted fans on site and seek the Project Structural Engineer's comment on these proposed locations and mounting method of the wall mounted fans prior to installation.

3. Each oscillating fan shall be secured by lock nuts and washers and mounted safely with safety wire.

4. The fans shall be produced by reputable manufacturers.

(c) Compliance with Specification, Standards, Obligations and Regulation

Please refer to Part A Section 1.

1.1.12 Maintenance Servicing Platform

(Not used)

1.1.13 Air Curtain

(Not used)

1.2 DESIGN RESPONSIBILITIES

Air-conditioning Installation comprise the design criteria of:-

	Summer Design Conditions	Winter Design Conditions
Outside	33℃ db, 66% RH	10℃ db, 40% RH
Inside (Air-conditioned areas)	25.5℃ db, 54% RH	20℃ db

1.3 COMPLIANCE WITH GENERAL SPECIFICATION

Please refer to Part A Section 1.

2. CONSTRAINTS APPLICABLE TO THE INSTALLATION

2.1 Requirement of off-site fabrication shall be in according with A/C G.S. or as recommended by the manufacturer.

2.2 General methodology of the electrical installation shall be in accordance with A/C G.S. and recommended by the respective manufacturer.

2.3 The Contractor shall ensure that the noise emission from the process of site installation, test or commission shall complies with the "Noise from Places other than Domestic Premises, Public Places or Construction Sites" under the Noise Control Ordinance.

3. TESTING AND COMMISSIONING

3.1 Compliance with Testing and Commissioning Procedures

The Contractor shall test and commission the A/C Installation in compliance Testing & Commissioning Procedures stated in the Section A of Particular Specification unless otherwise specified on the Drawings.

3.2 Testing and Commissioning Procedures for Special Items

The Contractor shall follow the manufacturer's recommendation on the testing and commissioning of any proprietary system and product included in the installation.

3.3 Particular Requirements on Testing and Commissioning Schedules/Sequences

3.3.1 All submissions as required under these procedures are to be submitted to the Architect at least 2 weeks prior to the commencement of testing and commissioning work.

3.3.2 The Contractor shall allow for the attendance on testing and inspection of the Building Services Installation to be conducted by the local electricity supply company so as to ensure that permanent electricity supply will be energized in such good time to the satisfaction of the Architect.

3.4 Others

3.4.1 The Contractor shall, at his own cost, allow for the attendance on testing and inspection of the building services installations to be conducted by the utility companies and/or government authorities so as to ensure that compliance with their requirements will be achieved in such a good time to the satisfaction of the Architect.

3.4.2 The Air-conditioning Installation shall be tested and commissioned fully in accordance with Part H of the "A/C GS" and "Testing and Commissioning Procedure for Air-conditioning, Refrigeration, Ventilation and Central Monitoring & Control Systems Installation in Government Buildings of the Hong Kong Special Administrative Region, 2012 Edition". The contractor shall follow the manufacturer's recommendation of the testing and commissioning of any proprietary system and product included in the installation.

3.4.3 The contractor shall provide all labour, instruments and materials necessary for the performance tests and make all necessary adjustments, including measurement of illumination level and checking of operation and submits test results.

3.4.4 The Contractor shall carry out all the necessary tests/surveys to all the noise generating plant/equipment installed and to provide necessary remedial measures so that the relevant statutory noise control requirements can be complied. The test/survey reports and noise level certificate shall be included in the test record section of the operation & maintenance manuals.

4. MAINTENANCE AND TRAINING

4.1 Maintenance Requirements

The Contractor shall allow for and carry out full comprehensive maintenance of the entire Air-conditioning Installation within the Maintenance Period. The commencement date of the maintenance will be directed by the Architect. The Contractor shall allow cost in the tender.

4.2 Training Requirements

The Contractor shall provide full comprehensive training for end user or his designated personnel on operational and maintenance aspects in accordance with A/C G.S. and the manufacturer's recommendation / requirement.

4.3 Others

(Not used)

5. Equipment Schedules Included in Particular Specification [ES(PS)]

The Contractor shall complete the Particular Equipment Schedule and submit for the approval of the Architect according to the timing and sequence of submissions as stipulated in the approved programme pursuant to the General Conditions of Contract. The equipment and materials in the following Equipment Schedule shall not be delivered to site without the prior approval of the Architect.

Equipment / Material	**Item**	**Specified**
Fresh Air Intake / Exhaust Air Fan	Type of fan	Window / wall mounted
	Operating sound power level (dBA)	40 max.
Fresh Air Intake / Exhaust Air Fan	Type of fan	In-line Duct Fan
	Casing break-out noise (dBA) (1m from the unit)	Less than 54
	Acoustic sound box	As required
	Operating sound power level (dBA)	50 max.
Split type air cooled package unit (Outdoor Unit)	Air discharge	Horizontal
	Condensing temperature	51.5°C (Max.)
	Air entering temperature	35°C
	Refrigerant used	CFC & HCFC Free & Zero ODP
	Energy efficiency grade	As per EMSD's requirement
	Compressor	
	- Type of compressor	Hermetic / Semi-hermetic Rotary / Scroll type
	- Suction temperature	Evap. Temperature -0.5°C
	- Lubrication system	Forced feed
Split type air cooled package unit (Outdoor Unit)	Condenser per unit	
	- Tube material	Copper
	- Fin material	Aluminium
	Accessory per unit	
	- Refrigerant check valve	1 per compressor
	- Refrigerant stop valve	1 per compressor
	- Purge relief valve	1 per compressor
	- Emergency stop	1 per unit
	Anti-vibration spring mounting	4 set per unit

5. Equipment Schedules Included in Particular Specification [ES(PS)] (Cont'd)

Equipment / Material	Item	Specified
Split type air cooled package unit (Indoor Unit)	Type	Cooling and Heat pump
	Refrigerant used	CFC & HCFC Free & Zero ODP
	Air entering condition	25.5°C / 54% RH (Cooling) 10°C (Heating)
	Operating sound pressure level at high speed	45 dBA Max.
	Auto swing	Required
	Time selector	Required
	Filter per unit	
	Type	Washable
	Material for media and casing	Non-combustible
	Built-in drain pump	Required for cassette type and duct type
Window type air conditioners	Type	Cooling only
	Refrigerant used	CFC & HCFC Free & Zero ODP (R410A)
	Type of compressor	Reciprocating
	Air enter condition	25.5°C / 54% RH (Cooling)
	Operating sound pressure level at high speed	45 dBA Max.
	Auto swing	Required
	Time selector	Required
	Condenser coil tube / fin material	Copper / Aluminium
	Type of supply fan	Centrifugal
	Type of drive	Direct
	Cooling coil tube / fins material	Copper / Aluminium
	Air filter material	Synthetic Cleanable Filter
	Energy efficiency grade	As per EMSD's requirement

5.1 Others

Equipment / Material	Specified
Domestic Fan	G.S. C3.21
In-Line Centrifugal Fan	G.S. C3.13
Wall / Ceiling Mounted Rotary Fan	G.S. C3.12
Refrigerant Pipe	G.S. C12.11
Condensate Drain Pipe	G.S. C12.12
Ductwork and Accessories	G.S. C2
Thermal Insulation and Accessories	G.S. C11
Grille and Diffuser	G.S. C3.18
Vibration Isolator	G.S. C8.3

Remark:

G.S. = General Specification for Air-conditioning Refrigeration, Ventilation and Central Monitoring and Control System Installation in Government Building, Hong Kong – 2017 Edition

6. Schedule of Appliance/Equipment Supplied by the Employer

(Not used)

PART D - FIRE SERVICE INSTALLATION

CONTENTS

1. SCOPE AND SPECIFICATION WORK

1.1 INSTALLATION / SYSTEMS

All equipment, materials and workmanship shall fully comply with the specifications as stated in the Section Part A of Particular Specification and all current amendments thereto, unless otherwise specified on the Drawings or in this Particular Specification.

The fire service installation is generally shown on the accompanying drawings and specified in the Schedule of Equipment and shall comprise, but not be limited to, the following items:-

(a) Modification and installation works including automatics fire alarm system c/w cable, conduit, battery and charger, all necessary accessories and etc.

(b) Provisions for dry contact, wirings and necessary accessories to release the electric door lock, in case of fire.

(c) Supply and install the visual fire alarm, breakglass unit and fire alarm bell c/w wirings, conduits and necessary accessories.

(d) Allow all the labour costs, material cost and time for temporary provision, diversion, engagement of the current E&M maintenance contractors and modification work.

(e) Supply of all necessary expertise, supervision, labour, materials, equipment and any incidentals required for the supply, transportation to site, installation, test and commissioning of all Fire Services Installation shown on the drawings and specified in the Equipment Schedule.

(f) Liaison with Fire Services Department, Water Supplies Department and other statutory authorities to obtain all necessary certificates and approvals, including the completion and submission of all forms, preparation of all shop drawings and other documents necessary for submissions and inspection purposes and payment of any fees and charges. All the costs for each of the tests required by various statutory authorities shall be included.

(g) Prepare and submit samples, catalogues, shop drawings, as-built drawings, test results and all necessary form to relevant parties for approval.

(h) Provide 4 sets of operation and maintenance manual and maintenance during the Maintenance Period.

This Fire Service Installation shall include the supply, (except those listed in the Schedule of Appliances/Equipment supplied by the Employer), installation and testing and commissioning of the following systems.

1.1.1 Hose Reel System

(Not used)

1.1.2 Sprinkler System

(Not used)

1.1.3 Pipeworks and Fittings

(Not used)

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.4 Fire Alarm System including Visual Fire Alarm & Alarm Bell

(a) General

1. The Contractor shall supply, deliver, install, perform testing and commission the fire alarm systems (also referred to as manual fire alarm systems) as shown on the Drawings and in compliance with the FS GS.

2. The system shall comprise wiring, labels, alarm bells, visual alarm signals and other accessories to complete the system.

(b) Technical and Performance Requirements.

1. The fire alarm system shall be installed, where applicable, as an integrated part of the fire detection system where provided.

2. The break glass units shall be linked through fire alarm control panel, which shall be interlinked with the existing manual fire alarm system/fire pump panel to give a general fire alarm and for the starting of the existing fixed fire service pump as per FSD's requirements.

3. The positions of alarm bells, fire alarm control panel and etc as indicated on the Drawings are indicative only. The exact positions of these shall be decided on site to suit the site conditions so that the best fire alarm indications with full coordination with all concerned parties and acceptable by the Architect. The Contractor shall submit the layout and conduit run diagrams to the Architect for approval prior to actual installation.

4. The Contractor shall be responsible for the satisfactory operation of the system. Working drawings including layout of the manual fire alarm and control equipment shall be submitted to the Architect for approval before commencement of works.

5. Visual Fire Alarm System

   The visual fire alarm system shall comply with the FS GS.

   The Contractor shall supply and install the red flashing light labelled "FIRE ALARM" in English and Chinese to size conforming to FS GS and complete with the corresponding wiring, control equipment and all other necessary accessories as indicated on the Drawings. The number of flashing lights and their positions shown on the Drawings are indicative only and the Contractor shall supply and install adequate number of flashing lights to comply with the requirements of FSD and to the approval of the Architect at no additional cost.

   The visual fire alarm system shall be activated simultaneously with the fire alarm bells during fire alarm condition in accordance with the FSD circular letter no. 2/2012 and Barrier Free Access 2008.

   The flashing red light shall be of semi-flush mounting and wall mounted at high level at locations as shown on drawings. The Contractor shall allow price for all modification works and equipment required for the interlinking between this visual fire alarm system and the existing manual fire alarm system.

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.4 Fire Alarm System including Visual Fire Alarm & Alarm Bell (cont'd)

(b) Technical and Performance Requirements (cont'd)

6. The Contractor shall carry out alarm audible level site test after work completion to verify that the fire alarm bell system shall comply with relevant sections of BS5839: Part 1: 2002+A2:2008. Under BS5839, the fire alarm bell is required to produce a minimum sound level of either 65dBA or 5dBA above any background noise likely to persist for a period longer than 30 seconds, whichever is greater, at any accessible point in the building. Additional fire alarm bells shall be added where necessary.

1.1.5 Fire Alarm Control System

(a) General

1. The Contractor shall design, supply, install and perform testing and commissioning the fire alarm control system and all necessary controls for all the Fire Service Installation to comply with the FS GS. The fire alarm control system shall also deem to include control system for all fire service installation and systems.

2. The Contractor shall supply all necessary accessories such as, controllers, relays, control wiring, indicator lights, controls, etc for the complete system installation to meet the technical requirements for the respective system.

3. The fire alarm control and indicating panels shall comply with the requirements laid down in the FS GS and the Drawings and shall be approved by Fire Services Department. The fire alarm control and indicating panels shall be located as indicated on the Drawings.

(b) Technical and Performance Requirements

1. The Contractor shall design the fire alarm control system to provide the functions required by individual fire service systems/installation and for control, alarm and indication in order to comply with the FS GS.

2. The Contractor shall design and include all controls, accessories and wiring for connection amongst the panels and individual equipment in order to provide the proper functioning, control and indication of this equipment as required by Fire Services Department.

3. The Contractor shall design the complete system in coordination with other services to perform the functions as specified.

4. The fire alarm control system shall be able to satisfy the control functions required by individual fire service systems/installation.

5. All testing provisions for checking the operation and functioning of the control and alarm system as detailed in this part of Specification and the FS GS shall be provided. The buzzer shall be activated if the test switches are not switched back to their normal operating status after the test.

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.5 Fire Alarm Control System (cont'd)

(c) Compliance with specification, standards, obligations and regulations.

Please refer to Part A Section 1.

1.1.6 Portable Fire Extinguishers

(Not used)

1.1.7 Electrical Installation

(a) General

1. The Contractor shall supply, deliver, install and perform testing and commissioning on the electrical installation for all fire service installation to comply with the FS GS, EGS and other relevant codes and regulations specified.

2. The installation shall comprise switchgear, cables, cable containment accessories, contactors, circuit breakers, fuses and all other electrical equipment and accessories to complete the installation.

3. The Contractor shall supply, install and perform testing and commissioning on the exit signs and emergency lighting luminaries as shown on the Drawings and as described in this Specification, FS GS and the EGS. Normal power supply for the exit signs and emergency lighting luminaries is included in electrical installation and the description of the interfacing point as shown on the Drawings.

4. Cables and wiring used for fire service installation shall comply with FS GS. Metal conduits shall be used for all fire service installation. Installation of conduit shall be surface mounted in the existing building area and in the plant areas except otherwise specified on drawing or approved by Architect.

(b) Technical and Performance Requirements

1. All electrical equipment shall be rated for continuous duties at the designed capacity. The circuits and equipment of the electrical installation shall be selected in such a manner that they are not susceptible to external electrical and magnetic interference as well as to supply harmonics on their normal operations and performance. On the other hand, they shall not cause interference, harmonics or other adverse effects to the normal and essential electrical supply systems as well as to other electrical equipment.

2. The batteries and chargers used for the fire service installation shall comply with the FS GS. The batteries shall be marked with the year and month or year and week of manufacture and the correct battery disposal method to be followed.

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.7 Electrical Installation (cont'd)

(c) Compliance with specification, standards, obligations and regulations.

1. Please refer to Part A Section 1.

2. Fire resistant cables used for Fire Services Installation shall be of low smoke zero halogen type and shall comply with all the following standards:

   (a) BS 6387: 2013 Category CWZ;
   (b) BS EN 50200 (class PH30 or Better);
   (c) BS EN 61034-1: 2005+A1: 2014 & BS EN 61034-2: 2005+A1: 2013 or IEC 61034-1 or 2: 2005/A1: 2013;
   (d) BS EN 60754-1 or 2: 2014 or IEC 60754-1 or 2: 2011 (with less than 0.5% acid gas emission and pH level for the gases evolved not less than 4.3); and
   (e) BS 7629-1: 2015 or BS 7846: 2015 where applicable for relevant types of cables under the standard.

   Or products having equivalent performance to all the above standards, and approved by LPCB, BASEC (British Approval Services for Electrical Cables) or similar widely recognized independent regulatory body and the Architect.

   For applications in different parts of fire services installation, fire resistant cables shall also comply with other standards as appropriate including BS 5839, BS 8434, BS EN 60332-2-2, BS EN 50266-2-1 TO 2-5: 2001, BS 5266-1: 2011, BS EN 50172: 2004, etc.

3. The sub-contractor shall use fire resistant cables complying with the requirements stipulated in section B9.9 of FS G.S. for all installation listed in Table 3 in section B9.11 of FS G.S. for different parts of fire service installation or cables having equivalent or better performance to the approval of the Architect.

1.1.8 Labels and Notices

(a) General

1. The Contractor shall supply, deliver and install all labels and notices for the fire service installation in accordance with the FS GS and the requirements of FSD.

(b) Technical and Performance Requirements

1. All new equipment shall be clearly and permanently labelled, to the approval of the Architect, with designations and instructions to indicate their functions, number, precautions, operating procedures, etc. engraved in both English and Chinese. Where labels are provided for making clear the method of operation of apparatus under normal and emergency conditions and precaution notices, they shall be concise and preferably diagrammatic in form.

2. Labels for similar equipment shall be of uniform appearance and size, and the dimensions and sizes of lettering shall be to the approval of the Architect.

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.8 Labels and Notices (cont'd)

(c) Compliance with specification, standards, obligations and regulations

Please refer to Part A Section 1.

1.1.9 SF_6Gas Leakage Alarm System for Transformer Room

(Not used)

1.1.10 Spare Parts

1. In additional to any spares referred to elsewhere in this Specification and in the FS GS, the contractor shall include in his tender price for the supply of the followings as spares: -
   (a) 1 no. manual call point
   (b) 1 no. alarm bell
   (c) 1 no. visual fire alarm

1.1.11 Dismantling and Diversion Works

(a) General

1. The Contractor shall supply, deliver, install, perform testing and commissioning on all pipeworks, conduits, wiring, equipment and all necessary accessories for any diversion or modification works to the existing fire service installation which will influence the construction and/or installation works, where necessary and whether indicated on the Drawing or not, and to comply with FSD's requirement and to the satisfaction of the Architect.

2. Temporary and/or permanent provision of diverted pipework and relocation of fire service installation shall be made for ensuring there is no disruption to the normal operation of the existing system. The existing FS installation must be maintained in normal operation and function at all time.

(b) Technical and Performance Requirements

1. In case any system suspension is unavoidable, the Contractor is responsible for arranging their works in the shortest time period and to advise Architect, STE office and FSD about the anticipated system suspension period in advance for approval. During the system suspension period, the affected areas shall be provided with additional portable fire extinguishers of sufficient number and type to FSD and Architect's approval at the Contractor's expense.

2. In case any relocation of fire service equipment is required, the existing installation should not be disconnected and dismantled until the new installation at the new locations had been completed.

3. The branch-off point indicated on Drawings is for reference only, the Contractor shall obtain the Architect's approval to determine the appropriate points of connection from the existing installation on Site.

1. SCOPE AND SPECIFICATION WORK (cont'd)

1.1.11 Dismantling and Diversion Works (cont'd)

(c) Compliance with specification, standards, obligations and regulations

Please refer to Part A Section 1.

1.2 DESIGN RESPONSIBILITIES

The Contractor shall be responsible for the design of the following system and election of equipment and components. Particular attention shall be said to ensure compatibility between different equipment / components to meet the specific performance requirements. The Contractor shall submit all design works comprising the followings to the Architect for approval:-

(i) Conduit system for automatic and manual fire alarm system.
(ii) Cabling for automatic and manual fire alarm system.

In addition, the Fire Service Installation shall include the design of the Fire Alarm Control System.

1.3 COMPLIANCE WITH GENERAL SPECIFICATION

Please refer to Part A Section 1.

1.4 OTHERS

The wording "entire fire service installation" shall mean not only the major items of system and equipment covered by this Specification but also all the incidental sundry components necessary for the complete execution of the Works and for the proper operation of the installation with their labour changes, whether or not mentioned in detail in the Specification and on the Drawings.

The Contractor shall ensure that the installation and functioning of the Fire Service systems are tally with Fire Services Department's requirements for granting necessary Fire Service Certificates, such as FS251, FS314A, etc or FSD's acceptance letters, wherever applicable.

2. CONSTRAINTS APPLICABLE TO THE INSTALLATION

(i) Requirement of off-site fabrication shall be in accordance with FS G.S. or as recommended by the manufacturer.

(ii) General methodology of the fire service and sprinkler installation shall be in accordance with FS G.S. and recommended by the respective manufacturer.

(iii) The Contractor shall ensure that the noise emission from the process of site installation, test or commission shall complies with the "Noise from Places other than Domestic Premises, Public Places or Construction Sites" under the Noise Control Ordinance.

3. TESTING AND COMMISSIONING

3.1 COMPLIANCE WITH TESTING AND COMMISSIONING PROCEDURES

The Contractor shall test and commission the Fire Service Installation in compliance Testing & Commissioning Procedures stated in the Section A of Particular Specification unless otherwise specified on the Drawings or in this Particular Specification, Part A section 6.

The Contractor shall provide all labour, instruments and materials necessary for the performance tests and make all necessary adjustments, including measurement of illumination level and checking of operation and submits test results.

3.2 TESTING AND COMMISSIONING PROCEDURES FOR SPECIAL ITEMS

(Not used)

3.3 PARTICULAR REQUIREMENTS ON TESTING AND COMMISSIONING SCHEDULES/SEQUENCES

3.3.1 All submissions as required under these procedures are to be submitted to the Architect at least 2 weeks prior to the commencement of testing and commissioning work.

3.3.2 The Contractor shall allow for the attendance on testing and inspection of the Building Services Installation to be conducted by the local electricity supply company so as to ensure that permanent electricity supply will be energized in such good time to the satisfaction of the Architect.

3.3.3 Mandatory Tests/Witness prior to "Substantial Completion" for Fire Service Installation.

3.3.3.1 In addition to the tests mentioned in the FS GS and this Particular Specification, relevant fire service certificates such as FS 251, FS314A, etc or FSD's acceptance letters for the complete FS installation shall be submitted to the Architect for checking before substantial completion of the Contract.

3.3.3.2 The Contractor shall submit to the Architect the Operation & Maintenance manual containing all installed equipment technical details together with associated FSD's approval letters, record of testing and commissioning results, relevant certificates obtained and as-fitted drawings.

3.4 OTHERS

3.4.1 The Contractor shall, at his own cost, allow for the attendance on testing and inspection of the building services installations to be conducted by the utility companies and/or government authorities so as to ensure that compliance with their requirements will be achieved in such a good time to the satisfaction of the Architect.

3.4.2 The Contractor shall, at his own cost, allow for the witness requirements as stipulated in the BSB Instruction Nos. 2, 4, 5 & 5A of 2000 - "Benchmarks on Percentage of Witness by BS Staff on Testing and Commissioning for BS Installations", a copy of which could be obtained from the Architect.

4. MAINTENANCE AND TRAINING

4.1 Maintenance Requirements

The Contractor shall allow for and out full comprehensive maintenance of the entire Fire Service Installations within the Maintenance Period. The commencement date of the maintenance will be directed by the Architect. The Contractor shall allow cost in the tender.

The Contractor shall be responsible for carrying out routine quarterly and final/annual inspection, testing and maintenance of the Fire Service Installation during the Maintenance Period in accordance with the FS GS.

4.2 Training Requirements

The Contractor shall provide full comprehensive training for his designated personnel on operational and maintenance aspects in accordance with FS G.S and the manufacturer's recommendation / requirement.

4.3 Others

(Not used)

5. EQUIPMENT SCHEDULES INCLUDED IN PARTICULAR SPECIFICATION [ES(PS)]

The Contractor shall complete the Particular Equipment Schedule and submit for the approval of the Architect according to the timing and sequence of submissions as stipulated in the approved programme pursuant to the General Conditions of Contract. The equipment and materials in the following Equipment Schedule shall not be delivered to site without the prior approval of the Architect.

Equipment/Material	**Specified**
Fire alarm bell	G.S. B6.10
Manual call point	G.S. B6.2
Visual fire alarm	G.S. B6.11
Automatic fire alarm control and indicating panel	G.S. B8.3
Fire resistant cable	G.S. B9.9
Batteries and Charger	G.S. B8.10

Remarks:

G.S. = General Specification for Fire Services installation in Government Building, Hong Kong Special Administrative Region 2017 Edition

6. SCHEDULE OF APPLIANCE/EQUIPMENT SUPPLIED BY THE EMPLOYER

(Not used)

7. SPECIAL ATTENTION

7.1 The Contractor shall complete the whole fire service installation work as required by this Specification and conduct the testing and commissioning of the installation to the satisfaction of the Architect within the construction programme.

7.2 The Contractor shall be responsible for application of all necessary inspections and testing by relevant authorities such as FSD and WSD. The contractor shall make sure that the fire service installation is acceptable and fully workable for obtaining necessary certificates for handover.

7.3 A clear schematic piping and control diagram of size not less than 1190mm x 840mm in display glass frame shall be posted in a position as directed by the Architect.

8. TESTING AND MAINTENANCE OF EXISTING FIRE SERVICE INSTALLATION

(Not used)

PART E – PLUMBING AND DRAINAGE INSTALLATION

CONTENTS

1. STATUTORY OBLIGATIONS

1.1 Statutory Regulations

The Contractor shall comply with all Regulations and requirements including those of the Government of Hong Kong, the Hong Kong Fire Services Department (FSD), the Water Supplies Department (WSD), the Building Authority, the Drainage Services Department, the Environmental Protection Department (EPD) and Food and Environmental Hygiene Department and the Electrical Supply Company together with any revisions or amendment made thereto, and shall be responsible for giving notifications to the appropriate Authorities and for paying all fees all in accordance with the Contract. The following are particularly relevant:-

(a) The Building Regulation (Standards of Sanitary Fitment, Plumbing, Drainage Works and Latinies)

(b) The Waterwork Ordinance and its Regulations.

(c) Hong Kong Waterworks Standard Requirement and General Code of Practices.

(d) Waterworks Regulation (Cap. 102).

(e) The Building Authority and its Regulations.

1.2 General Practice

All materials and workmanship shall comply, where applicable, with all relevant sections including (technical, inspection guides and supplements, etc.) together with any revisions or amendments made thereto, of the following:-

(a) General Specification for Plumbing and Drainage Installation in Government buildings of the Hong Kong Special Administrative Region 2017 Edition, issued by Building Services Branch, Architectural Services Department.

(b) The supply rules issued by the respective Supply Company currently in operation in HK.

(c) Appropriate British Standard Specification(s) (B.S. for short), British Standard Code(s) of Practice (B.S.C.P. for short).

(d) The code of Practice - Prevention of Legionnaires' Disease 2012 Edition.

1.3 In Case of Conflict

In case of conflict between the requirements among the publications referred to in Section 2 and 3 above interpretation shall be in accordance with the following order of preference unless otherwise directed by the Architect:-

(a) Ordinances and Regulations, Laws of Hong Kong.

(b) For Plumbing & Drainage Installation:-
  i) Waterworks Regulations.
  ii) Building Regulations.
  iii) The Particular Specification/Drawings and Equipment Schedule.
  iv) General Specification

2. SCOPE OF WORK

2.1 General

The Contractor shall provide all materials, labour, tools and plant for the complete installation, setting to work and testing of the following systems and works as shown on the Drawings and specified in the Equipment Schedule. All works shall be executed by a licensed plumber using only experienced tradesman and comply with the relevant by-laws, regulations of the Building Department and other public authorities.

(a) Complete flushing water pipeworks / system including supply / fix to walls or ceilings all supply, branch or other piping and fittings for the flushing water in uPVC tubing complete with valves, etc., connected to existing flushing water system as shown on drawings.

(b) Complete fresh water pipeworks / system including supply / fix to walls or ceilings all supply, branch or other piping and fittings for the cold water in copper tubing complete with gate valves, etc., connected to existing fresh water system as shown on drawings.

(c) Complete soil and waste drainage pipeworks / system including supply and install vented pipworks for soil and waste water disposal from sanitary/equipment appliances and connected to existing foul water system as shown on drawings.

(d) Provide labour materials and tools for the demolition of and plug off existing plumbing and drainage pipeworks as shown on drawings.

(e) Provide labour materials and tools for divertion of the existing services where necessary, plug off any branch whatever temporary or permanent required and provide new connections.

(f) Demolish and cart away all abandoned pipes and debris after completions of diversion works.

(g) Provide and install pipe sleeves, seal and make good all openings.

(h) Supply and installation of sanitary fixtures.

(i) Provide painting to all metallic pipeworks and UPVC pipes including all brackets and supports.

(j) Prepare and submit samples, catalogues, shop drawings, as-built drawings, test results and all necessary form to relevant parties for approval.

(k) Provide 4 sets of operation and maintenance manual and maintenance during the Maintenance Period.

Incidental works and attendance to work supply, drainage installation and inspection by relevant government offices are required.

The testing and commissioning for the above works which were shown on the accompanying drawings shall be done by the contractor.

2. SCOPE OF WORK (Cont'd)

2.2 Connection to the Existing Plumbing / Drainage / Sewage System

The drainage/sewage, water supply or other utility services pipe routings as shown on Drawings are indicative only. Prior to commencement of plumbing and drainage works, the Contractor shall investigate the actual positions, sizes, levels and direction of falls of the existing drains/sewers, water supply and submit a proposal to the Architect for approval.

The Contractor shall be responsible for the connection works of the water supply (e.g. cold water supply) and drains/sewers.

2.3 Shop Drawings

The plumbing and drainage installation as shown on the Tender Drawings only provide a basic design intent for the project but by no means the actual installation drawings. The Contractor shall prepare and submit shop drawings showing the actual pipe arrangement and detail drawings to the Architect for approval within two weeks upon requested. The Architect may reject, approve or amend such shop drawings. If the shop drawings are rejected, the Contractor shall revise them according to the Architect's comments and resubmit the revised shop drawings for approval at the time as directed by the Architect.

3. STANDARD OF MATERIAL AND WORKMANSHIP

3.1 Operation and Maintenance (O&M) Manual

The O&M manual of this part of installation may also be incorporated into the O&M manual for the whole plumbing and drainage installation.

3.2 Pipeworks and Fittings

The pipeworks and fittings used shall confirm to the following:-

(a) Drainage

i) Drainage pipe Nominal Bore 40mm and above:

- Unpracticed PVC pipe and fittings to B.S. 5255

ii) Drainage pipe Nominal Bore 50mm and above:

- Socketless epoxy coated cast iron to B.S. EN 877 with internal and external average 100-150mm, microns epoxy coating to B.S. EN 877

(b) Trap

i) UPVC anti-siphon trap shall be used for the aboveground drainage installation such as basin, sink and the floor drain which is not passing through the compartment slab inside the building or located outside the building.

3. STANDARD OF MATERIAL AND WORKMANSHIP (Cont'd)

3.2 Pipeworks and Fittings (Cont'd)

(c) Fresh water pipe

Nominal bore below 67mm:

i) Copper tubes to BS EN 1057 R250 and capillary fittings to BS EN 1254-1 with silver brazing pipe joints.

(d) Flushing water pipe

Nominal bore below 80mm:

i) Unplasticised PVC Pipe to BS 3505, Class E with uplasticised PVC injection moulded fittings to BS 4346-1, solvents to BS 4346-1.

(e) All copper pipes where buried in partition walls or installed in direct contact with concrete (non-structural element) shall be UPVC sheathed. All joints shall be wrapped with polythene tape after assembly.

(f) All UPVC pipes where buried in partition wall or installed indirect contact with concrete (non-structural element) shall be wrapped with polythene tape of protection. Fire Services Department approved fire stopper shall be provided by the Contractor for UPVC pipings passing through fire rated compartments with fire rating equivalent to the surrounding structure.

All UPVC pipe mounting on external walls shall be UPVC pipe with colour matching to architectural finishes. Samples of UPVC pipe shall be submitted to the Architect for approval.

(g) Plastic covered tube for cold water approved equal for copper pipes.

4. PIPE BRACKET / SUPPORT

All pipework shall be supported by brackets, anchors and supports at internals not greater than those specified elsewhere in the Specification.

All brackets for PVC pipe shall be stainless steel with PVC linings and all brackets for copper pipes shall be copper alloy.

All brackets shall be fixed by means of stainless steel bolts and nuts or screws unless otherwise approved.

Additional supports shall be provided at bends and valves, etc. All supports shall be of hot dip galvanized mild steel, brackets for UPVC pipe shall be PVC sheathed. Spacing of bracket for cast iron pipe shall not be greater than one pipe length. All bracket, anchor and support shall be painted with suitable primer and two finish coats with colour selected by Architect.

5. PIPE SLEEVES

Galvanized iron steel or UPVC pipe sleeves shall be provided and installed by the Contractor including sealing up the gap between the sleeves and structure and the gap between the sleeves and pipework. Pipe sleeves passing through fire compartment wall or floor slab must be galvanized iron steel pipe and the gaps must be firmly sealed with fire resistance sealant. The sleeve shall have a minimum 15mm projection above the finished floor level.

6. MATERIALS PROPOSED

Materials shall be of metric unit. The Contractor shall submit catalogues, technical information and samples of the materials proposed for approval as required by the Architect.

7. COLOUR AND MAKE OF MATERIALS

All equipment of the same category shall preferably be of the same scheme throughout and shall be the product of the same manufacturer.

8. PAINTING

The Contractor shall allow for painting all plant and equipment including (but not by way of limitation) piping, hangers, brackets and supports, insulation etc. provided under this Contract for corrosion protection in general and for aesthetic purpose for installations exposed to view. In particular, all equipment, pipework, etc. must be painted after erecting with one coat of priming paint.

9. TESTING AND COMMISSIONING

a) The Contractor shall, at his own cost, allow for the attendance on testing and inspection of the building services installations to be conducted by the utility companies and / or government authorities so as to ensure that compliance with their requirements will be achieved in such a good time to the satisfaction of the Architect.

b) The Plumbing Installation shall be tested and commissioned fully in accordance with Part D of the "General Specification for Plumbing Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition" and "Testing and Commissioning Procedure for Plumbing Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition". The Contractor shall follow the manufacturer's recommendation of the testing and commissioning of any proprietary system and product included in the installation.

c) The Drainage Installation shall be tested and commissioned fully in accordance with Part D of the "General Specification for Drainage Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition" and "Testing and Commissioning Procedure for Drainage Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition". The Contractor shall follow the manufacturer's recommendation of the testing and commissioning of any proprietary system and product included in the installation.

9. TESTING AND COMMISSIONING (Cont'd)

d) The Contractor shall provide all labour, instruments and material necessary for the performance tests and make all necessary adjustments, including measurement of illumination level and checking of operation and sub,its test results.

10. SUPPLY OF TESTING EQUIPMENT

a) The Contractor shall provide all tools, pressure pumps, instruments and recorders required to carry out the tests given in this section.

b) All water and electricity required for testing purposes will be supplied free of charge by the Contractor.

11. CLEANING & FLUSHING

a) The Contractor shall clean the entire installation including all sanitary fittings and drainage pipes etc. after installation and keep them in a new condition.

b) All pipes etc. are to be flushed through with water, rodding when necessary to ensure clearance of debris.

c) Cleaning and flushing are to be carried out in sections as the installation are completed which the contractor shall comply with the following requirements.

- Section 4.1.6 of the Testing and Commissioning Procedure for Plumbing Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition

- Section B1.12 of General Specification for Plumbing Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition

- Section B2.16 of General Specification for Drainage Installation in Government Buildings of the Hong Kong Special Administrative Region 2017 Edition

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

Schedule of rate

Chu Hai College of Higher Education,
80 Castle Peak Road, Tuen Mun, N.T.

Description		Quantity	Unit Price	Amount
	7/F office area - renovation tender schedule of rate (SOR) (SOR quantities for reference only)			
1	**Preliminaries**			
1.1	Allow sum for CAR (20 Million covering unlimited single claim) & EC with joint name of CHC, BMO and main contractor covering construction in period and 6 months maintenance period.	Sum	---	
1.2	Allow sum for protection to affected areas, necessary hoarding and safety platform for works.	Sum	---	
1.3	Allow sum for daily cleaning all debris from site and general professional cleaning upon completion of works.	Sum	---	
1.4	Allow sum for competent full time site supervisor to attend regular weekly site meeting and daily photos site record photo report to CHC management office.	Sum	---	
1.5	Allow sum for shop drawings and as-built drawings as well as O&M Manuel upon practical completion.	Sum	---	
1.6	Allow cost to delivery all fitting out items via only one passenger lift from G/F to 7/F including plywood protection to lift car case for each time delivery (No excess material / tools allowed to storage at 7/F site areas)	Sum	---	
			Item 1 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
2	**Demolition works**			
2.1	Remove existing dry wall parties at Room behind reception counter (7sqm), at sitting area (7sqm).	Sum	---	
2.2	Remove and set aside carpet tiles at affected area for reuse, 96sqm.	Sum	---	
2.3	Disassemble and simply packing all loose furniture for reuse and cart away all unused items from site as per CHC BMO instructions, 30pcs.	Sum	---	
2.4	Office OA / document packing by CHC BMO.	Sum	---	N/A
		Item 2 Sub-total: HK$		

Description		Quantity	Unit Price	Amount
3	**Wall works**			
3.1	Extend full glazed partition to enlarge room to match existing design and material, 7sqm.	Sum	---	
3.2	Gypsum board dry partition next to entrance door for enlarged room, 7sqm.	Sum	---	
3.3	Emulsion paint to wall at all affected wall area, 120sqm.	Sum	---	
3.4	Make good wood skirting to all affected areas, 40m.	Sum	---	
3.5	New GB partition with half glazed frame and door at room in room av. partition, 12sqm. + doors, 3 sets.	Sum	---	
3.6	Refinish existing entrance FR door in wood veneered finish and repaint door frame to match future renovated lift lobby, 1 set.	Sum	---	
3.7	Trophy high cabinet with wood veneered finish, LED strip light as per perspective image in size 1.5mL x 0.4mW x 2.4mH, 1 set.	Sum	---	
3.8	Side screen at RHS / LHS of above item 3.7 0.75mL x 2Nos.	Sum	---	
3.9	Feature wall with concealed Led light strip all in wood veneered finish as per perspective image, 3mL x 0.5mW x 2.4mH.	Sum	---	
			Item 3 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
4	**Floor works**			
4.1	Make good floor surfaces and relay carpet tiles to 3Nos. Of rooms along window line, sitting area and secretary area, 56sqm.	Sum	---	
4.2	New carpet tiles (Material PC HK$280.00/sqm) to 2Nos. Of rooms at staircase side and stock room to staff (3P) room area, 40sqm.	Sum	---	
			Item 4 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
5	**Ceiling works**			
5.1	Open up & make good affected metal panel ceiling area for works in order to keep existing false ceiling, skylight to match new room layout, 84sqm.	Sum	---	
5.2	Add metal panel false ceiling at stock room change to staff room (3P), 12sqm.	Sum	---	
			Item 5 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
6	**Electrical works**			
6.1	Remove and cap off no use 13A socket, Lan point, telephone point at affected areas, 25Nos.	Sum	---	
6.2	New 13A twin socket at tables, 25Nos.	Sum	---	
6.3	Telephone / Lan point c/w Cat. 6 cabling and RJ45 jet plate at tables, 21Nos. at sitting area, 1No.	Sum	---	
6.4	Allow sum to relocate main Lan / telephone console existing reception counter and reset. (if any) .	Sum	---	
6.5	LED downlight / spotlight at sitting area, 8Nos.	Sum	---	
6.6	Relocate light box / add light switch for rooms, 8Nos.	Sum	---	
6.7	Light point for LED light strip at trophy cabinet and feature wall, 2 areas.	Sum	---	
6.8	Add 20A / 10A fuse at existing MCB board for additional power socket and light fitting, 6Nos.	Sum	---	
6.9	Issue WR1A & testing report of existing MCB board as per CLP / EMSD general regulation by REC / REW.	Sum	---	
6.10	Allow sum for security works (if any by NSC)	Sum	---	N/A
			Item 6 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
7	**MVAC works**			
7.1	Add supply air outlet / air duct from existing FCU system to match new rooms layout including all necessary VCD, TAD and air balance checking, 4 sets.	Sum	---	
7.2	Modify existing air supply x 2Nos. / return x 1No. at stock room change to staff rooms (3P) at false ceiling area.	Sum	---	
7.3	Relocate thermostat at rooms to match new layout (if any), 2Nos.	Sum	---	
			Item 7 Sub-total: HK$	

Description		Quantity	Unit Price	Amount
8	**Fire Services works (By NSC-FS ~ All provisional)**			
8.1	Relocate existing sprinkler head to match new room layout, 4Nos.	Sum	---	
8.2	New sprinkler head to match room light, 4Nos.	Sum	---	
8.3	Drain and refill sprinkler system, 1 time.	Sum	---	
8.4	Allow sum for interface with existing BMS system for sprinkler head.	Sum	---	
8.5	Form 314A / 251 and as fitted drawing for FSD systems.	Sum	---	
		Item 8 Sub-total: HK$		
9	**Contingency**			
9.1	Allow sum for contingency.	Sum	---	N/A
		Item 9 Sub-total: HK$		N/A

Chu Hai College of Higher Education,
80 Castle Peak Road, Tuen Mun, N.T.

	Description	Quantity	Unit Price	Amount
	Appendix A (By CHC)			
	Loose / system furniture schedule			
1	Staff table with Formica finish to match existing office standard in size table, 1600mmL x 700mmW x 750mmH. + return , 900mmL x 350W x 750mmH, screen high av. 1200mmH, 6 sets. @2 rooms next to staircase area.	Sum		
2	Ditto, 1400mmL x 700mmW x 750mmH + return 1200mmH / front screen, 3 sets @original stock room area.	Sum		
3	" L " shaped staff cubical c/w " L " screen, table top and 1No. Of pedestal in size 1500mmL x 2000mmW x 750mmW / 1200mmH screen, 8 sets @3Nos. Of room curtain wall side.	Sum		
4	1600 x700 x 750 + return, 3Nos. @room in room.	Sum		
5	Relocate existing security counter to match new layout, 1 set.	Sum		
6	Metal file cabinet,			
6.1	Low - 1000mmL x 400mmD x 900mmH, 9Nos. (Rooms at staircase side x 6Nos. + secretary x 3Nos.)	Sum		
6.2	High - 1000mmL x 400mmD x 2200mmH, 10Nos. (Rooms at window side x 10Nos)	Sum		
7	Staff chairs to match existing tone, new 21Nos. - existing 6Nos. = need 15Nos. Purchase.	Sum		
8	Sitting area furniture,			
8.1	3-seater sofa, 1No.			
8.2	Single seater sofa, 2Nos.			
8.3	Side table, 1No.	Sum		
			Total: HK$	

Chu Hai College of Higher Education,
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	Description	Quantity	Unit Price	Amount
	Summary			
1	Preliminaries.	Sum	---	
2	Demolition works.	Sum	---	
3	Wall works.	Sum	---	
4	Floor works.	Sum	---	
5	Ceiling works.	Sum	---	
6	Electrical works.	Sum	---	
7	MVAC works.	Sum	---	
8	Fire Services works.	Sum	---	
9	Contingency.	Sum	---	
		Total: HK$		

Chu Hai College of Higher Education
80 Castle Peak Road, Tuen Mun, N.T.

Tender Drawing / 3D rendering

item 3.8

False Ceiling ITEM 9.1

Full Glass partition

ITEM 3.1 + 3.2 + 3.3

3.4

Carpet tiles ITEM

NOTES & LEGEND

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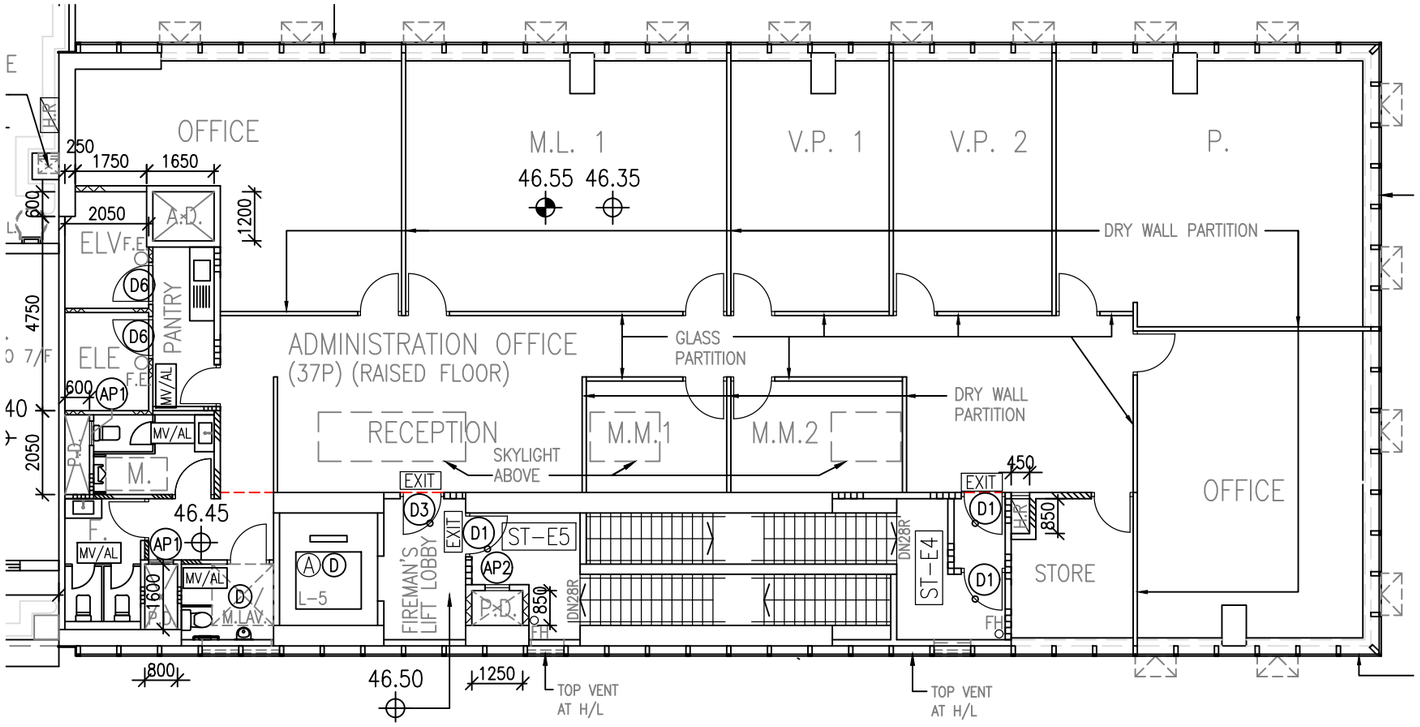
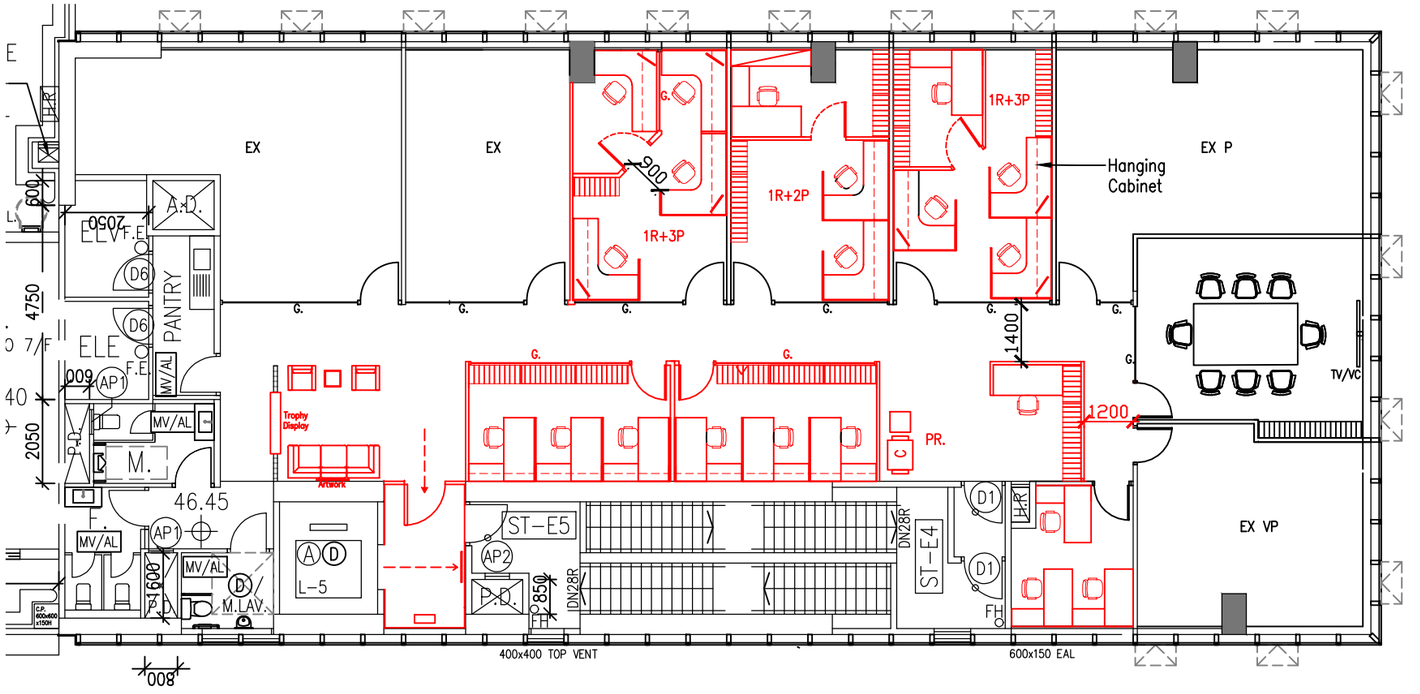
All prints and specification and their copyright are the property of HSL and shall be returned at the completion of work.
Do not scale drawing - All measurement must be checked at the site by the Contractor



EXISTING FLOOR LAYOUT PLAN



NEW FLOOR LAYOUT PLAN

7 FLOOR (Option D)

Drawing No. : H S - CHCOHE-7F-P01 - R 11

屋宇處註冊小型工程承建商 **B.D. Registered Minor Works Contractor**

註冊編號： **MWC 1577 / 2013**

HENG SHUN CONTRACTING LTD
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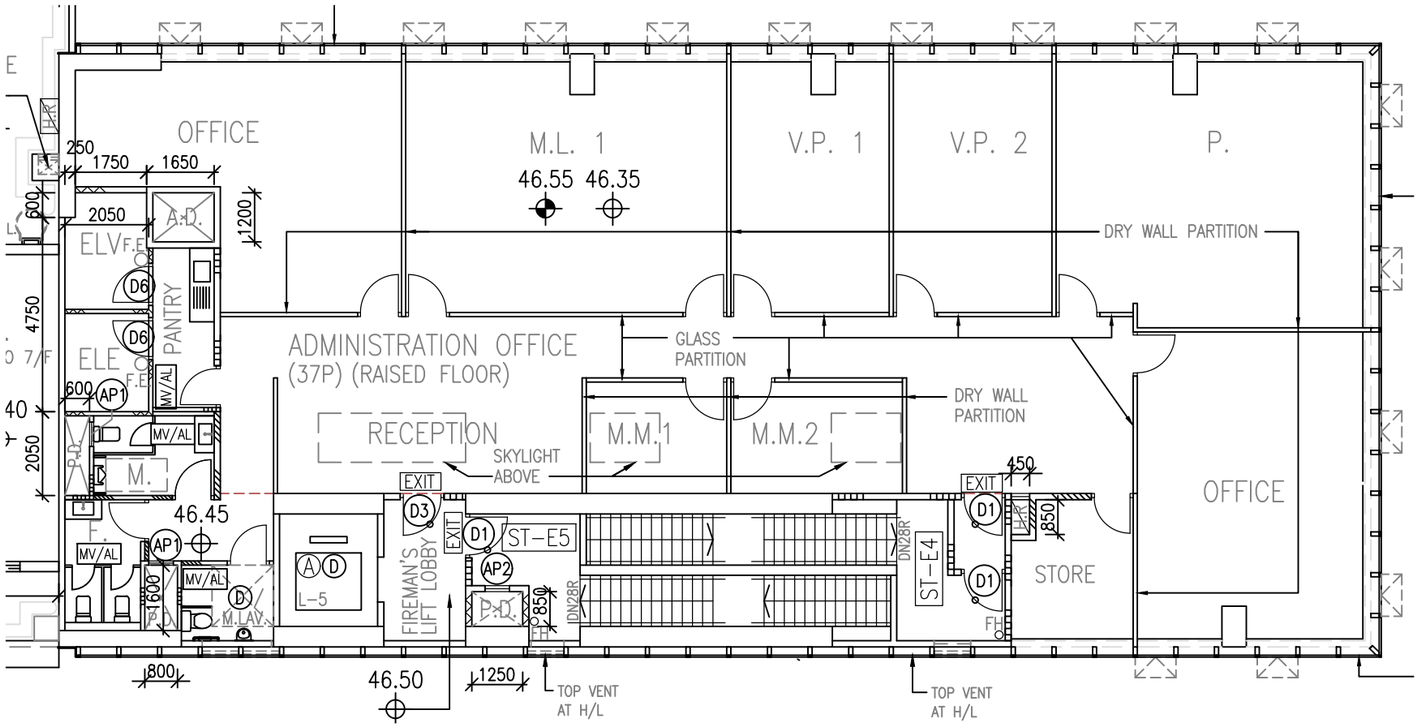
CASTLE PEAK ROAD, T.M.T.L.489 TUEN MUN,N.T.

Drawing Title : FLOOR LAYOUT PLAN (Option D)

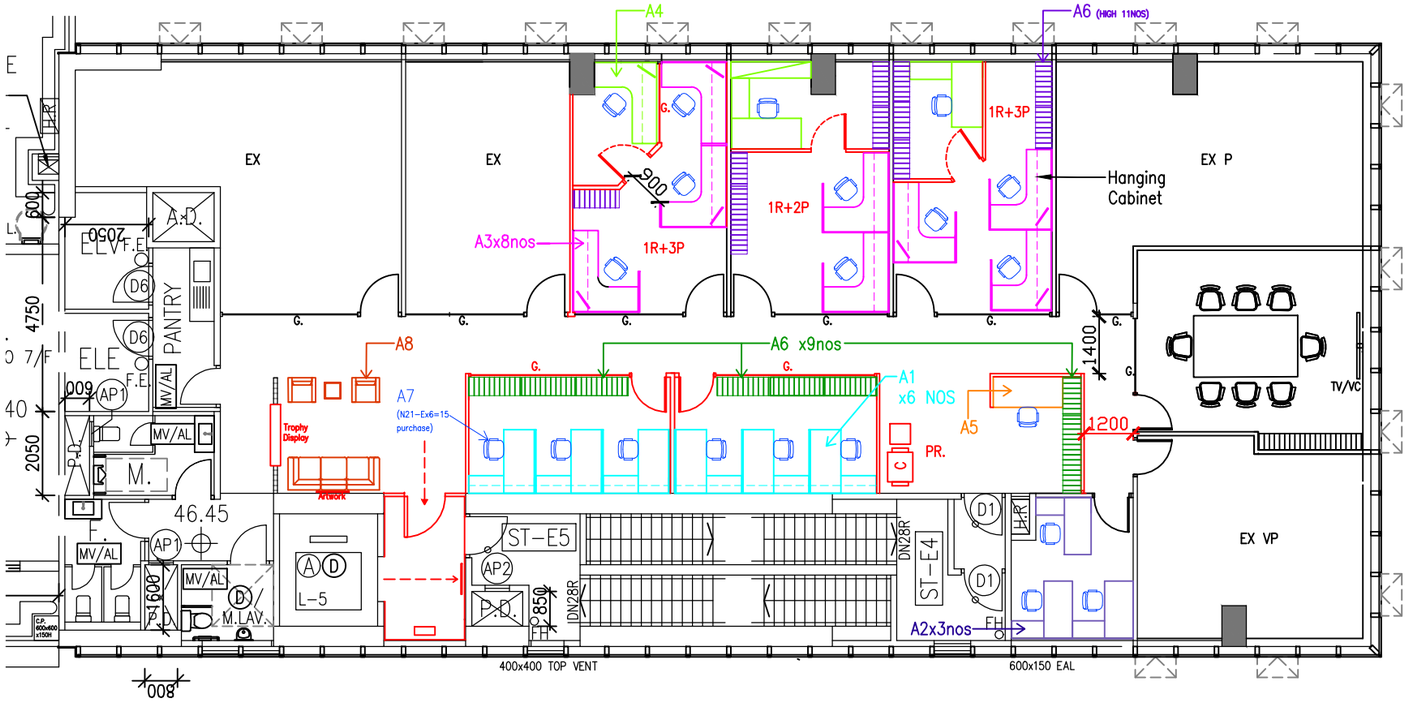
Job No. : CHCOHE **Date :** 16 MAR 2023

Scale : 1:150(A3) **Drawn :** S.C. **Checked by :** V.Y.

NOTES & LEGEND



EXISTING FLOOR LAYOUT PLAN



NEW FLOOR LAYOUT PLAN

FURNITURE SCHEDULE
APPENDIX "A"
7 FLOOR (Option D)

屋宇處註冊小型工程承建商
B.D. Registered Minor Works Contractor

註冊編號：
MWC 1577 / 2013

Drawing No. : H S - CHCOHE-7F-P01.1 - R 11

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Drawing Title : FURNITURE SCHEDULE-APPENDIX "A"

Job No. : CHCOHE **Date :** 16 MAR 2023

Scale : 1:150(A3) **Drawn :** S.C. **Checked by :** V.Y.