



PAMBANSANG MUSEO NG PILIPINAS
NATIONAL MUSEUM OF THE PHILIPPINES

BIDS AND AWARDS COMMITTEE

BIDDING DOCUMENTS

for the

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN, BOHOL)

(Reference No. 7952864)

TABLE OF CONTENTS

Section I.	Invitation to Bid
Section II.	Instructions to Bidders
Section III.	Bid Data Sheet
Section IV.	General Conditions of Contract
Section V.	Special Conditions of Contract
Section VI.	Technical Specifications, Scope of Work and Terms of Reference
Section VII.	Bill of Quantities
Section VIII.	Checklist of Technical and Financial Documents
Annex A	Packaging and Labelling Instructions
Annex B	Bidding Forms

Section I. Invitation to Bid



PAMBANSANG MUSEO NG PILIPINAS
NATIONAL MUSEUM OF THE PHILIPPINES

**Invitation to Bid
for
REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM &
SATELLITE OFFICE (TAGBILARAN, BOHOL)**

1. The **National Museum of the Philippines**, through the **General Fund FY 2021** intends to apply the sum of **Three Million Five Hundred Thousand Pesos (PHP 3,500,000.00)**, being the Approved Budget for the Contract (ABC), to payments under the contract for **REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN, BOHOL)**. Bids received in excess of the ABC shall be automatically rejected at bid opening.
2. The **National Museum of the Philippines** now invites bids for the above Procurement Project. Completion of the Works is required within **Ninety (90) calendar days**. The Contractor must have a **PCAB License Category B (Size Range: Medium A)** Contractor's License and must have completed or implemented at least one (1) contract that is similar to the project to be bid, and whose value, adjusted to current prices using PSA consumer price indices, must be at least fifty percent (50%) of the ABC to be bid. Similar is defined as **"having comprising of National Heritage Site"**.
3. Bidding will be conducted through open competitive bidding procedures using non-discretionary "pass/fail" criterion as specified in 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.
4. Interested bidders may obtain further information from the **National Museum of the Philippines Bids and Awards Committee** and inspect the Bidding Documents at the address given below from **Mondays - Fridays at 9:30 A.M. to 2:30 P.M.**
5. A complete set of Bidding Documents may be acquired by interested bidders on **27 August 2021**, from the given address below and the website <http://nationalmuseum.gov.ph/> and upon payment of the applicable non-refundable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of **Three Thousand Pesos (PHP 3,000.00)**. The Procuring Entity shall allow the bidder to present its proof of payment for the fees presented in person, or through electronic means.
6. **Pre-Bid Conference** shall be on **3 September 2021, 10:30 A.M.** at **Old Civil Service Building, National Museum of the Philippines, Padre Burgos Street, Manila**, which shall be open to prospective bidders.

7. Bids must be duly received by the BAC Secretariat through manual submission at the office address as indicated below on or before **17 September 2021, at 10:30 A.M. LATE BIDS SHALL NOT BE ACCEPTED.**
8. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in ITB Clause 16.
9. Bid opening shall be on **17 September 2021, at 10:30 A.M. at Old Civil Service Building, National Museum of the Philippines, Padre Burgos Street, Manila.** Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.
10. The **National Museum of the Philippines** reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of 2016 revised Implementing Rules and Regulations (IRR) of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.
11. For further information, please refer to:

Mr. Edwin J. dela Rosa
Head, BAC Secretariat
2nd Floor, BAC Room, North Annex of the
National Museum of Fine Arts Building (Motorpool)
Padre Burgos Street, Manila 1000
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(SGD)
ATTY. MA. ROSENNE M. FLORES-AVILA
Chairperson
Bids and Awards Committee

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, **National Museum of the Philippines**, invites Bids for **REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN BOHOL)**, with Project Identification Number **NMPBAC-PB-2021-08-07**.

The Procurement Project (referred to herein as “Project”) is for the construction of Works, as described in Section VI (Specifications).

2. Funding Information

- 2.1. The GOP through the source of funding as indicated below for **General Fund FY 2021** in the amount of **Three Million Five Hundred Thousand Pesos (Php 3,500,000.00)**.
- 2.2. The source of funding is: **NGA, the General Appropriations Act or Special Appropriations.**

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manual and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or invitation to bid by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have inspected the site, determined the general characteristics of the contracted Works and the conditions for this Project, such as the location and the nature of the work; (b) climatic conditions; (c) transportation facilities; (c) nature and condition of the terrain, geological conditions at the site communication facilities, requirements, location and availability of construction aggregates and other materials, labor, water, electric power and access roads; and (d) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex “I” of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to current prices using the PSA's CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

A contract is considered to be "similar" to the contract to be bid if it has the major categories of work stated in the **BDS**.

5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

There is no restriction on the origin of Goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN.

7. Subcontracts

7.1. The Bidder may subcontract portions of the Project to the extent allowed by the Procuring Entity as stated herein, but in no case more than fifty percent (50%) of the Project.

The Procuring Entity has prescribed that:

Subcontracting is allowed. The portions of Project and the maximum percentage allowed to be subcontracted are indicated in the **BDS**, which shall not exceed fifty percent (50%) of the contracted Works.

7.1. If the bidder has already identified and has an existing contract with its subcontractor(s) during the procurement stage, it must submit together with its Bid the documentary requirements of the subcontractor(s) complying with the eligibility criteria stated in **ITB** Clause 5 in accordance with Section 23.4 of the 2016 revised IRR of RA No. 9184 pursuant to Section 23.1 thereof, or

7.2. The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the implementation of this Contract. Subcontractors must submit the documentary requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility criteria specified in **ITB** Clause 5 to the implementing or end-user unit.

- 7.3. Subcontracting of any portion of the Project does not relieve the Contractor of any liability or obligation under the Contract. The Supplier will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Contractor's own acts, defaults, or negligence, or those of its agents, servants, or workmen.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents Comprising the Bid: Eligibility and Technical Components

- 10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.

- 10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an Apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

- 10.3. A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.

- 10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.

- 10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of

the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

- 11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.
- 11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic technical design as indicated in the drawings and specifications. Unless there is a value engineering clause in the **BDS**, alternative Bids shall not be accepted.

13. Bid Prices

All bid prices for the given scope of work in the Project as awarded shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as determined by the NEDA and approved by the GPPB pursuant to the revised Guidelines for Contract Price Escalation guidelines.

14. Bid and Payment Currencies

- 14.1. Bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.
- 14.2. Payment of the contract price shall be made in **Philippine Pesos**.

15. Bid Security

- 15.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS**.

15.2. The Bid and bid security shall be valid until One Hundred Twenty (120) calendar days. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission to the given website or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB**.

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 6 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

18.2. The preliminary examination of Bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*" using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as required by **ITB** Clause 16 shall be submitted for each contract (lot) separately.

19.3. In all cases, the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184 must be sufficient for the total of the ABCs for all the lots participated in by the prospective Bidder.

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

Section III. Bid Data Sheet

Bid Data Sheet

ITB Clause							
5.2	For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be “ having comprising of National Heritage Site ”.						
7.1	The contractor may subcontract any portion of works under the project, subject to the approval of proper authorities and the National Museum of the Philippines, so long as the works intended to be subcontracted is not significant and material. The subcontracted works shall not exceed fifty percent (50%) of the contracted Works.						
10.3	The Contractor must have a Category B (Size Range: Medium A) PCAB License. In case of a Joint Venture Agreement (JVA) between contractors, a Special Contractor’s License is required.						
10.4	The key personnel must meet the required minimum years of experience set below: <table><tr><th><u>Key Personnel</u></th><th><u>General Experience</u></th><th><u>Relevant Experience</u></th></tr><tr><td colspan="3">**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the qualifications of personnel.</i></td></tr></table>	<u>Key Personnel</u>	<u>General Experience</u>	<u>Relevant Experience</u>	**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the qualifications of personnel.</i>		
<u>Key Personnel</u>	<u>General Experience</u>	<u>Relevant Experience</u>					
**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the qualifications of personnel.</i>							
10.5	The minimum major equipment requirements are the following: <table><tr><th><u>Equipment</u></th><th><u>Capacity</u></th><th><u>Number of Units</u></th></tr><tr><td colspan="3">**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the minimum equipment requirements.</i></td></tr></table>	<u>Equipment</u>	<u>Capacity</u>	<u>Number of Units</u>	**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the minimum equipment requirements.</i>		
<u>Equipment</u>	<u>Capacity</u>	<u>Number of Units</u>					
**Note: <i>Kindly refer to the Terms of Reference / Technical Specification of the project for the minimum equipment requirements.</i>							
12	Not applicable.						
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: a. The amount of not less than 2% of the ABC, if bid security is in cash, cashier’s/manager’s check, bank draft/guarantee or irrevocable letter of credit; b. The amount of not less than 5% of the ABC if bid security is in Surety Bond.						
19.2	Partial bids are not allowed. The project was for one (1) lot and not divided to sub-lots.						

20	If needed, Environmental Compliance Certificate, Certification that the project site is not within a geohazard zone, among others is required.
21	Additional contract documents to be submitted by the winning bidder relevant to the Project that are required by existing laws and/or the National Museum of the Philippines; 1. Construction schedule and S-curve 2. Manpower schedule 3. Construction methods 4. Equipment utilization schedule 5. Construction safety and health program approved by the DOLE, 6. PERT/CPM

Section IV. General Conditions of Contract

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

If sectional completion is specified in the **Special Conditions of Contract (SCC)**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date shall apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3. Possession of Site

3.1 The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the **SCC**, which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.

3.2 If possession of a portion is not given by the above date, the Procuring Entity will be deemed to have delayed the start of the relevant activities. The resulting adjustments in contract time to address such delay may be addressed through contract extension provided under Annex "E" of the 2016 revised IRR of RA No. 9184.

4. The Contractor's Obligations

The Contractor shall employ the key personnel named in the Schedule of Key Personnel indicating their designation, in accordance with **ITB** Clause 10.3 and specified in the **BDS**, to carry out the supervision of the Works.

The Procuring Entity will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are equal to or better than those of the personnel listed in the Schedule.

5. Performance Security

5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.

5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the SCC supplemented by any information obtained by the Contractor.

7. Warranty

7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.

7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the SCC.

8. Liability of the Contractor

Subject to additional provisions, if any, set forth in the SCC, the Contractor's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Contractor is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

9. Termination for Other Causes

Contract termination shall be initiated in case it is determined *prima facie* by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in ITB Clause 4.

10. Dayworks

Subject to the guidelines on Variation Order in Annex “E” of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the **SCC**, the Dayworks rates in the Contractor’s Bid shall be used for small additional amounts of work only when the Procuring Entity’s Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

11.1. The Contractor shall submit to the Procuring Entity’s Representative for approval the said Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works. The submissions of the Program of Work are indicated in the **SCC**.

11.2. The Contractor shall submit to the Procuring Entity’s Representative for approval an updated Program of Work at intervals no longer than the period stated in the **SCC**. If the Contractor does not submit an updated Program of Work within this period, the Procuring Entity’s Representative may withhold the amount stated in the **SCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

12. Instructions, Inspections and Audits

The Contractor shall permit the GOP or the Procuring Entity to inspect the Contractor’s accounts and records relating to the performance of the Contractor and to have them audited by auditors of the GOP or the Procuring Entity, as may be required.

13. Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the **SCC**, subject to the requirements in Annex “E” of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

The Contractor may submit a request for payment for Work accomplished. Such requests for payment shall be verified and certified by the Procuring Entity’s Representative/Project Engineer. Except as otherwise stipulated in the **SCC**, materials and equipment delivered on the site but not completely put in place shall not be included for payment.

15. Operating and Maintenance Manuals

15.1. If required, the Contractor will provide “as built” Drawings and/or operating and maintenance manuals as specified in the **SCC**.

- 15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the SCC from payments due to the Contractor.

Section V. Special Conditions of Contract

Special Conditions of Contract

GCC Clause	
2	Not Applicable
4.1	The project starts after seven (7) days received of NTP
7.2	Fifteen (15) years.
10	Dayworks are applicable at the rate shown in the Contractor's original Bid.
11.1	The Contract shall submit the Program of Work to the Procuring Entity's Representative within Ten (10) calendar days of delivery of the Notice of Award
13	The amount of the advance payment is 15% of ABC Php 525,000.00
14	Materials and equipment delivered on the site but not completely put in place shall be included for payment.
15.1	The date by which operating and maintenance manuals are required is Fifteen (15) days from date of completion The date by which "as built" drawings are required is Fifteen (15) days from date of completion
15.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is 1% of ABC Php 35,000.00

*Section VI. Technical Specifications, Terms of
Reference, Scope of Work and Drawings*

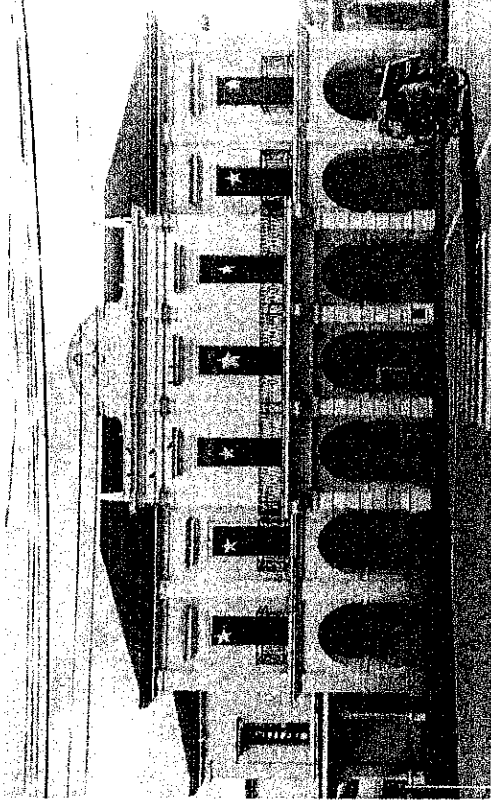


PAMBANSANG MUSEO NG PILIPINAS
NATIONAL MUSEUM OF THE PHILIPPINES

Old Congress Building, P. Burgos St., Ermita, Manila

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN, BOHOL)

Km. 0, Old Capitol Complex, CPG Ave. Tagbilaran City, Bohol



TECHNICAL SPECIFICATION & GENERAL / SPECIAL CONDITIONS OF THE CONTRACT

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ENGR. JAINAB JAIMEE T. ALTILLERO
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Recommending Approval:

Atty. Ma. Rosenne Flores-Avila
ATTY. MA. ROSENNE FLORES-AVILA
Deputy Director-General (Administration)

Approved by:

Jeremy R. Barns, Ces0 III
JEREMY R. BARNES, CESO III
Director-General

VIII. TECHNICAL SPECIFICATIONS

DIVISION 01 GENERAL REQUIREMENTS

1. SCOPE OF WORK

This section shall include the mobilization and demobilization of Contractor's plant, equipment, materials and employee to the site; construction of Engineer's office and facilities; compliance with the contract requirements and maintaining the facilities for the Engineer.

This section shall include the furnishing of labor, materials, transportation, tools, supplies, plant, equipment and appurtenances to complete satisfactorily the construction of the proposed project.

2. MOBILIZATION AND DEMOBILIZATION

The Contractor upon receipt of the Notice-to-Proceed shall immediately mobilize and transport his plant, equipment, materials and employees to the site and demobilize or remove the same at the completion of project and level/ clear the site acceptable to the Engineer and the Owner.

Mobilization and Demobilization are incidental to other items of work and will not be measured for payment.

3. TEMPORARY FACILITIES

3.1 Combined Field office, Living Room/Kitchen, Quarter and Bathroom

During the performance of the contract, the Contractor shall provide and maintain one unit of field office with living room/kitchen, quarter and bathroom within the site of the work at designated location approved by the Procuring Entity's representative at which the Engineer shall be holding office at all times, while the work is in progress. The location, dimensions and layout of such combined field office/quarters shall be subject to the approval of the Engineer and local authorities having jurisdiction thereof. Construction shanties, sheds and temporary facilities provided as required for the Contractor's convenience shall be maintained in good condition and neat appearance including finishes as required by the Engineer.

3.2 Temporary Light and Power

The Contractor shall provide and maintain temporary electrical service including installation of temporary power and lighting within the construction site and facilities constructed thereat. The electrical services shall be adequate in capacity to supply power to construction tools and equipment without overloading the temporary facilities and shall be made available to supply power, lighting and construction operations of all trades. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the local governing codes. At the completion of the construction work all temporary wiring, lighting, equipment and devices shall be removed.

3.3 Temporary Toilets

The Contractor shall provide and maintain in sanitary condition enclosed toilets for the use of all construction personnel located within the contract limits, complete with fixtures, water and sewer connections and all appurtenances. Installation shall be in accordance with all applicable codes and regulations of the local authorities having jurisdiction thereof. Upon completion of the work, temporary toilet and their appurtenances shall be removed.

3.4 Temporary Water Service

The Contractor shall provide and maintain temporary water supply service, complete with necessary connections and appurtenances. Installed water supply lines shall be used as a source of water for construction purposes subject to the approval of the Engineer. The Contractor shall pay the cost of operation, maintenance and restoration of the water system. All temporary water service including equipment and piping shall be removed upon completion of the work and all worn out and damaged parts of the permanent system shall be replaced and restored in first class condition equal to new.

3.5 Security

The Contractor shall provide sufficient security in the construction site to prevent illegal entry or work damaged during nights; holidays and other period when work is not executed; and during working hours. The Contractor shall take ample precautions against fire by keeping away flammable materials, and ensure that such materials are properly handled and stored. Fires shall not be allowed within the area of construction, except when permitted by the Engineer.

3.6 Disposal Area

The proposed location of disposal area shall be at the site designated by the Owner/Engineer. It is the responsibility of the Contractor to disposed off site all construction debris and be considered in the preparation of his proposal.

3.7 Contractor's Key Personnel and Maintenance Staff to be assigned to the Project

a) Key Personnel:

Project Manager (Licensed Civil Engineer)

1 - Licensed Civil/Structural Engineer

1 - Licensed Electrical Engineer

1 - Licensed Mechanical Engineer

1 - Licensed Plumbing and Sanitary Engineer

1 - Materials/Quantity Engineer

1 - Safety Engineer (Certified)

Payment for the above key personnel are incidental to other items of work, hence, will not be measured and paid separately.

b) Maintenance Staff:

- 1 - Clerk Typist/Encoder
- 1 - Security Guard
- 1 - Utility Man

c) Personnel to be Assigned to Assist the Engineer

The Contractor shall at all times during the duration of the contract provide for the use of the Engineer all equipment, instruments and apparatus, all information and records and qualified chainmen and laborers required by the Engineer for inspecting and measuring the works. Such equipment, instruments and apparatus shall include those listed in this provision.

The Contractor shall at all times during the duration of the contract provide for the use of the Engineer all equipment, instruments and apparatus, all information and records and 3 qualified Civil Engineers, chainmen and laborers required by the Engineer for inspecting and measuring the works.

4.FACILITIES FOR THE ENGINEER

The Contractor shall provide and maintain 2 units Office (with Living Room, Dining/Kitchen, Quarter and bathroom) to include utilities for the Engineer but not limited to the following items:

4.1 Combined Field Office and Engineer's Quarters

The Contractor shall provide and maintain on a **rental basis** two (2) units combined field office and quarter (2 units 40 footer portable cabin/trailer type mobile office) including electricity, water, air-conditioning and drainage services as directed by the Engineer. The portable cabin/trailer shall be securely anchored to the ground at all four corners to guard against movement during high winds.

The Contractor shall provide the combined field office and quarter building, before occupancy by the Engineer, with furniture (working tables, chairs, conference tables, filing cabinet, plan racks), access to copying and fax machines, air conditioning unit and toilet facilities as well as communication facilities as specified in Schedule A.

The Contractor shall provide for the field office sufficient and necessary supply for all normal stationary, printing paper, consumable items as specified under Schedule C, all as required by and to the satisfaction of the Engineer.

If the Contractor cannot provide the articles on time, the Engineer shall secure the items and the Contractor shall immediately reimburse the Engineer for the cost thereof.

The combined field office and Engineer's quarter, furniture and fixtures, office equipment and communication facilities shall be ready for occupancy and use by the Engineer within thirty (30) calendar days of the start of contract time. During the period that the building is not yet ready, the Contractor shall provide temporary accommodation to the satisfaction of the Engineer.

The Contractor will be paid for the actual cost duly receipted plus 15% for the temporary accommodation so provided under Item No. A(1)b. Facilities for the Engineer (Maintenance of combined Field Office and Quarters).

The Contractor shall provide the combined field office and quarter throughout the period of the Contract, with 24-hour supply of potable water, electricity and other services.

The Contractor shall be responsible for replacing and/or restoring, as directed, any facility or parts thereof which become damaged from any cause, or become worn out, lost, misplaced or stolen. The Contractor shall also provide stocks of expendable items such as light bulbs and tubes, insecticides, fuel, lubricants and the like.

The Contractor shall pay all bills for water, electricity, and other services.

(1) The field office and quarter, furniture and fixtures, office equipment like air-con units and temporary power equipment etc., microcomputer system shall become the property of the Owner upon their payment.

(2) The Contractor shall be responsible for the maintenance and protection of all facilities (to include the facilities of the Engineer) to be provided during the Contract. He shall provide one (1) utilityman to maintain all the facilities keeping them in good condition. He shall provide minimum of two (2) security guards in 2 shifts, 1 guard per shift to safeguard and secure, day and night, the building, equipment, furnishings and the personal property of the occupants, all as directed and/or approved by the Engineer.

The Contractor, if requested by the Engineer, shall immediately replace assigned personnel for reasons arising from misconduct and/or unsatisfactory performance.

4.2 Vehicles for the Engineer

The Contractor shall provide within thirty (30) calendar days after notice to commence work, the vehicles listed in Schedule B for the exclusive use of the Engineer, payment of which shall be on a monthly basis.

The vehicles shall comply in all respects with all relevant Philippine national or local laws, statutes and regulations. All vehicles shall carry or be fitted with the accessories as may be prescribed by laws and have comprehensive insurance. The vehicles on delivery shall be in good running condition, of the latest model and shall be driven by a competent qualified and experienced driver who shall be under the direct order of the Engineer. The Contractor shall maintain the vehicles in first class condition and shall be supplied with appropriate fuel and lubricants at all times. Provide a minimum of 20 liters of fuel per day as well as 4 spare tires.

He shall provide equivalent substitute vehicles when taken out of service for maintenance, repair or any other reason. Unless otherwise specified, the vehicles shall at the end of the contract become the property of the Owner.

4.3 Photographs

The Contractor shall provide record progress photographs (120 photographs per month) taken as, when and where directed by the Engineer at intervals of not more than one month. The photographs shall be sufficient in number and location to record the exact progress of the works. The Contractor shall provide one proof print of each photograph taken, and the negative and three (3) copies, in 3R size and printed on glossy paper, of any of the photographs selected as progress photographs by the Engineer. The photographs retained by the Engineer will become the property of the Owner and the

Contractor shall supply approved albums to accommodate them. Two copies are to be signed by the Contractor, one of which will be signed by the Engineer and returned to the Contractor.

4.4 Signboards

The Contractor shall furnish, erect and maintain 2 project identification signs, for as shown on the Drawings. All signs shall be placed at strategic location designated by the Engineer. Upon completion of the work, all signs installed shall be removed from the site.

4.5 General Operation and Maintenance Manual

The Contractor shall produce and supply to the Engineer two bound hard copies and two disk copies (Microsoft Word and Microsoft Excel) of an operation and maintenance manual on the target completion date for the contract.

No separate payment for the Operation and Maintenance Manual as this is deemed to be included as incidental to other items of work.

4.6 As-Built Drawings

The Contractor shall produce and supply to the Engineer two good hard copies of a full set of "As-Built" drawings at A1 size. The Engineer may allow up to 30 days after target completion date for delivery of some of these drawings, but otherwise they shall be due on the completion date. These shall include correctly amended version of all Contract Drawings to freely and accurately describe the As-built condition of all elements of the project within the Contractor's scope of work, to the approval of the Engineer. All drawings shall be clearly marked "AS BUILT".

No separate payment for the As-built Drawings as this is deemed to be included as incidental to other items of work.

5. MISCELLANEOUS ITEMS FOR THE ENGINEER'S QUARTERS

5.1 PAYMENT

- a) For all work executed or goods, materials, or services supplied by the Contractor under lump sum items, the quantities as determined above shall be paid for at the appropriate contract lump sum unit price as indicated in the Bid Schedule.
- b) The quantities determined as provided above for the maintenance of the combined field office, and quarter, the provision of transport for the Engineer, the provision of operation and maintenance of the Engineer's transport and the provision of progress photographs, shall be paid for at the appropriate contract unit price for each of the particular pay item shown in the Bid Schedule.

6. COMPLIANCE WITH CONTRACT REQUIREMENTS

6.1 Control of on Site Construction

Prior to the start of any definable feature of the work, the Contractor must perform the necessary inspection to include as follows:

- a) Review of Contract Documents to make sure that materials, equipment and products have been tested, submitted and approved.
- b) Physical examination of materials and equipment to assure its conformity to the specifications, plans, shop drawings and other data.
- c) As soon as the work has been started the Contractor shall conduct initial inspection to check and review the workmanship in compliance with the contract requirements for a particular item of work.
- d) The Contractor shall perform these inspections on a regular basis to assure continuing compliance with the contract requirements until completion of a particular type of work.

6.2 Preconstruction Meetings

Prior to the start of construction, Contractor's material men or vendors whose presence are required, must attend preconstruction meetings as directed for the purpose of discussing the execution of work.

6.3 Progress Meetings

Progress meetings shall be called upon by the following for the purpose of discussing the implementation of the work:

- a) When called upon by the Engineer or the Owner or his representative for the purpose of discussing the execution of work. Contractor's material men or vendors whose presence is necessary or requested must attend progress meetings. Each of such meeting shall be held at the time and place designated by the Engineer or his representative. Decisions and instructions agreed on these meetings shall be binding and conclusive on the contract. Minutes of this meeting shall be recorded and reasonable number of copies shall be furnished to the Contractor for distribution to various materials men and vendors involved.
- b) The Contractor may also call for a progress meeting for the purpose of coordinating, expediting and scheduling the work. In such meeting Contractor's material men or vendors, whose presence is necessary or requested are required to attend.

6.4 Progress Reports

The Contractor shall faithfully prepare and submit progress reports to the Engineer every 30 days after the start of the project up to its completion, showing the work completed, work remaining to be done, the status of construction equipment and materials at the site.

6.5 Survey Data

The Contractor shall layout his work from established based lines and bench mark indicated in the drawing and shall be responsible for all measurement in connection therewith. The Contractor shall furnish, at his own expense, all stakes, templates, platforms, equipment, tools, materials and labor as may be required in laying out any part of the work, out of established base lines and bench mark. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks until he is authorized to remove them. If such marks are destroyed by the Contractor through his negligence prior to the authorized removal, they shall be replaced at the expense of the Contractor.

6.6 Shop Drawings

The Contractor shall submit and furnish shop drawings and samples accompanied with transmittal forms in accordance with the provision of the Conditions of Contract. The term "Shop Drawings" as used herein shall be understood to include detailed design calculations, construction drawings, lists, graphs, and others.

a) Transmittal forms shall be filled out in type-written or ink with no alterations or interlineations unless initialed and dated before submittal. Shop drawings shall be submitted the same size as the contract drawings when practicable, but in no case it shall exceed dimension of the contract drawings. The Contractor shall make preliminary check of all shop drawings for compliance with the contract documents and he shall stamp each print with statement of compliance with the requirements. The Contractor may authorize his supplier to deal directly with the Engineer with regard to shop drawings, however, ultimate responsibility for accuracy and completeness in the submittal shall remain with the Contractor.

b) The said shop drawing and transmittal shall be submitted at a time sufficiently early, to allow review of the same by the Engineer and to accommodate the rate of construction progress required under the contract. The contractor shall submit print copies of shop drawings with transmittal forms, and copies of brochures with transmittal forms, as required by the Engineer.

c) Any shop drawings and samples, submitted not accompanied by transmittal forms or where all applicable items on the forms are not completed will be returned for re-submittal. The Engineer who will check and evaluate mentioned shop drawings will retain print copy for his file and return the rest to the Contractor with notation. Returned shop drawings marked "No Exceptions Taken" or "Make Corrections Noted", means formal revision of said drawings will not be required. If it is marked "Amend-Resubmit" or "Rejected-Resubmit", the Contractor shall revise said drawing and shall submit revised drawing to the Engineer.

d) The Engineer shall process the submission and indicate the appropriate action on the shop drawings and transmittal forms. Construction of an item shall not commenced before the Engineer has reviewed the pertinent shop drawing and returned it to the Contractor, marked as mentioned above. Revisions indicated on shop drawing shall be considered as changes necessary to meet the requirements of the contract drawings and specifications, and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay, resulting from having Contractors make the required revisions, unless reviewed by the Engineer was delayed beyond reasonable period of time

and unless the Contractor can establish that such delay in revision resulted in delay of the project.

Re-submittal procedure shall follow the same procedure as the initial submittal.

6.7 Construction Photographs

The Contractor shall take photographs during the progress of the work once a month, all taken where directed by the Engineer. At the completion of the project final photographs shall be taken by the Contractor as directed by the Engineer. Two prints of each photograph shall be sent to the Owner and one print to the Engineer. The photographs shall be neatly labeled, dated, and identified in a little box in the lower right hand corner, showing the date of exposure, project name, location and direction of view.

All negatives shall be retained by the Contractor until completion of the work at which time they shall become the property of the Owner.

6.8 Cleaning-up

The Contractor shall at all times keep the construction area including storage area used by him free from accumulations of waste material or rubbish. Upon completion of construction, the Contractor shall leave the work and premises in a clean, neat and workmanlike conditions satisfactory to the Owner.

6.9 Documents to be Submitted

The following documents shall be submitted by the Contractor to the Engineer and the Owner prior to final payment and before issuance of final certificate of payment in accordance with the provisions of the conditions of contract.

- a) The guarantee required by the Conditions of Contract and any other extended guarantees stated in the technical sections of the specifications.
- b) A set of As-Built drawings shall be submitted showing accurate record of changes or deviations from the contract documents and the shop drawings indicating the work as actually installed. Records shall be arranged in order, in accordance with the various sections of the specifications and properly indexed with certifications of endorsement thereof, that each of the revised print of the drawings and specifications are complete and accurate. Prior to the application for final payment, and as a condition to its approval by the Engineer and the Procuring Entity, the Contractor shall deliver the records, drawings, and specifications arranged in proper order, indexed and endorsed as herein specified.

END OF SECTION

DIVISION 02 EXISTING CONDITIONS
PART I-GENERAL

1. SITE ASSESSMENT AND SITE SURVEY

General Contractor involved in site assessment and survey must have a thorough review of its scope to be able to delineate the boundary of development. The Supervising Engineer must be familiar with the provision of the latest edition of the National Building Code and the regulations of the local authority concerned in the enforcement of the laws and ordinances.

Coordinate as necessary with other trades concerned to assure proper knowledge of scope of works.

Site assessment and survey shall be conducted using appropriate technologies including the use of standard and agreed –upon procedures.

2. SELECTIVE DEMOLITION

Existing concrete pavements at the line of development and to be affected by foundation works as per Plan shall be demolished as approved by the Supervising/Consulting Engineer.

No other portions which are not included in the scope of works shall be altered, moved or demolished unless with written approval of Consulting Architect/Engineer.

Haul routes shall be designated by the Procuring Entity and Consulting Architect/Engineer.

END OF SECTION

DIVISION 03 SITE WORKS

PART I-GENERAL

The General Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Excavation and filling shall be performed in manner and sequence that will provide proper drainage at all times. Water which accumulates in excavated areas shall be removed by pumping before fill or concrete is placed therein. He shall perform excavation of every type of material encountered within the limits of project to the lines, grades and elevations indicated and as specified herein.

The General Contractor shall protect and maintain existing utility lines or notify authorities concerned for removal or discontinuance of said utilities in accordance with the instructions and requirements of notified parties in the event that it would interfere with the excavation.

Any excess material remaining after completion of the site works shall be disposed of by hauling and spreading in nearby spoil areas designated by the Procuring Entity. Excavated material deposited in spoil areas shall be graded to a uniform surface.

PART II-PRODUCT

1. SITE CLEARING AND GRUBBING

The work shall include the furnishing of all labor, materials, equipment and services necessary for complete clearing of trees not marked for preservation, snags, logs, brush, stump, rubbish and disposal to designated areas.

2. SITE MOVING

2.1 Common Fill – shall be approved site – excavated material free from roots stumps and other perishable or objectionable matter.

2.2 Select Fill – shall be placed where indicated and shall consist of crushed gravel, crushed rock, or a combination thereof. The materials shall be free from adobe vegetable matters and shall be thoroughly tamped after placing.

2.3 Equipments like vibratory compactors and other equipments necessary for complete and proper procedure.

3. EARTHWORK METHODS

3.1 Termite Control

Liquid Termite Concentrate

Liquid Termicide Ready-Mixed Solution

Powder Termicide

4. SHORING AND UNDERPINNING

Adequate bracing, shoring, underpinning, excavation and support shall be provided by the General Contractor. Design and configuration shall be approved by the Consulting Engineer.

PART III-EXECUTION

1. SITE CLEARING AND GRUBBING

The General Contractor shall consult with the Procuring Entity and Consultants prior to begin clearing, and a full understanding is to be reached as to procedure.

Site clearing, as shown in Plans, shall be undertaken to allow the succeeding phase of works to proceed with limited constraints for grading, trench excavation, and other utility preparation.

The work shall consist of clearing and grubbing within the boundary limits. Clearing and grubbing shall be done prior to pipe installations. Existing structure shall be protected against damage.

1.2 Selective Tree and Shrub Removal and Trimming

Trees to be left standing and uninjured shall be designated by special markings that are conducive to preventing injury to the tree. All trees not marked for preservation and all snags, logs, brush, stumps, shrubs, rubbish and similar materials shall be cleared from within the limits of the designated areas.

2. SITE MOVING

2.1 Excavation and Fill

2.1.1 Subgrade Preparation

Sub-grade shall be shaped to line, grade, and cross-section, and compacted as specified. This operation shall include plowing, disk, and any moistening or aerating required to obtain proper compaction. Soft or otherwise unsatisfactory excavated materials or other approved materials as directed in writing. Low areas resulting from removal of unsatisfactory materials or excavation of rock shall be brought up to required grade with satisfactory materials, and entire sub-grade shaped as specified. Elevation of finish sub-grade shall conform to elevation as shown.

Stake out accurately the lines of the building and of the other structures included in the contract, and establish grades therefore, after which secure approval by Consulting Architect and Engineer before any excavation work is commenced.

Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundations.

Footings or foundations which may be affected by the excavation shall be underpinned adequately, or otherwise, protected against settlement and/or against lateral movement.

2.1.2 Excavation

During construction, any excavation shall be kept shaped and drained. Ditches and drains shall be maintained in such a manner as to drain effectively at times. Storage or stockpiling of materials on the sub-grade will not be permitted. Graded areas shall be protected against action of elements prior to acceptance of work. Settlement or washing that may have occurred shall be repaired and grades re-established to the required elevations and slopes immediately prior to installation of paving.

Excavation carried below indicated depths will not be permitted except to remove unsatisfactory material. Unauthorized materials removed below depths indicated shall be replaced at no additional cost to the Procuring Entity.

Excavations shall be to the depths indicated bearing values. Excavations for footings and foundations carried below required depths shall be filled with concrete and bottom of such shall be level. All structural excavations shall extend to sufficient distance from the walls and footings to allow for proper erection and dismantling of forms for installation of service and for inspection. All excavations shall be inspected and approved before pouring any concrete laying underground services or placing select fill materials.

2.1.3 Trenching

Trenches shall be of necessary width for proper laying of pipe, while concrete lining, duct, or cable, and banks shall be nearly vertical as practicable. Trench excavation shall be coordinated to avoid open-trenches for prolonged periods. Bottoms of trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on undisturbed soil at every point along its entire length, except for portions of pipe sections where it is necessary to excavate for bell holes and for proper making of pipe joints.

Pile materials suitable for backfilling a sufficient distance from banks or trenches to prevent slides or cave-ins. Excavated materials shall be piled to one side only of trenches and in such a manner as to permit ready access to and use of existing utilities system. Sheathing and shoring shall be done as necessary for protection of work and for safety of personnel.

Backfilling shall be coordinated with testing of utilities. Trenches shall be carefully backfilled with satisfactory materials, free of large clod of earth or stones not over 25mm in size and deposited 0.20m max. layer, loose depth. Care shall be taken not to damage pipe. Trenches and excavation pits improperly backfilled, or where settlement occurs, shall be reopened to depth required for proper compaction, then refilled and compacted, with the surface restored to required grade and compaction.

2.1.4 Rock Removal

Hard material shall be defined as solid ledge rock, any boulder, masonry or concrete except pavements exceeding ½ cubic meter in volume, firmly cemented unstratified mass or conglomerate deposits possessing the characteristics of solid rock shall be removed through systematic drilling and blasting as directed or approved by the Engineer and at the General Contractor's expense.

2.1.5 Dewatering

Excavate in such manner that immediate surrounding will be continually drained. Water shall not be allowed to accumulate in excavations. Keep all excavations dry and protected from the weather. Drained water shall be connected to the nearest storm drainage system.

2.1.6 Backfill

Backfilling can only begin with the construction below finish grade approved, forms removed, underground utilities had been inspected, tested and approved, excavation cleaned of trash and debris. Backfill material shall be free of roots, other organic matters, trash, debris and stones larger than 75 centimeter in any dimension. Place backfill in 0.20 cm. maximum layers loose depth, each layer being thoroughly compacted and rammed by wetting, tamping or rolling.

Satisfactory excavated material required for fill and backfill shall be separately stockpiled as directed. Unsatisfactory and surplus excavated materials not required for fill and backfill shall be disposed of in a designated waste area. Stockpiles of excavated material shall be graded and sloped for proper drainage.

Before placing fill material, the surface upon which it will be placed shall be cleared of all brush roots, vegetable matter and debris, scarified and thoroughly wetted to ensure good bonding between the ground.

2.1.7 Compaction

Compaction shall be by rolling with approved tamping rollers or other approved equipment well –suited to the particular soil being compacted. Materials shall be moistened or aerated as necessary to provide moisture content that will facilitate obtaining the specified compaction with the equipment utilized. Each layer shall be compacted to not less than 95% maximum dry density.

2.2 Grading

Cutting, filling and grading will be done to bring all areas of respective surfacing as fixed by the finished grade. Site grading shall conform to the lines and grades indicated by the finish contours on the Plans. Where topsoil, pavement, aggregate surfacing and other items are shown, rough grade shall be finished to such depth below finish grade as necessary to accommodate these items. All areas where structures are to be built on fill, shall be stripped to such depth as necessary to remove turf, roots, organic matter and other objectionable materials.

DIVISION 04 CONCRETE

PART I-GENERAL

1. CONCRETE FORMWORKS

Design, erect, support, brace, and maintain form work so it will produce correctly aligned concrete and safety support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure.

Construct forms to the exact sizes, shapes, lines and dimensions as required to obtain accurate alignment, location, grades, and level and plumb work in the finish structure.

2. CONCRETE REINFORCEMENTS

Steel reinforcement shall be stored above the surface of the ground upon platforms, skid or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the worked, reinforcement shall be free from dirt, detrimental rust, loose scale, paint, grease, oil, or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimension, and cross sectional area and tensile properties of the material meets the physical requirements for the size and grade of steel specified.

3. CAST-IN-PLACE AND PRE-CAST CONCRETE

All cements shall be stored, immediately upon delivery at the Site, in weatherproof building, which will protect the cement from dampness. The floor shall be raised from the ground. The buildings shall be placed in locations approved by the Supervising/Consulting Engineer. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner as to allow the earliest deliveries to be used first and to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity for storage of a sufficient quantity of cement to allow sampling at least twelve days before the cement is to be used. Bulk cement, if used, shall be transferred to elevated air tight and weatherproof bins. Stored cement shall meet the test requirements at any time after shortage when wrested is ordered by the Supervising/Consulting Engineer. At the time of use, all cements shall be free of lumps.

The handling and storing of concrete aggregates shall be such as to prevent segregation or the inclusion of foreign materials. The Supervising/Consulting Engineer may require that aggregates be stored on separate platforms at satisfactory locations.

In order to secure greater uniformity of concrete mix, the Supervising/Consulting Engineer may require that the coarse aggregate be separated into two or more sizes. Different sizes of aggregates shall be stored in separate bins or in separate stockpiles sufficiently remote from each other to prevent the material at the edges of the piles from becoming intermixed.

PART II- PRODUCTS

1. CONCRETE FORMWORKS

Use plywood, metal, phenolic, or surfaced lumber form for all exposed concrete work, 1/4" thick minimum. Forms for surfaces exposed or unexposed to view and requires a standard finish shall be plywood or metal. For surfaces requiring special finishes, phenolic or plywood not less than 12mm shall be used. Surfaces of steel forms shall be free from irregularities.

2. CONCRETE REINFORCEMENTS

2.1 Reinforcing Steel

The reinforcing steel bars shall be as shown in Plans. The sizes shall be but not limited to the following: 10 mm Ø, 12 mm Ø, 16 mm Ø, 25 mm Ø, 28 mm Ø. Verify Plans for Reinforcing Steel Bar schedule.

2.2 Tie Wires

Tie wires to be used for steel reinforcements shall be Ga 16 Galvanized Iron conforming to ASTM A 641. Spacing and length shall be as shown in Plans

3. CAST-IN-PLACE CONCRETE

3.1 Portland Cement

All materials and workmanship shall conform to the latest building code of American Concrete Institute (ACI-318).

Cement shall conform to the requirements of the following cited Specifications for the specified or permitted.

Table 1: Types of Cement

Type	Specifications
Portland Cement	AASHTO M 85 (ASTM C 150)
Blended Hydraulic Cement	AASHTO M 240 (ASTM C 595)
Masonry Cement	AASHTO M 150-74 (ASTM C 91)

When Types IV and V (AASHTO M 85), P and PA (AASHTO M 150) cements are used, proper recognition shall be given to the effects of slower strength gain on concrete proportioning and construction practices. Types S and SA cements will be permitted only when blended with Portland Cement in proportions approved by the Supervising/Consulting Engineer.

Unless otherwise permitted by the Supervising/Consulting Engineer, the product of only one mill of any one brand and type of Portland Cement shall be used on the project.

The General Contractor shall provide suitable means of storing and protecting the cement against dampness. Cement which, for any reason, has become partially set or which contains lumps of caked cement will be rejected. Cement salvaged from discarded or used bags shall not be used.

3.2 Fine Aggregates

It shall consist of natural sand, stone screenings or other inert materials with similar characteristic, or combinations thereof, having hard, strong and durable particles approved by the Engineer. Fine aggregate from different sources of supply shall not be mixed or stored in the same pile nor used alternately in the same class of concrete without the approval of the Engineer.

It shall not contain more than three mass percent of material passing the 0.075 mm (No. 200 sieve) by washing nor more than one mass percent each of clay lumps or shale. The use of beach sand will not be allowed without the approval of the Supervising/Consulting Engineer.

If the fine aggregate is subjected to five cycles of the sodium sulfate soundness test, the weighted loss shall not exceed 10 mass percent.

The fine aggregate shall be free from injurious amounts of organic impurities and if a color darker than the standard is produced, it shall be rejected. However, when tested for the effect of organic impurities of strength of mortar by AASHTO T 71, the fine aggregate may be used if the relative strength at 7 and 28 days is not less than 95 mass percent.

The fine aggregates shall be well graded from coarse to fine and shall conform to Table 2.

Table 2. Grading Requirements for Fine Aggregates

Sieve Designation	Mass Percent Passing
9.5 mm (3/8 in)	100
4.75 mm (No. 4)	95 – 100
1.18 mm (No. 16)	45 - 80
0.300 mm (No. 50)	5-30
0.150 mm (No. 100)	0 - 10

3.3 Coarse Aggregates

It shall consist of crushed stone, gravel, blast furnace slag, or other approved inert materials of similar characteristics, or combinations thereof, having hard, strong, durable pieces and free from any adherent coatings.

It shall contain no more than one mass percent of material passing the 0.075mm (No. 200) sieve, not more than 0.25 mass percent of clay lumps, nor more than 3.5 mass percent of soft fragments. If the coarse

aggregate is subjected to five cycles of the sodium sulfate soundness test, the weighted loss shall not exceed 12 mass percent.

It shall have a mass percent of wear not exceeding 40 when tested by AASHTO T 96.

If slag is used, its density shall not be less than 1120kg/m³ (70 lbs/cu ft.) The gradation of the coarse aggregate shall conform to Table 3. Only one grading specification shall be used from any source.

Table 3. Grading Requirements for Coarse Aggregates

Standard (mm)	Alternate US Standard	Class A	Class B	Class C	Class D	Class Seal
63	2 - ½"					
50	2"	100	100			
37.5	1 - ½"	95 - 100	-			100
25	1"	-	35 - 70	-	100	95 - 100
19.0	¾"	35 - 70	-	100	-	25 - 60
12.5	½"	-	10 - 30	90 - 100	-	25 - 60
9.5	3/8"	10 - 30	-	40 - 70	20 - 55	-
4.75	No. 4	0 - 5	0 - 5	0 - 15	0 - 10	0 - 10

" The measured cement content shall be within plus (+) or minus (-) 2 mass percent of the design cement content.

3.4 Water

Water used in mixing, curing, or other designated applications shall be reasonably clean and free of oil, salt, acid, alkali, grass or other substances injurious to the finished product. Water will be tested in accordance with and shall meet the requirements of item 714, Water. Water which is drinkable may be used without test. Where the source of water is shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

4. PRE-CAST CONCRETE

4.1 Structural Pre- stressed Concrete

4.1 Concrete Joists

Concrete joists shall be of two types:

3/8 mm diameter 7-wire strand grade 270 ksi

4.2 Portland Cement

Portland cement shall comply with ASTM C150, type I

4.3 Reinforcement

Reinforcements shall be 10mm welded wire mesh matting spaced at 0.25 m x 6m and Ga. 16 GI Tie wires.
Provide 10mm diameter dowel bars (L/A) spaced at 0.60m

4.4 Aggregates

Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps shale, alkali, surface coatings and organic matter and complying with ASTM C144.

4.5 Water

Provide water, free from deleterious amounts of acids, alkalis, and organic materials.

PART III-EXECUTION

1. CONCRETE FORMWORKS

Concrete forms shall be mortar-tight, true to the dimensions, lines and grades of the structure and with sufficient strength, rigidity, shape and surface smoothness as to leave the finished works true to the dimension shown on the Plans or required by the Engineer and the surface finish as specified. The General Contractor shall be responsible for the adequacy of forms and form support. Wire ties shall not be used where concrete surface will be exposed to weathering and where discoloration will be exposed. All form work shall be provided with adequate clean-out openings to permit inspection and easy cleaning.

The inside surfaces of form shall be cleaned of all dirt, mortar and foreign material. Forms which will later be removed shall be thoroughly coated with non-staining type mineral form oil prior to use. The form oil shall be of commercial quality form oil or other approved coating which will permit the ready release of the forms and will not discolor the concrete.

Concrete shall not be deposited in the forms until all work in connection with constructing the forms has been completed, all inspected and approved said forms and materials. Such work shall include the removal of all dirt, chips, sawdust and other foreign material from the forms.

The rate of depositing concrete in forms shall be such to prevent bulging of the forms or form panels in excess of the deflections permitted by this Specifications. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position

Forms and falsework shall not be removed without the consent of the Supervising/Consulting Engineer. The Engineer's consent shall not relieve the General Contractor of responsibility for the safety of the work.

Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.

Falsework removal for continuous or cantilevered structures shall be as directed by the Supervising/Consulting Engineer or shall be such that the structure is gradually subjected to its working stress.

When concrete strength tests are used for removal of forms and supports, such removal should not begin until the concrete has attained the percentage of the specified design strength shown in the table below:

Table 4. Requirements for Removal of Forms

Element	Minimum Time
Foundation	24 Hrs.
Suspended slab except when additional loads are imposed	8 Days
Walls	18 Hrs.
Beams	14 Days

Forms and falsework shall not be released from under concrete without first determining if the concrete has gained adequate strength without regard to the time element. In the absence of strength determination, the forms and falsework are to remain in place until removal is permitted by the Engineer.

1.1 Tolerances and variations

The General Contractor shall set and maintain concrete forms to ensure that after removal of forms and prior to patching and finishing, no portion of concrete work will exceed any of the tolerances specified. Variations in floor levels shall be measured before removal of supporting shore. The General Contractor shall be responsible for variations due to deflection. The specified variation for one element of the structure will not be applicable when it will permit another element of the structure to exceed its variations.

1.2 Architectural Cast-in Place Concrete Forming

To facilitate finishing, forms used on ornamental work, railing, parapets and exposed vertical surfaces shall be removed in not less than 12 or more than 48 hours, depending upon the weather condition of concrete in columns, forms shall always be removed from them before the removal of shoring from beneath beams and girders.

2. CONCRETE REINFORCEMENTS

2.1 Reinforcing Steel

Reinforcing steel shall meet the requirements of Item 710, Reinforcing Steel and Wire Rope, and conform to ASTM 615 Grade 33 for diameter 10 and larger bars.

In general, the latest edition of ACI-315, manual of Standard Practice Detailing of Reinforced Concrete Structures shall be adhered to unless otherwise shown or noted.

2.1.1 Order List

Before materials are ordered, all order lists and bending diagrams shall be furnished by the General Contractor, for approval of the Consulting Engineer. The approved of order lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for the correctness of such lists and diagrams. Any expense incident to the revisions of materials furnished in accordance with such lists and diagrams to make them comply with the Plans shall be borne by the Contractor.

2.1.3 Placing and Fastening

Steel reinforcement shall be provided as indicated, together with all necessary wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay, and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the reinforcement in place throughout the concreting operations. The supports shall be used in such manner that they will not be exposed or contribute in any way to the discoloration or deterioration of the concrete.

All steel reinforcement shall be accurately placed in the position shown on the Plans and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 300 mm in each directions, in which case, alternate intersections shall be tied. Ties shall be fastened on the inside.

Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports, so that it does not vary from the position indicated on the Plans by more than 6 mm. Blocks for holding reinforcement from contact with the forms shall be precast mortar blocks of approved shapes and dimensions. Layers of bars shall be separated by precast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks shall not be permitted. The minimum distance between bars shall be 40 mm. Reinforcement of any member shall be placed, inspected and approved by the Consulting Engineer before the concrete begins. Concrete placed in violation of this provision may be rejected and removal may be required.

The reinforcement shall be placed and secured by concrete or metal chair spacers. The clear distance between parallel bars shall be minimum of $1\frac{1}{2}$ times the diameter of the bar. In no case shall the clear distance between the bars except in the columns and between multiple layers of bars in beams be less than 2.5 centimeters nor less than $1\frac{1}{3}$ times the maximum size of the coarse aggregates. Where bars are used in two or more layers, the bars in the upper layers shall be placed directly above those in the lower layers at a minimum clear distance of 2.5 centimeters. The clear distance between longitudinal bars in columns shall not be less than $1\frac{1}{2}$ times the bar diameter, or $1\frac{1}{2}$ times the maximum size of the coarse aggregate.

Vertical staples 10 millimeters in diameter spaced not more than 1.5 meters both ways shall connect top and bottom bars of all slab reinforcement.

Bends for stirrups and ties shall be made around a pin having a diameter of not less than six times the diameter of the bar, except that for bars larger than 20 millimeters, the pin shall not be less than eight times the diameter of the bar, all bars shall be bent cold.

All bars at the free end of a cantilever must be hooked.

All free ends of cantilever floor slabs shall have two longitudinal bars placed one above the other and spaced as far apart as possible to serve as a longitudinal stiffener to ensure a truly straight horizontal line.

All openings in slabs and concrete walls shall have diagonal reinforcements at the corners with sizes and lengths as shown in Plans.

2.1.4 Embedded Items

Do not embed piping, other than electrical conduit, in structural concrete unless reflected in Plans or approved by the Consulting Engineer. Provide necessary support and reinforcements as shown on Plans.

Locate conduit as shown in Plans to maintain maximum strength of the concrete.

Increase the thickness of the concrete if the outside diameter of the conduit exceeds 30% of the thickness of the concrete.

All required flashing, reglets, seals, masonry ties, anchors, bolts, inserts, wood locks, nailing strips, ground, wire hangers, sleeves, drains, guard angles, inserts for elevator guides, provisions for floor hinges and other required items in the concrete, accurately secured so they will not be displaced, and in the precise locations needed. All sub-contractors whose work is related to the concrete supported by it shall be given ample notice and opportunity to introduce or furnish embedded item before concrete is placed. All ferrous metal sleeves, inserts, anchors and other embedded ferrous items exposed to weather or where rust would impair the appearance of finish or structure shall be galvanized.

2.1.5 Splicing

All reinforcement shall be furnished in the full lengths indicated on the Plans. Splicing of bars, except where shown on the Plans will not be permitted without the written approval of the Consulting Engineer. Splices shall be securely wired together & shall lap in accordance with table. Splices shall be staggered as far as possible and with a minimum separation of not less than 40 bar diameters. Not more than one-third of the bars may be spliced in the same cross-section, except where shown on the Plans.

Table 7: Splices

For Tension

TABLE OF LAP SPLICE (FC' = 4000PSI) GR. 60				
BAR Ø	TYPE A	TYPE B	ANCHORAGE LENGTH	
16 MM	0.61 M		0.80 M	0.35 M (Hook)
20 MM	0.76 M	1.00 M		0.40 M (Hook)
25 MM	1.20 M	1.52 M		0.50 M (Hook)
28 MM	1.35 M	1.70 M		0.55 M (Hook)

32 MM 1.55 M 1.95 M 0.60 M (Hook)

TABLE OF LAP SPLICE (FC' = 2500PSI) GR. 33

BAR Ø	TYPE A	TYPE B	ANCHORAGE LENGTH
10 MM	0.30 M	0.40 M	0.24 M (Hook)
12 MM	0.32 M	0.41 M	0.30 M (Hook)

For Compression

TABLE OF LAP SPLICE (FC' = 4000PSI) GR. 60

BAR Ø	TYPE A	TYPE B	ANCHORAGE LENGTH
16 MM	0.50 M	0.60 M	0.35 M (Hook)
20 MM	0.60 M	0.75 M	0.40 M (Hook)
25 MM	0.75 M	0.95 M	0.50 M (Hook)
28 MM	0.85 M	1.05 M	0.55 M (Hook)
32 MM	0.95 M	1.20 M	0.65 M (Hook)

TABLE OF LAP SPLICE (FC' = 2500PSI) GR. 33

BAR Ø	TYPE A	TYPE B	ANCHORAGE LENGTH
10 MM	0.25 M	0.30 M	0.15 M (Hook)
12 MM	0.26 M	0.33 M	0.20 M (Hook)

In tapped splices, the bars shall be placed in contact and wired together. Lapped splices will not be permitted at locations where the concrete section is insufficient to provide minimum clear distance of one and one-third (1 1/3) the maximum size of coarse aggregate between the splice and the nearest adjacent bar. Welding of reinforcing steel shall be done only if detailed on the Plans or if authorized by the Consulting Engineer in writing. Spiral reinforcement shall be spliced by lapping at least one and a half turns or by butt welding unless otherwise shown on the Plans.

2.2 Tie wires

Clean all reinforcement by removing mud, oil or other materials before tying.

3. CAST-IN-PLACE CONCRETE

3.1 Structural Concrete

3.1.1 Strength

All concrete shall develop a min. compressive strength at the end of twenty eight (28) days w/ corresponding maximum aggregate and slumps as follows:

Table 8: Maximum Aggregate and Slump

Location	28 days Strength	Max. aggregate	Max. slump
All others including suspended slabs (mm)	3000 psi	¾ in. (19mm)	4 in. (100 mm)

Columns, R.C. walls	3000 psi	¾ in. (19mm)	4 in. (100 mm)
Beams, Girders	3000 psi	¾ in. (19mm)	4 in. (100 mm)
Lintel Beams/Stiffener Columns mm)	3000 psi	¾ in. (19mm)	4 in. (100

3.1.2 Usage

Five classes of concrete are provided for in this item, namely: A, B, C, P and Seal. Each class shall be used in that part of the structure as called for on the Plans. The classes of concrete will generally be used as follows:

Class A – All superstructures and heavily reinforced substructures. The important parts of the structure included are slabs, beams, girders, columns, arch ribs, box culverts, reinforced abutments, retaining walls, and reinforced footings.

Class B – Footings, pedestals, massive pier shafts, pipe bedding, and gravity walls, unreinforced or with only a small amount of reinforcement.

Class C – Thin reinforced sections, precast R.C. piles and cribbing and for filler in steel grid floors.

Class P – Pre-stressed concrete structures and members.

Seal – Concrete deposited in water.

3.1.3 Sampling and Testing of Structural Concrete

As work progresses, at least one (1) sample consisting of three (3) concrete cylinder test specimens, 150mm x 300mm (6 "x12") shall be taken from each seventy five (75) cubic meter of each class of concrete or fraction thereof placed each day.

Compliance with the requirements of this section shall be determined in accordance with the following standard methods of AASHTO:

Table 9.AASHTO Standard Methods

Sampling of fresh concrete	T 141
Weight per cubic meter and air content (gravi-metric) of concrete	T 121
Sieve analysis of fine and coarse aggregates	T 27
Slump of Portland Cement Concrete	T 119
Specific gravity and absorption of fine aggregate	T 84
Test for strength shall be made in accordance with the following:	
Making and curing concrete compressive and flexural test	
Specimens in the field	T 23

Compressive strength of molded concrete cylinders

T 22

3.1.4 Proportioning and Strength of Structural Concrete

The concrete materials shall be proportioned in accordance with the requirements for each class of concrete, using the absolute method as outlined in the American Concrete Institute (ACI) Standard 211.1. "Recommended Practice for Selecting proportions for Normal and Heavyweight Concrete". Other methods of proportioning may be employed in the mix design with prior approval of the Engineer. The mix shall either be designed or approved by the Consulting Engineer. A change in the source of materials during the progress of work may necessitate a new mix design. The strength requirements for each class of concrete shall be as specified in Table 10.

3.1.5 Consistency

Concrete shall have a consistency such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcing steel but individual particles of the coarse aggregate when isolated shall show a coating of mortar containing its proportionate amount of sand. The consistency of concrete shall be gauged by the ability of the equipment to properly place it and not by difficulty in mixing and transporting. The quantity of mixing water shall be determined by the Consulting Engineer and shall not be varied without his consent. Concrete as dry as it is practical to place with the equipment specified shall be used.

3.1.6 Mixing and Delivery

Concrete may be mixed at the site of the construction, at a central point or by a combination of central point and truck mixing or by a combination of central point mixing and truck agitating. Mixing and delivery of concrete shall be in accordance with the appropriate requirement of AASHTO M 157 except as modified in the following paragraphs of this section, for truck mixing or a combination of central point and truck mixing or truck agitating. Delivery of concrete shall be regulated so that placing is at a continuous rate unless delayed by placing operations. The intervals between delivery of batches shall not be so long as to allow the concrete in place to harden partially, and in no case shall such an interval exceed 30 minutes.

In exceptional cases and when volumetric measurements are authorized, for small project requiring less than 75 cubic meters per day of pouring, the weight proportions shall be converted to equivalent volumetric proportions. In such cases, suitable allowance shall be made for variations in the moisture condition of the aggregates, including the bulking effect in the fine aggregate. Batching and mixing shall be in accordance with ASTM C 685, Section 6 through 9.

3.1.7 Mixing Concrete: General

Concrete shall be thoroughly mixed in a mixer of an approved size and type that will ensure a uniform distribution of the materials throughout the mass.

All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The

auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Consulting Engineer.

Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20mm or more below the original height of the manufacturer's design. The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand and water to coat inside the drum without reducing the required mortar content of the mix.

When the aggregate contains more water than the quantity necessary to produce a saturated surface dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregate. All water shall be in the drum by the end of the first quarter of the specified mixing time. Cement shall be batched and charged into the mixer so that it will not result in loss of cement due to the effect of wind, hoppers, or other conditions which reduce or vary the required quantity of cement in the concrete mixture.

The entire content of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein. The materials composting a batch except water shall be deposited simultaneously into the mixer.

All concrete shall be mixed for a period of not less than 1 – ½ minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it has been designed. When mixing is to cease for a period of one hour or more, the mixer shall be thoroughly cleaned. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

3.1.8 Conveying

Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.

Deposit concrete in its final position without segregation, re handling, or flowing. Place concrete with buggies, buckets or wheelbarrows. No chutes shall be allowed except to transfer concrete from the mixer to the buggies and shall not exceed six meters in total length.

Do not place concrete with a free fall of more than 1-½ meters, except when approved sheet metal conduits, pipes or elephant trunks are employed. These conveyers, when used, shall be kept full of concrete and the ends kept buried in the newly placed concrete as pouring progresses.

Do not use concrete which becomes non- plastic or unworkable, or does not meet required quality control limits, or has been contaminated with foreign materials remove rejected concrete from the job site.

3.1.9 Placing Concrete

Deposit concrete in horizontal layers not deeper than 60 centimeters, and avoid inclined construction joints.

Deposit concrete in its final position within three hours from the time of mixing, after which it will be rejected.

Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, unit the placing of a panel or a section is completed.

Bring slab surfaces to the correct level with a straightedge, and then strike off.

Use bull floats to smooth the surface, leaving the surface free from bumps and hollows.

Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

3.1.10 Consolidation

Consolidate each layer of concrete immediately after placing; by use of concrete vibrators supplemented by hand spading, rodding, or tamping.

Do not allow pouring without the use of vibrators. Avoid segregation due to over vibration. Do not use vibrators to transport or spread concrete inside the forms.

Stop vibration when mixture ceases to decrease in volume. When possible, concreting shall be continuous until the section is complete.

3.1.11 Construction Joints

Construction joints shall be made only where shown on the Plans or called for in the pouring schedule, unless otherwise approved by the Supervising/Consulting Engineer. Shear keys or reinforcement shall be used, unless otherwise specified, to transmit shear or to bond the two sections together.

Before depositing new concrete on or against concrete which has hardened, the forms shall be retightened. The surface of the hardened concrete shall be roughened as required by the Engineer, in a manner that will not leave loose particles of aggregate or damage concrete at the surface.

The placing of concrete shall be carried continuously from joint to joint. The face edges of all joints which are exposed to view shall be carefully finished true to line and elevation.

3.2 Architectural Concrete

Mouldings, Trims, shoes and other architectural concrete shown in Plans shall have the same concrete mix design as structural concrete. Design, configuration and reinforcements shall be as shown in Plans.

3.3 Finishing Concrete

3.3.1 Ordinary Finish

Immediately following the removal of forms, all formwork and irregular protection shall be removed from all surfaces except from those which are not to be exposed or are not to be waterproofed. Complete repair on concrete imperfections within 24 hours after removal of forms. Neatly remove pins from exposed

surfaces. On all surfaces the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges and other defects shall be thoroughly cleaned, and having been kept saturated with water and made true with a mortar and fine aggregate mixed in the proportions used in the grade of concrete being finished. Concrete that is damaged or honeycombed must be removed to reach concrete and replaced with the dry-pack mortar, or concrete as hereinafter specified. Where large bulges and abrupt irregularities protrude, the protrusions shall be removed by grinding. Use dry-pack filling for holes whose width is less than its depth, for holes left by removal of fasteners from the ends of form tie-rods, for grout and pipe recesses, and for narrow slots cut for repairing of cracks. Do not use dry pack for filling behind reinforcements or for filling holes that extend completely through the concrete.

Use motor filling placed under pressure by a motor gun for holes too wide for dry-pack filling and too shallow for concrete filling and not deeper than the far side of the reinforcement nearest to the surface.

Use concrete filling for holes extending entirely through the concrete, for holes greater in area than 1,000 square centimeters and deeper than 10 centimeters, and for holes, which extend beyond the reinforcements.

Mortar to be used shall not be more than one (1) hour old. All construction and expansion joints in the completed work shall be left carefully tooled and free of all mortar and concrete. The joint filler shall be left exposed for its full length, with clean and true edges.

All concrete shall be given Class 1, Ordinary Finish and additionally any further finish as specified. The resulting surfaces shall be true and uniform. All repaired surfaces, the appearance of which is not satisfactory to the Engineer, shall be "rubbed" as specified below.

3.3.2 Rubbed Finish

After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of three hours. Sufficient time shall have elapsed before the wetting down to allow the mortar used to thoroughly set. The mortar shall be composed of cement and fine sand mixed in the proportions used in the grade of concrete being finished. Rubbing shall be continued until all form marks, protections and irregularities have been removed, all voids have been filled, and a uniform surface has been obtained.

Unless otherwise specified, the following surfaces shall be given a Class 2, Rubbed Finish.

The exposed faces of piers, abutments, wingwalls and retaining walls.

The outside faces of girders, T-beams, slabs, columns, brackets, curbs, headwalls, railings, arch rings, spandrel walls and parapets.

3.4 Specialty Placed Concrete

Ready mixed concrete defined in this specification as concrete poured regularly by a commercial establishment and delivered to the purchaser in a plastic state. Subject to approval of the Supervising/Consulting Engineer, ready mixed concrete maybe used provided that:

The plant has sufficient capacity and transportation equipment to deliver the concrete at rate desired,

The plant meets the requirements specified herein before for equipment, measurement of materials, and mixing, except as modified herein. The cement, aggregates, water and admixtures shall conform to all applicable requirements of this specification.

Ready mixed concrete not specified otherwise hereinafter shall be mixed and delivered by means of truck mixing, combination central plant and truck mixing or central plant mixing as directed and approved by the Engineer.

3.5 Water Concrete Curing

All concrete shall be kept moist for a minimum of seven consecutive days immediately after pouring by the use of wet burlap, fog spraying, curing compounds or other approved methods.

Waterproof kraft paper or polyethylene-coated waterproof paper for concrete curing shall be of commercial quality.

Burlap, plain or polyethylene coated burlap shall be of commercial quality

4. PRE-CAST CONCRETE

4.1 Structural Pre-stressed Concrete

4.1.1 Installation

Installation for floor system shall be as recommended by the Contractor or Manufacturer and as specified herein.

4.1.2 Shoring

Shoring shall be provided by the Contractor. Concrete joist shall rest firmly before pouring of concrete topping. Shoring members shall be capable of supporting the dead weight of concrete joist and concrete topping. For c-joint more than 5m span, quarter spacing of shoring is required. For concrete joist 3.00-5.00 m span, mid span shoring is required. For concrete joist less than 3.00 m span, no shoring is required.

4.1.3 Steel forms

Removable steel forms, steel stiffeners and other wood forms as required shall be removed as recommended by the Engineer after pouring of concrete topping. However, shoring of the concrete joist must remain in place for not less than seven (7) days.

4.1.4 Pointing and Cleaning

After removal of forms, all damaged portions shall be pointed and repaired. Excess mortar shall be removed and care shall be taken to prevent damage while on the curing period.

END OF SECTION

DIVISION 05 MASONRY

PART I-GENERAL

Concrete Masonry Unit Corners shall be protected from damage, with substantial board covers. Mortar or grout stains on masonry work shall be removed immediately. Any masonry work showing stains from mortar or concrete, or grout at completion of work, shall be replaced or the entire masonry surface sandblasted to provide uniform approved appearance. In cleaning the block, only stiff fiber brushes and wooden scrapers shall be used. Metal implements or acids shall not be used for cleaning blocks. All imperfect joining, nail holes, chipped edges of corners, and similar defects shall be corrected or replaced as directed.

TESTING AND SAMPLING BRICK UNITS FOR RESTORATION

In sampling the blocks for strength, absorption and moisture content determination, ten (10) individual units shall be selected from each 50,000 units or fraction thereof, contained in the lot. For non-load bearing type of CHB, no sampling for test shall be required for less than 500 units to be used in the job.

Units shall be tested in accordance with the standard method of testing Masonry units of the ASTM designation. No blocks shall be used unless results of tests are known and duly approved by the supervising Architect/Engineer.

PART II- PRODUCTS

1. CONCRETE UNIT MASONRY

Concrete hollow blocks shall be standard machine fabricated and shall have fine and even texture and well defined edges. All non-load bearing type concrete blocks shall have a unit weight not to exceed 80 PCF. For load bearing type, a minimum compressive strength of 6.90 MPa shall be developed. Samples shall be tested and submitted to the Consulting Engineer. Dimensions and tolerances shall be as individually specified on the Plans.

Provide units of dimensions shown on the Plans. Where dimensions are not shown on the Plans, provide units having nominal dimensions of 4" x 8" x 16" shown or otherwise required. Provide accessory shapes as indicated or otherwise required.

2. PORTLAND CEMENT

Portland cement shall comply with ASTM C150, type I

3. REINFORCEMENTS

Reinforcements shall be based on wall thickness as shown in Plans

4. FINE AGGREGATES

Fine aggregate shall conform to the requirements of AASHTO M 45 (ASTM C 144). Provide clean, sharp, well graded aggregate free from injurious amounts of dust, lumps shale, alkali, surface coatings and organic matter.

5. WATER

Water shall conform to the requirements of Item 714, Water. Provide water, free from deleterious amounts of acids, alkalis, and organic materials.

6. LIME

Provide hydrated lime complying with ASTM C207, or quicklime complying with ASTM C5. When quicklime is used, Slake and then screen through a 16 mesh sieve. After slaking and screening, but before using, store and protect for not less than ten days.

PART III-EXECUTION

1. MASONRY MORTARING

Unless otherwise indicated on the Plans, masonry mortar shall be composed of one (1) part Portland cement, and two (2) parts fine aggregate by volume to which hydrated lime has been added in an amount equal to ten (10) mass percent of the cement. Grout shall be of the same materials and proportion as mortar to which additional water shall be added to produce a consistency for pouring without segregation.

1.1 Mixing

Provide mortar type "M" or type "S", as designated on the Plans or otherwise directed by the Consulting Engineer, and in accordance with ASTM C270.

1.2 Proportions

For type "M" mortar, provide one part Portland cement to $\frac{1}{4}$ part hydrated lime and 3-3/4-part sand by volume.

For type "S" mortar, provide one part Portland cement to $\frac{1}{2}$ part hydrate lime and 4-1/2-part sand by volume.

Mechanically mix in a batch mixer for not less than three minutes, using only sufficient water to produce a mortar, which is spreadable, and of a workable consistency.

Plastic cement shall have less than 12% of the total volume in approved types of plastic agents and shall conform to all of the requirements for Portland Cement per ASTM C-150

Mortar shall be re-tempered with water as required to maintain high plasticity. Re-tempering on mortar boards shall be done only by adding water within a basin formed with mortar and mortar re-worked into water.

1.3 Admixture

The use of admixtures shall not be permitted in mortar or grout unless substantiating data is submitted to and approved by the Consulting Architect/Engineer.

The use of admixtures shall not be permitted in mortar without reducing the lime content.

Insert coloring pigments maybe added but not to exceed 6% by weight of cement

2. MASONRY GROUTING

Grout for pouring shall be of fluid consistency and mixed in the proportion by volume: 1 part Portland Cement, 2-3 parts maximum damp loose sand. Grout for pumping shall be fluid consistency and shall not have less than 7 bags of cement in each cubic meter. The mix design shall be approved by Consulting Engineer.

Concrete hollow blocks shall be laid with all cells completely grouted from the wall footing up to the ground level. The rest of the concrete hollow blocks above ground shall have at least 50 percent of the cells grouted, including those containing the vertical reinforcements.

Reinforcing steel shall be secured in place and inspected before grouting starts.

Mortar dropping should be kept out of the grout space. All grout shall be puddled or vibrated in place.

Cells containing reinforcement shall be solidly filled with grout and pours shall be stopped 3.8 cm below the top of a course to form a key at pour joints.

Grouting of beams over openings shall be done in continuous operation.

Spaces around door frames and other built-in items shall be filled solidly with grout of mortar.

3. MASONRY ANCHORAGE AND REINFORCING

3.1 Masonry Anchors

Where columns and beams poured without the CHB wall dowels, provide 16 mm diameter expansion bolts to match CHB reinforcement spacing. These anchors shall be drilled and hammered in placed. No chipping off of concrete columns and beams is allowed unless otherwise permitted by the Engineer.

3.2 Masonry Reinforcing Bars

Wall reinforcements shall be as follows:

Table 8. Masonry Reinforcements

Wall Thickness	Vertical Reinforcement	Horizontal Reinforcement
8 in (200 mm)	12 mm Ø @ 600 mm	10 mm Ø @ 600 mm

6 in (150 mm)	12 mm Ø @ 600 mm	10 mm Ø @ 600 mm
4 in (100 mm)	10 mm Ø @ 600 mm	10 mm Ø @ 600 mm

Lap splices shall be 40db long (minimum) where splice dowels from footing or slabs shall extend into the block wall a minimum of 40db and dowels to match.

All reinforcing steel, except dowels in concrete, shall be accurately set in strict accordance with the Plans and the notes thereon. Vertical steel shall be secured firmly in place by means of frames or other suitable devices. Horizontal steel may be placed as the work progresses. In any core containing reinforcement, the distance between any masonry and the reinforcement shall be at least 12.7 mm (1/2 in) at all points. The masonry contractor shall furnish all tiles, spacers and supports required to hold steel in position during grouting. Cores shall be grouted in lifts not exceeding 1.22 m (4 ft) in height. Grout shall be thoroughly rodded. Splices in reinforcing bars shall be lapped at a distance sufficient to develop the stress in the bar, but not less than 40 bar diameters.

Reinforcing steel shall be straight except for bends around corners and where bends or hooks are detailed on Plans.

Provide 1-16 mm Ø vertical bars with 38 mm clearance from openings at corners, intersections, end of walls and each side of openings.

Wire reinforcement shall be completely embedded in mortar/grout. Joints with wire reinforcement shall be at least twice the thickness of the wire.

Wire reinforcement shall be lapped at least 16 cm at slices and shall contain at least one cross wire of each piece of reinforcement in the lapped distance.

3.3 Lintel Beams

Unless noted otherwise, lintel beams to be used shall have a depth of 0.20 m and the thickness of CHB wall, reinforced by 4 – 10 mm Ø bars with 10 mm Ø at 150 mm stirrups.

Lintel beams shall be provided on top of CHB wall openings. It shall extend at least 0.20 m beyond each opening.

Stiffener beams (detail similar to lintel beam) shall be provided on top CHB partition walls not anchored to regular reinforced concrete beams/girders. Stiffener beams shall be provided for walls exceeding 3 meters in height.

3.4 Dowels

Where CHB walls adjoin R.C. columns and beams provide dowels on R.C. column and beams prior to pouring to match CHB wall reinforcement size and spacing. Dowels shall be 600 mm long unless noted otherwise.

3.5 Setting Embedded Items

All anchor bolts and miscellaneous metalwork embedded in masonry shall be set in accordance with setting plans or instructions furnished by trades supplying the metalwork. Care shall be exercised to ensure that all anchors are completely surrounded by grout.

3.6 Masonry Lintels

The Contractor shall provide properly shored supports for construction of masonry lintels for opening in walls. Shoring shall not be removed for at least seven days after lintels are placed.

3.7 Movement Gaps

3.7.1 Control Joints

Do not continue bond beams or joint reinforcing across control joints.

Install preformed control joint filler at locations indicated on Plans.

Use proper size material to create sealant joint space.

Backer rod and sealant installed according to Plans.

3.7.2 Expansion Joints

Install expansion joint filler material on centreline of wall at locations indicated on drawings

Backer rod and sealant installed according to Plans.

3.7.3 Seismic Joints

Provide seal and cover at both faces of joint, as indicated in Plans.

Secure seal to face of wall.

4. MASONRY WORKMANSHIP

Units shall be set plumb and true to line with level horizontal joints and with level courses accurately spaced. Hollow units shall be laid with full mortar coverage on horizontal and vertical face shells, and at least 50 percent of the cells shall be filled with grout, the cells containing vertical reinforcements to be among those to be filled up.

All cells of CHB walls from footing up to at least the ground floor level shall be filled up. Clean the top surface of foundation free from dirt, debris, and laitance, and expose the aggregate prior to start of installing first course Solid units shall be laid with full head and bed joints. Joints shall be uniform and approximately 10 mm wide unless otherwise indicated.

Wetting the units shall not be permitted except when hot dry weather exists causing the units to be warm to the touch, and then the surface only maybe wetted with a light fog spray.

Unless otherwise shown on the Plans, joints of exterior concrete masonry units that will be exposed and painted shall be cut flush and tooled finished with a 6.5 mm depth "V" joint for horizontal joints. Vertical joints between the horizontal joints shall be tooled flush. Joints of interior concrete masonry units shall be cut flush, and the blocks shall be given a cement plaster finish except as otherwise shown on the Plans. The minimum of cement plaster shall be 10 mm.

Use masonry saws to cut and fit masonry units and cuts shall be neat and true to line..

Accurately fit the units to plumbing, ducts, opening, and other interfaces, neatly patching all holes.

Keep the walls continually clean, preventing grout and mortar stains. If grout does run over, clean immediately.

Unless otherwise shown on the Plans, provide running bond with vertical joints located at center of masonry units in the alternate course below. Do not use chipped or broken units. If such units are discovered in the finished wall, the Architect may require their immediate removal and replacement with new units at no additional cost to the owner.

Concrete masonry units shall be laid with thicker edge of the core up to provide a wide mortar bed. Both face core and ends of blocks should receive a full bed of mortar. Cross web should be mortared.

Intersecting masonry walls and partitions shall be bounded by the use of steel ties.

END OF SECTION

DIVISION 06 METALS

PART I-GENERAL

All structural steel work shall be in accordance with AISC Specification for the Design, Fabrication and Erection of Structural steel for buildings.

Materials and parts necessary to complete each item through such work which is not shown or specified shall be included, such as miscellaneous bolts, anchors, supports, braces and connections, etc.

Materials shall be stored out of contact with the ground to minimize contamination, corrosion and deterioration.

Shop drawings as well as erection drawings shall be prepared and submitted by the General Contractor to the Supervising/Consulting Engineer for approval before any fabrication is made.

Shop fabricated members shall be marked prior to delivery to facilitate the erection of members. Markings shall be listed and given description and copies of which shall be furnished to the Procuring Entity and the Consulting Architect/Engineer. Markings shall be neatly painted on the members with a distinctive color of enamel paint.

PART II- PRODUCTS

3. COLD-FORMED METAL FRAMING

3.1 Ceilings

Hangers and rod joiners shall be 6 mm diameter with hook end, threaded or un threaded as shown in Plans.

Suspension clips shall be Ga. 24, 15mm x 30mm x 55mm.

Carrying channel support bracket shall be Ga. 26, spring steel.

W-clip shall be Ga. 24, galvanized steel.

Furring member shall be double crading, Ga. 26, galvanized steel, 5.0 m long, configuration and size as shown in Plans.

Carrying channel shall be 0.8 mm thick, 5.0 m long, configuration and sizes as shown in Plans.

Wall angle shall be Ga. 24, 2.4 or 3.0 m long, configuration and sizes as shown in Plans.

10 mm Ø Expansion bolt to ceiling

Nails, common or finishing of the proper sizes for intended use and shall be of the best commercial standard.

4. METAL SUPPORT ASSEMBLIES

Metal support assemblies for plumbing, electrical, mechanical, fire suppression and communication shall be fabricated as shown on Plans. This includes but not limited to the following:

Duct Hangers/ Hanger rods, Angle bar, Vibration isolator, Locking nut, Heavy duty Clevis type hanger, U-bolt $3/8" \times 1 \frac{1}{2}" \times 1 \frac{1}{2}" \times 6$ m Angle bars, $3/16" \times 1 \times 6$ m Flat bars, $3/16" \times 1 \times 6$ m Round bars, $1/2" \times 2$ Bolt and Nut, $1/2"$ Anchor Grip with Bolt and $3/8" \times 1$ U-bolt

5. METAL FABRICATIONS

5.1 Stainless Steel Railings

Provide metal from pitting, seam marks, roller marks, grinding marks and stains at areas exposed to view on completed rail units.

Railing design, configurations and dimensions are as shown in Plans.

6. SHOP-APPLIED COATINGS FOR METAL

Shop-applied coatings for metal shall be quality material

7. METAL FASTENINGS

7.1 Machine Bolts

Machine Bolts shall conform to ASTM A-307. Each bolt shall be provided with standard nuts and washers.

7.2 Anchor Bolts, Sag rods

Anchor Bolts and sag rods shall conform to ASTM A-141 and shall be provided where indicated and where necessary for fastening work in place. They shall be embedded in the concrete and masonry as the work progresses and shall be spaced as indicated in Plans or specified otherwise. Sizes, kinds and spacing of anchors and anchors not indicated or specified shall be as necessary for their purposes.

7.3 Saddle

Saddle shall be a standard manufactured products of sections shown and shall be heat treated extruded aluminum alloy 6063-TS conforming to ASTM Specification B221.

7.4 Expansion Shield

Expansion shields shall be of the style, type and size suited for the intended use. Shields shall be accurately recessed and unless otherwise indicated, shall be not less than 50mm into concrete or masonry.

7.5 Nails

Power driven nails shall be steel, especially formulated to produce high ductility and hardness and capable of being explosively driven through the medium to be attached.

Nails, common or finishing of the proper sizes for intended use and shall be of the best commercial standard.

7.6 Washers

Circular washers shall be flat and smooth and shall conform to requirements for type A washers in ANSI B 27.2. Beveled washers to American Standard Beams and channel shall be square or rectangular, tapered in thickness and smoothed. Washer for use with high strength bolts shall be hardened.

7.7 Miscellaneous Fastenings

Anchor clips, plates and nuts shall be of the configuration and sizes shown, and shall conform to the best commercial standard as approved.

PART III-EXECUTION

1. STRUCTURAL AND ARCHITECTURALLY EXPOSED STEEL FRAMING AND METAL SUPPORT ASSEMBLIES

All structural steel shapes and plates of beams shall conform to ASTM A-36.

Exposed surfaces shall have smooth finish, sharp and well defined lines. Section shall be well framed to shape and size with sharp lines and angles; curved work shall be sprung evenly to curves. All necessary rabbets, lags and brackets shall be provided so that the work can be assembled in a neat and substantial manner. Holes for bolts and screws shall be drilled. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide ample strength and stiffness. Joints exposed to weather shall be formed to exclude water.

Metal work shall be provided with proper clearances. Work shall be fabricated and installed in a manner that will provide for expansion and contraction, prevent the shearing of the bolts, screws and other fastenings, insure rigidity and provide close fitting of sections.

Welding Electrodes shall conform to AWS A-5.1 or A-5.5; E 70 Electrodes.

1.1 Fabrication

Field fabrication shall be kept to a minimum. And shop fabrication shall be employed to the greatest extent possible with members shop fabricated as practicable with a minimum requirement for field connections.

Welding, shearing, gas cutting, chipping and all other works involved in the fabrication of structural steel shall be done with accuracy and of the highest quality of workmanship, within allowable tolerances prescribed in the AISC specifications.

1.2 Welding

The technique, appearance and quality of welds and the method of correcting defective work shall conform to the applicable provisions of Workmanship of the Standard Code for Welding in Building Construction of the American Welding Society.

Welding of structural members in shop and on field, shall be done only by certified and experienced welder.

Surfaces to be welded shall be free from loose side, rust, grease, paint and other foreign materials that will impair the soundness of the weld.

Temporary weld and assembly attachments shall be kept to a minimum. All temporary attachment that are welded, shall be removed by a flame torch above the parent metal surface and ground to smooth surface by power grinding.

Notes shall be made on the Plans and on the shop drawings of those joints or groups of joints in which it is especially important for the welding sequence and technique of welding to be controlled carefully, to minimize welding under restraint, and to avoid undue distortion.

Weld length called on the Plans and on the shop drawings shall be the net effective length.

1.3 Connections and Holes

Connections shall be as shown in the Plans and shall develop the full capacity of the members.

Surfaces or joints prepared for welded or high strength bolted connections shall comply with the cleanliness requirements of all joint surfaces within friction type joints as specified in bolted parts of the AISC specifications.

Holes shall be punched or drilled at right angles to the surface of the metals and shall not be enlarged by burning.

Holes shall be clean-cut without rugged edges. Outside burrs resulting from drilling or reaming operations shall be removed with a tool which reaches a 1.588mm level around the bolt holes.

1.4 Workmanship

The steel structures shall be erected plumb and true to line and grade. Bracings and supports shall be introduced whenever necessary to take care of all the loads to which the structure may be subjected. Such bracings shall be left in place as long as may be required for safety.

Base plates and bearing plates shall be supported on steel wedges until the supported members shall have been aligned and plumb, following which the entire bearing area shall be grouted solid with non-shrink cement grout.

Grouting mortar shall be of the commercial type approved by the Consulting Architect/Engineer and the methods of use as recommended by the manufacturer.

Quality control shall be practiced by the Fabricator to assure high quality in the work. In addition to the Fabricator's quality control procedures, materials and workmanship shall be subject to inspection by Architect/Engineer.

Fabricator shall cooperate harmoniously with the Consulting Architect/Engineer to avoid misinterpretation of the work, when correction shall be needed.

Materials or workmanship not in reasonable conformance with the provisions of these Specifications shall be rejected at anytime during the progress of the work.

Inserts and sleeves of suitable and approved type shall be furnished and installed where necessary for the support of piping, mechanical equipment or apparatus, or other work. Steel pipe sleeves of suitable type and size shall be provided where indicated and where required for all pipes passing through floors, roofs or walls.

The Fabricator shall receive copies of all reports made by the Engineer authorized by the Procuring Entity and/or his Architect/Engineer.

2. COLD-FORMED METAL FRAMING

Light-gauge Cold-formed Structural Steel shall conform to pertinent specifications of the American Iron and Steel Institute (AISI).

Light steel framing system shall be as manufacturer's standard.

2.1 Application

Light steel framing system shall be used in lieu of wood framing system and applied where indicated. Sizes, configurations, and typical installation procedures are as shown in the accompanying drawings

Submit shop drawings of the required steel framing assemblies for walling, ceiling or other applications for approval prior to procurement.

3. METAL FABRICATIONS

3.1 Stainless Steel Railings

3.1.1 Fabrication

Fabricate handrails and frames in accordance to approved Plans, Shop Drawings and Field dimensions using mitered and welded joints with bends where indicated.

Shop fabricate in greatest possible lengths to eliminate field splicing. Form bends to uniform radius, free of distortion, twists, cracks and grain separation.

Top rails shall be continuous over posts and frames for strength.

Splices and expansion joints shall utilize internal splice connectors with set screws to allow for rail expansion over ambient temperature change.

Weld all shop assembled connections continuous without undercut and or distortion of rail materials.

Grind and or dress exposed welds smooth and flush to corner or fillet without weakening rail materials.

Remove all burrs and sharp edges from exposed ends of final rail assemblies.

Lightly sand and blend with fine grit paper all light scratches prior to rail finishing.

Provide drainage and weep holes within rail assemblies to prevent entrapment of water.

3.1.2 Installation

Install in accordance with Plans and Shop drawings as approved by Consulting Architect.

Set railings within sleeves, use anchor bolts or core drill for mounting holes. Maintain slab edge distances and rail locations as per Plan.

Assemble rail fitting splices together to form tight hairline joints while allowing for thermal expansion as required.

Make all adjustments to alignment for satisfactory rail appearance and to plumb joints prior to final tightening of fasteners or pouring of holes.

After installation is complete, clean product using non-abrasive mild soap and water. Do not utilize any cleaners containing any type of acid.

Use touch-up paint and touch-up kit to repair any areas damaged during installation.

4. SHOP-APPLIED COATINGS FOR METAL

Steel work prior to painting and after inspection and approval shall be cleaned of loose mill scale, loose rust, weld slag or flux deposit, dirt and other foreign materials.

Oil and grease shall be removed by solvent. Parts of the steel work which shall be fielded, welded or connected shall not be painted. All steel work specified to have no shop paint shall likewise be thoroughly cleaned.

Steel works to be encased in concrete shall not be painted. All other steel works shall be given one coat of shop paint of metal primer, applied thoroughly and evenly to dry surfaces, which have been cleaned, by brush, spray roller coating, floor coating or dipping at the selection of the Fabricator.

All steel work after complete erection, shall be field painted with the type and color specified in the section of painting of this Specifications. Surfaces where the shop coat of paint has been damaged shall be retouched using the same system as the original shop painting. Surfaces which will be in contact after erection, except when in contact with bolted or welded connection shall be given one finish coat before erection.

5. METAL FASTENINGS

Connections for which details are not indicated shall be designed in accordance with the American Institute of Steel Construction and shall be welded or bolted, except as specified otherwise. Welding shall be done in a manner that will prevent permanent buckling and all welds exposed in the finished work shall be ground smooth. Steel and iron shall be standard well-finished structural shapes, plates, or bar steel or bar iron. All finished and/or machined faces shall be true to line and level.

END OF SECTION

DIVISION 07 WOOD, PLASTICS, AND COMPOSITES

PART I-GENERAL

Lumber of the different species herein specified for the various parts of the structure shall be well-seasoned, sawn straight, sun dried or kiln dried and free from defects such as loose and unsound knots, pitch pockets, sapwood, cracks and other imperfections impairing its strength, durability and appearance.

Stress grade lumber is seasoned, close grained and high quality lumber of the specified specie, free from defects and suitable for sustaining heavy load.

Stress grade lumber shall be used for wooden structural members subject to heavy loads, and for sub-floor framing embedded or in contact with concrete and masonry.

Select grade lumber of the specified specie is generally of high quality of good appearance, without imperfections, and suitable for use without waste due to defects and suitable also for natural finish. Select grade lumber shall be used for fascia and base boards, trims, moulding, mill work, shelves, doors, frame of openings as specified and shown in Plans.

Common grade lumber has minimum tight medium knot larger than 25mm in diameter, with minimal imperfections, without sapwood, without decay, insect holes, and suitable for use with some waste due to minor defects and suitable also for paint finish. Common grade lumber shall be used for light framework, and nailers.

Dressed lumber for exterior and interior finishing for doors and windows and millwork shall be kiln-dried having no moisture content in excess of 14 percent at the time of its installation.

Any lumber equally good for the purpose extended may be substituted for the specific kind subject to the prior approval of the Consulting Architect/Engineer. Provided that the substitution shall be of equal or better specie acceptable to the Supervising/Consulting Architect/Engineer.

In case of substitution with better specie, no additional cost therefore shall be allowed to the General Contractor.

All lumber shall be surfaced four sides. All cutting, framing and fitting necessary for accommodation of other work shall be provided. All nails, spikes, screws, bolts, clips, anchors, shapes and any other rough hardware, necessary for the completion of the work, shall be provided.

STORAGE AND PROTECTION OF MATERIALS

Lumber and other materials shall be protected from dampness during and after delivery at the site.

Materials shall be delivered well in advance of actual need and in adequate quantity to preclude delay in the work.

Lumber shall be piled in orderly stack at least 15.0 cm. above the ground and at sheltered place where it will be of least obstruction to work.

Lumber and woodwork shall be covered and protected from the elements until used.

Building shall be thoroughly dry before the finish is placed in them.

Exterior and interior finish shall be dressed and smooth. Finishing woodwork shall be hand smoothed and sanded at the site as necessary to produce the proper finish.

Where practicable, millwork shall be fabricated in the shop, doweled and mortised and tenoned together, backed up and glued machine and hand sanded to a smooth surface, and delivered to the site, ready to be secured in place.

PART II- PRODUCTS

1. CABINETS

2. Hardware

Drawer guides shall be heavy duty, full over travel-extension, ball bearing type.

Concealed Hinges shall be full overlay, self-closing.

Pulls shall be solid stainless steel pulls, fastened from back with two screws. Provide longer pulls for drawers more than 24 " .

2. CEILINGS

2.1 Fiber Cement Board

Fiber Cement board to be used in ceilings shall be of good grade and shall be 6 mm and 12 mm thick as shown on Plans, tempered or oil impregnated for moisture/water resistance.

Texture shall be subject to the approval of Consulting Architect/Engineer.

3. FASTENERS

Nails of adequate size shall be steel wire, diamond-pointed, ribbed shank and bright finish. Nails shall not be driven close together than one half their lengths unless driven in bored holes or closer to the edge of the timber than one quarter their length. Nails shall penetrate by at least half their length into the timber farthest from the head. End distance, edge distance and spacing of nails shall be such as to avoid splitting of wood.

Screw of adequate size shall be cadmium or brass plated steel with slotted head.

Lag screw of adequate size, for anchoring heavy timber framing in concrete or masonry, shall be galvanized steel. Lag screw shall be set into pre-bored lead holes and not driven. The lead hole for the shank shall have the same diameter as the shank and the same length as the threaded portion.

Bolts and nuts shall be of steel having a yield point of not less than 245 Mpa. Bolts shall have square heads and provided with standard flat steel washers and hexagonal nuts. Bolts shall be set into drill holes suitably sized enough for snug fit. All nuts shall be accessible for servicing by wrenches. Length of the bolts shall be enough to extend through the nut and an allowance for nut tightening.

Threads shall conform to American coarse thread series. The threaded portion shall be long enough such that the nut can be tightened against the bolted members without any need for blocking.

Wrought iron straps or angles, when required in conjunction with bolts or lag screws to provide proper anchorage shall be of the shape and size shown on plans.

All materials to be incorporated in the wood, plastics and composites shall be of approved quality as specified. Before using, all materials shall have been inspected and accepted by the Consulting Architect/Engineer.

4. MILL WORKS

Mill works such as fascia, trims, casings and mouldings shall be sound, plumb, properly treated or finished, and adequately seasoned. Design and Configurations shall be approved by the Consulting Architect.

5. WOOD TREATMENT

Lumber, plywood and plyboard specified and treated with approved wood preservative shall be pressure treated with water borne preservative as wolman salt, boliden salt or tanalith H-R.

Pressure treatment shall meet the standards set by the American Wood Preservers Association per publication C2-77, or Philippine Trade Standards PTS 243-02.00 as to penetration and amount of chemicals retained in the treated lumber.

Pressure treated lumber shall be accompanied by a certification of pressure treatment from the wood preserving plant as to the pressure treatment, sizes and quantity of wood treated.

Notwithstanding the presentation of said certification, the supervising Architect/Engineer may require physical inspection and undertake borings to ascertain penetration of preservative into the wood.

PART III-EXECUTION

1. FINISH CARPENTRY

Finished carpentry covers work on ceiling boards, cabinets, fabricated woodwork, millwork and trims.

Joints of framing shall be tenoned, mortised or doweled where suitable, closely fitted and secured with water resistant rein glue. Exterior joints shall be mitered and interior angles coped.

Panels shall be fitted to allow for construction or expansion and ensure that the panels remain in place without warping, splitting and opening of joints.

Exposed edges of plywood shall be provided with select grade hardwood strips, rabbeted as necessary, glued in place and secured with finishing nails. To prevent splitting, hardwood for trims shall be drilled before fastening with nails or screws.

Fabricated woodwork shall be done preferably at the shop. It shall be done true to details and profiles indicated on the Plans.

Where set against concrete or masonry, woodwork shall be installed after curing is completed.

Exposed wood surfaces shall be free from disfiguring defects such as raised grains, stains, uneven planing, sanding, tool marks and scratches.

Exposed surfaces shall be machine or hand sanded to an even smooth surface, ready for finish.

END OF SECTION

DIVISION 08 THERMAL AND MOISTURE PROTECTION

PART I-GENERAL

Materials shall be delivered in original sealed containers, clearly marked with brand name and type of materials.

Materials shall be stored at temperature specified with normal handling to prevent damage to container. Do not store for long periods in direct sunlight.

Manufactured coating materials shall delivered to the site in the original sealed containers or package bearing the manufacturer's name and brand designation.

To have a bond between the membrane waterproofing and the slab, concrete topping shall be placed as the membrane dries after 48 hours of application.

If a bond is not required, the membrane shall be protected with asphalt asbestos board or asphalt felt paper until such time as topping and concrete covering is applied.

Prior to topping or placing concrete cover, inspect the membrane for any damage and repair work as required.

PART II- PRODUCTS

1. WATERPROOFING/DAMP-PROOFING

1.1 Waterproofing for Concrete Roof Decks, Toilets, Canopies, Concrete gutters

Provide membrane waterproofing where shown on the Plans, as specified herein, and as needed for a complete and proper installation.

1.1.1 Integral waterproofing

Integral waterproofing compound shall be cementitious powder pre-mix admixture or water base surface coat conforming with the standard Specifications set by the Bureau of Product Standards, Department of Trade and Industry.

1.1.2 Membrane Waterproofing

Membrane waterproofing shall be osmo-seal powder, liquid elastomeric or epoxy solvent less waterproofing compound formulated for extra flexibility and resiliency to give lasting waterproof effect.

2. THERMAL INSULATION

2.1 Ceilings

Mat or blanket insulation shall be 50mm thick with aluminum foil membrane facing and with edges suitable for fastening insulation to supporting members. Insulation including affixed vapor barrier, shall have a flame spread rating not greater than 25 and a smoke developed rating not greater than 50 when tested in accordance with ASTM e84.

Fasteners and adhesives shall be approved standard product of insulation manufacturer.

PART III-EXECUTION

1. WATERPROOFING / DAMPPROOFING

1.1 Field Quality Control

Waterproofed areas shall be given 24-hour flood test upon completion of the waterproofing. Allow system to cure 48 hours prior to flood test or until dry enough to support foot traffic and test.

Waterproofing works shall be done in a skillful manner, completely watertight, and free from loose applications. The Contractor shall submit a guarantee certificate against water leaks for a period of five years. In case of failure within the guarantee period, the General Contractor shall repair the defective work free of charge to the Procuring Entity.

1.2 Application

1.2.1 Integral Waterproofing

Mixture shall be applied by notched trowel, squeegee, roller, paint brush or airless spray and shall remain tight under condition of expansion.

Concrete mixture for roof decks, toilet, gutters, parapets and other areas indicated on the Plans to be integrally waterproofed shall be blended with integral waterproofing compound.

Only a minimum quantity of clean water shall be used in the concrete mixture to be sufficiently plastic and to obtain enough workability in placing concrete.

Top barrier or coating shall be a mixture of high early strength Portland cement with fine silica sand and water-white elastomer chemicals to provide a cementitious water barrier for concrete. Application of cementitious barrier or coating shall be 90 mils thick.

Concrete slab shall be properly graded to drain rainwater. A minimum pitch of one percent (1%) is satisfactory to drain water freely into the drain lines.

Drainage connection and weep-holes shall be set up to permit the free flow of water.

Any expansion and contraction joints shall be cleaned, primed, fitted with a backing rod and caulked with sealant.

Prepared surfaces shall be cured and kept wet by sprinkling water at regular intervals for a period of atleast three days when smooth surface finish is actually set.

Allow cured surfaces to dry and remove all dust, dirt, debris and oil.

All loose areas shall be refitted and well secured. Repair cracks, breaks and open seams. Where required or as directed in the membrane waterproofing product instruction manual, prepared surface shall be prime coated.

1.2.2 Membrane Waterproofing

Prior to application, concrete surfaces shall be sound and cured without the use of curing compound.

Apply a coat of neutralizer to remove oil, dirt, and other contaminants

Apply a coat of concrete primer on surfaces to be installed with membrane self-sealing type when required or as directed in the product instruction manual.

Stir thoroughly each container of membrane waterproofing before use.

Apply a coat of membrane waterproofing by manufacturer standard through brush, airless spray, notched trowel, squeegee or roller, with approval of the Supervising/Consulting Engineer.

Three applications is recommended and each coat is allowed a minimum of 24 hours curing time between each coat or as recommended in the product manufacturer's instruction manual.

Application of membrane waterproofing coat should not commence unless ambient temperature is 4.44° C or higher and shall not proceed during inclement weather condition.

The waterproofing compound is combustible. Extra care shall be observed by persons having skin sensitiveness to wear protective gloves while applying.

All surfaces on which coating is to be applied shall be steel trowelled finish, dry, clean, smooth and free from oil or grease and from projections that might puncture the coatings. Floor surfaces shall be kept dry prior to and during installation.

Concrete surfaces like basement, deck, plant boxes, etc., are free of ridges or sharp projections.

Concrete must be cured for a minimum of 14 days.

Concrete shall be finished by a power or hand steel trowel followed by soft hair broom to obtain light texture or light sidewalk finish.

Method of application shall be as per manufacturer's specifications to attain the thickness specified hereinbefore.

At all integral flashing, apply 120-mil thick of cementitious coating to the surface to be flashed extending 150mm unto the floor slab and up the vertical wall.

2. THERMAL INSULATION

All surfaces on which insulation and vapor barriers are to be applied shall be clean, smooth, dry, and free from any projections which might puncture the vapor barriers. The condition of the surfaces shall be inspected and approved by the Construction Architect/Engineer immediately before the work is started.

Each space between framing members shall be insulated completely with blanket insulation. Continuous strips of blanket shall be cut to required length for attachment at top and bottom. Blankets shall be butted snugly. Affixed facing shall be installed facing toward the interior side of the construction. Insulation shall

be secured in place by use of nailing strips, or an approved adhesive standard of manufacturer. The insulation shall be installed after all electric wiring, plumbing, and other concealed work are in place; areas around electrical outlets, pipes, and all protruding objects shall be snugly fitted. When water pipes occur in ceiling construction, insulation shall be applied between the ceiling and the pipe. Large pipes may require compression or removal of some of the insulation, retaining the vapor-barrier facing. The insulation shall be cut to fit, angles, corners, or irregular spaces, always forming a flange of the affixed facing where insulation is to be fastened to the forming. All joints or breaks shall be sealed in a manner that will assure a continuous vapor barrier capable of effectively controlling condensation.

END OF SECTION

DIVISION 09 OPENINGS

PART I-GENERAL

Stockpile items sufficiently in advance to assure their availability, and make necessary deliveries in a timely manner to assure orderly progress of the total work.

Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

Upon completion of the work, and as a condition of its acceptance, provide the inspection, adjustment, and report.

Materials list of items proposed to be provided under this Section.

Manufacturer's specifications and other data needed to prove compliance with the specified requirements

Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.

Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

Provide quality grade wooden doorframes in the types and designs indicated on the Plans and properly reinforced for the finish hardware required.

All parts shall be protected adequately to ensure against damage during transit and construction operations.

1. DOORS, FRAMES AND PARTITIONS

1.1 Repair of Existing Steel Grille Doors and Windows

Work includes:

Doors:

Cutting of excess grilles along designated cutting lines to adopt to new finish floor line

Chipping of concrete jambs to remove bottom hinges of door grilles

Joining (Re-welding) of steel grille door bottom frame to existing door

Re-installation of bottom hinges to concrete walls / re-welding to installed bottom frame

Restoration of chipped-off concrete on door jambs

Windows:

Chipping of concrete to remove defective window grilles or as necessary

Cutting of defective grilles/ grilles not conforming to design

Fabrication of window grilles according to design and configuration

Joining (Re-welding) of window grilles as necessary

Re-installation of new/restored window grilles

1.2 Wooden Panel Doors

Panel doors shall be protected against damage and dampness. Doors shall be stored under cover in a well ventilated building where they will not be exposed to extreme changes in humidity. They shall not be brought into the structure until plastering has been completed and is thoroughly dry.

1.3 Customized Metal Door Backing

Provide metal fabrications, miscellaneous metal, and related accessory items, galvanized and prime painted, complete, as shown on Plans and specified.

1.4 Glass Entrances and Partitions, including Customized Glass Door Backing at Existing Steel Grille Doors

All steel, stainless steel and aluminum parts shall be protected adequately to ensure against damage during transit and construction phase.

The Contractor does not only protect all entrance units during the construction phase but shall also be responsible for removal of protective materials and cleaning the aluminum and steel surface including glazing before work is accepted by the Consulting Architect/Engineer.

Aluminum frames and stainless steel finishing hardware shall be thoroughly cleaned with kerosene or gasoline, diluted with water and then wipe surface using clean cloth rags. No abrasive cleaning materials shall be permitted in cleaning surface.

Upon completion of the building, cracked, broken or imperfect glass, or glass which has been set improperly shall be replaced. Glass surfaces shall be thoroughly cleaned, with labels; paint spots, putty, and other defacements removed, and shall be clean at the time the work is accepted.

2. CURTAIN WALL ASSEMBLY

A qualified independent testing agency to test glazed curtain-wall systems for compliance with specified requirements for performance and test methods should be employed. Provide test specimens and assemblies representative of proposed materials and construction.

Select sizes and configurations of assemblies to adequately demonstrate capability of glazed curtain-wall systems to comply with performance requirements

Conduct meeting at Project site to review methods and procedures related to glazed curtain-wall systems including, but not limited to, the following:

Review structural load limitations.

Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review required testing, inspecting, and certifying procedures.

Notify Consulting Architect seven days in advance of the dates and times when assemblies will be constructed.

2.1 Special Assembly Warranty

Contractor's standard form in which Contractor agrees to repair or replace components of glazed curtain-wall systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period as agreed upon by the Procuring Entity and Consultants from date of Substantial Completion.

Failures include, but are not limited to, the following:

Structural failures including, but not limited to, excessive deflection.

Noise or vibration caused by thermal movements.

Deterioration of metals (metal finishes), and other materials beyond normal weathering.

Water leakage.

Failure of operating components to function normally

3. WINDOWS

3.1 Customized Aluminum Framed Glass Windows on Existing Steel Window Grilles

Fabricate custom windows as shown in Plans. Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

5. DOOR HARDWARE

With the delivery of permanent keys, deliver to the Owner one complete set of adjustment tools and one set of maintenance manuals for lockets, latch, sets, closets, and panic devices.

After hardware has been properly fitted, all exposed items such as knob platers, pulls, locks., etc. shall be removed until final coat of painter's finish has been approved, and then hardware installed.

Other items of hardware, unless to be painted over that are not to be removed before painting shall be properly marked or completely covered until final coat of painter's finish has been applied, after which such protective cover shall be removed.

The Contractor shall place his order for all hardware early in order to avoid delay in the job. No request for extension of time shall be entertained by the Procuring Entity due to this delay and no substitution of hardware shall be allowed due to negligence of contractor on this matter.

6. GLAZING

Clean all glass on both sides after putty has been applied completely. Do not disturb edge of putty with scraper. At completion of work leave glass and glazing works free from cracks and rattles and clean on both sides.

Glass shall be provided with caution stickers to call attention. Wherever needed, glazed glasses shall be protected using protective materials.

Work instruction on glass fitting and installation should strictly follow a standard precautionary measure to avoid damage or breakage on glass and secure total work safety. Glazing and fitting methods shall depend on the type of frame and glass to be used. Glazing on conventional frame section such as aluminum shall be glazing bead, glazing channel or sealant as caulking materials while glazing on concrete or metal channel support shall be sealant or glazing gaskets.

The sizes to provide for the required edge clearances shall be determined by measuring the actual opening to receive the glass. The labels shall be left in place until installation is approved. Movable items shall be securely fixed, or in a closed and locked position until glazing compound has thoroughly set. Beads or stops which are furnished with the items to be glazed shall be used to secure the glass in place.

Items to be glazed shall be shop or field glazed, using the glass of the quantity and thickness specified or indicated, shall be in conformance with the detail and general conditions governing glazing manuals.

Clearances shall be as specified herein or as specified by glass manufacturer as approved. The minimum edge clearance shall not be less than the thickness of the glass. The face clearance of glass from rabbets or stops shall not be less than 3mm.

Sufficient glazing compound shall be applied to the entire perimeter

All glass and glazing materials shall be delivered at jobsite with labels affixed indicating quality, make type and thickness. Each glass in glazed position shall resist a design pressure of 244 kilograms per square meter.

PART II- PRODUCTS

1. DOORS, FRAMES AND PARTITIONS

1.1 Repair of Existing Steel Grille Doors and Windows

The Contractor shall refer to Plans for the design for the existing steel grille doors and window grilles to be adopted.

1.2 Wooden Panel Door

Panel doors shall be customized, quality and clear lumber. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces. Design shall be as shown on Plans. Type and finish shall be approved by the Consulting Architect before installation.

3. WINDOWS

3.1 Customized Aluminum Framed Glass Windows on Existing Steel Window Grilles

3.1.1.1 Glazing

Plate glass shall be clear 6mm thick for customized windows on existing steel grilles. They shall be clear, except where indicated on the Plans as tinted, frosted, diffused or opaque.

3.1.2 Frames and Accessories

Frames for windows shall be fabricated from extruded aluminum section true to details with clean, straight, sharply defined profiles and free from defects impairing strength or durability. Extruded aluminum section shall conform to the specification requirements defined in ASTM B 211.

3.1 Glazing

4.5mm solid sheet structural polycarbonate

3.2 Frames and Accessories

Anchor profile cap to connecting profile

Aluminum connecting cap profile

Aluminum connecting profile

Aluminum base profile

2 ½ Sheet anchoring screw

Bell seal

Rubber sealing profile/gasket

5. DOOR HARDWARE

5.1 Wooden Panel Doors

5.1.1 Heavy Duty Hinges

Butt hinges shall be provided 4 pieces for each door. Butt hinges shall be heavy duty, non-rising loose pin type, 75mm x 75mm, and wrought bronze or brass finish, button tips and mounting screws of the same material

5.1.2 Lockset/Handle set

Lockset shall be finish and type as recommended by the manufacturer on their specific use and as approved by the Consulting Architect. Other factors being equal, preference will be given to the lockset offering the larger number of non-ferrous components, of the types specified hereinafter. Knobs shall be located so that the center line of the strike is 97 cm nominal above floor line.

All lockset shall be installed in a neat, professional manner, following manufacturer's instructions. Except as indicated or specified otherwise, fasteners furnished with the lockset shall be used to fasten hardware in

place. After installation, protect hardware from paint, stains, blemishes and other damages until acceptance of the work. All lockset shall be adjusted properly and checked in the presence of the Consulting Architect/Engineer, and all hinges, locks, bolts, pulls, closers and other items shall operate properly. After lockset is checked, keys shall be tagged, identified, and delivered to the Owner. All errors in cutting and fitting, and all damage to adjoining work shall be corrected, repaired and finished as directed.

Security lockset shall be delivered to the jobsite in their original individual containers with the necessary appurtenances; including screws, and instructions. Each individual container shall be marked with manufacturer's name and catalog number.

All lock and latch strikes shall be installed in door frames at the same height from the floor.

5.1.3 Door stopper

Door stop shall be heavy-duty, wall-mounted as indicated

5.1.4 Door pulls/handles, Door knobs

Door pulls, handles and door knobs shall be same finish as locksets or handle sets, sizes and configuration in accordance with the Plans.

5.2 Customized Metal Door Backing

Hardwares such as locks and hinges shall be as shown in Plans and to be approved by the Consulting Architect/Engineer.

5.3 Glass Entrances and Partitions, including Customized Glass Door Backing at Existing Steel Grille Doors

5.3.1 Hinges/Locks

Screws, nuts, washers, bolts, rivets and other miscellaneous fastening devices shall be made of non-corrosive materials such as aluminum, stainless steel, etc.

Hardware for fixing and locking devices shall be closely matched to the extruded aluminum section and adaptable to the type and method of opening.

Weather strip shall be first class quality flexible vinyl forming an effective seal and without adverse deformation when installed.

Pile weather strip shall be silicon treated and free from residual wetting agents made of soft fine hair as on wool, fur, etc.

5.3.2 Lockset/Handle set

Lockset shall stainless steel type for frameless glass doors as recommended by the manufacturer on their specific use and as approved by the Consulting Architect. Other factors being equal, preference will be given to the lockset offering the larger number of non-ferrous components, of the types specified hereinafter. Knobs shall be located so that the center line of the strike is 97 cm nominal above floor line.

All lock and latch strikes shall be installed in door frames at the same height from the floor.

5.3.3 Door stopper

Door stop shall be heavy-duty, wall-mounted as indicated.

5.3.4 Door pulls/handles, Door knobs

Door pulls, handles and door knobs shall be stainless steel finish, sizes and configuration in accordance with the Plans.

5.3.5 Frames

Frames for interior partitions shall be fabricated from extruded aluminum section true to details with clean, straight, sharply defined profiles and free from defects impairing strength or durability. Extruded aluminum section shall conform to the specification requirements defined in ASTM B 211.

6.2 Mirrors

All comfort rooms whether shown or not, the General Contractor shall provide and fit securely in place at the most convenient height above each lavatory 1 mirror, made from local glazing quality polished plate glass 6 mm. thick with beveled edges and brass chromium plated frame 3 mm. thick waterproof tangle marine plywood backing, all in accordance with full size details.

PART III-EXECUTION

1. DOORS, FRAMES AND PARTITIONS

1.1 Repair of Existing Steel Grille Doors and Windows

1.1.1 Examination

Examine the substrate and conditions in which the work is to be installed. Correct unsatisfactory substrate and conditions prior to start of installation.

1.1.2 Preparation

Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchor, which are to be embedded in concrete construction. Coordinate delivery of such items to project site.

Coordinate metalwork with adjoining work. Do cutting, shearing, drilling, punching, threading, tapping, etc., required for metal work and for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.

Obtain Consulting Architect/Engineer's review prior to site cutting or making adjustments to structural members not indicated to be cut or adjusted.

Clean and strip primed steel items to bare metal where site welding is to be done.

Make provision for erection loads with temporary bracing. Keep work in alignment.

1.1.3 Installation

Provide anchorage devices and fasteners for securing metal work to in-place construction, including threaded fasteners for concrete inserts, through bolts, lag bolts, screws, and other connectors as required.

Conceal fastenings where practical. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.

Perform cutting, drilling, and fitting required for installation of metal work. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels. Provide temporary bracing anchors in formwork for items which are to be built into concrete or similar construction.

Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

1.2 Wooden Panel Doors

Panel doors shall be decorative or carving type, from tanguile or Narra configuration and sizes as shown on Plans.

Frames shall be of the design, size and thickness as indicated. This shall be set plumb and true, and well-braced to prevent distortion. Frames in masonry or concrete walls shall be secured as indicated.

Provide panel wood door, design, and thickness shown on the door schedule in the Plans, labeled or non-labeled as indicated and required, and in solid core as shown on the Door schedule.

Grade: Except as may be shown otherwise on the Plans.

Fabricate the work of this Section to "custom grade" standards of the referenced organization. .

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

1.1.1 Placing Frames

Except where specifically otherwise directed by the Supervising/Consulting Engineer/Architect, or not practicable because of construction conditions, place frames prior to construction of enclosing walls and ceilings. Set frames accurately into position, plumb, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1.1.2 Installation Procedure

Main frame shall consist of head, sill and jamb stiles specifically designed and machined to inter-fit and be joined at corners with self threading screws.

Door panel shall be accurately joined at corners assembled and fixed rigidly to ensure weather tightness.

Panel doors and frames shall conform to best commercial standard. Doors and frames shall have wood preservative treatment.

Panel doors shall be levelled, hung plumbed, and fitted accurately allowing 2mm clearance at the jambs and heads. Lock stiles of doors, 45mm thick or thicker, shall be beveled 3mm in 50mm. Knob locks and latches shall be installed 1mm from finished floors to center knobs. Apply hardware with fastenings to size, quality, quantity and finish to provide workable door system.

1.1.3 Touch-up

Upon completion of the installation, visually check all exposed surfaces of the work of this Section and touch-up all scratches and abrasions to be completely invisible to the unaided eye from a distance of one and a half meters.

1.4 Glass Entrances and Partitions, including Customized Glass Door Backing at Existing Steel Grille Doors

1.3.1 Construction Requirements

For all assembly and fabrication works the cut end shall be true and accurate, free of burrs and rough edges. Cut-outs recesses, mortising and grinding operation for hardwares shall be accurately made and properly reinforced.

All joints between metal surface and masonry shall be fully caulked.

Aluminum parts in contact with steel members shall be properly insulated by a coat of zinc chromate, primer/ bituminous paint applied to the steel surface.

Weather strip shall be furnished on edges at the meeting stiles

3. WINDOWS

3.1 Installation

Examine openings, substrates, structural support, anchorage, and conditions, with Consulting Architect present, for compliance with requirements for installation tolerances, rough opening dimensions, levelness, coordination with wall flashings, and other built-in components; operational clearances and other conditions affecting performance of work.

Fabricate aluminum windows, in sizes indicated, that for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows. Fabricate aluminum windows that are reglazable without dismantling sash.

Provide operable sash with a double row of sliding weather stripping in horizontal rails and single- or double-row weather stripping in meeting or jamb stiles, as required to meet specified performance requirements. Provide weather stripping where applicable.

Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.

Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials

Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.2 Protection and Cleaning

Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

Exposed Aluminum surfaces shall be Powder Coated Hard coats (White).

5. DOOR HARDWARE

5.1 Keying

Factory key, masterkey, and grand-masterkey locks and cylinders as directed by the Architect.

Furnish three keys for each lock, twelve masterkeys for each set, and three grand-masterkeys.

Furnish a construction masterkey system with 15 keys for locks & cylinders.

Use only the construction keys during construction.

Upon substantial completion of the work, as that Date is established by the Architect, void the construction key system and, in the presence of the Architect, demonstrate that the specified keying system is operating properly.

5.2 Surface Conditions

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

All lockset shall be installed in a neat, professional manner, following manufacturer's instructions. Except as indicated or specified otherwise, fasteners furnished with the lockset shall be used to fasten hardware in place. After installation, protect hardware from paint, stains, blemishes and other damages until acceptance of the work. All lockset shall be adjusted properly and checked in the presence of the Architect/Engineer, and all hinges, locks, bolts, pulls, closers and other items shall operate properly. After lockset is checked, keys shall be tagged, identified, and delivered to the Owner. All errors in cutting and fitting, and all damage to adjoining work shall be corrected, repaired and finished as directed.

5.3 Fasteners

Fastenings of suitable size, quality and type shall be provided to secure hardware in position. Machine screws and expansion shields shall be provided for securing items of hardware to concrete or masonry.

Furnish necessary screws, bolts, and other fasteners suitable size and type to anchor the hardware, in position of long life under use.

Where necessary, furnish fasteners with toggle bolts, expansion shields, bolts, and other anchors approved by the Consulting Architect, according to the material to which the hardware is to be applied and according to the recommendations of the hardware manufacturer.

Provide fasteners which harmonize with the hardware as to finish and material.

Where butts are required to swing 180 degrees, furnish butts of sufficient throw to clear the trim.

Furnish silencers for door frames at the rate of three for each single door and two for each door or pair of doors; except weather-stripped doors and doors with light seals or sound seals.

6. GLAZING

6.1 Installation

Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, and as required by governmental agencies having jurisdiction, anchoring all components firmly into position for long life under hard use.

Leave labels on glass until inspection and approved by the Consulting Architect, and then clean in accordance with provisions.

All glass sheets shall be bedded, back puttied, secured in place and face puttied. Secure glass in aluminum frame with non-corrosive clips except where glazing beads are required. Apply putty in uniformly straight lines, with accurately formed bevels and clean-cut corners; remove excess putty from glass.

Set glass in frames of interior partitions in felt channel insets or bedded in putty to prevent any rattle: secure glass in wood doors and wooden frames with glazing stops: secure stops on doors with screws.

Glass breakage caused in executing the work or by faulty installation shall be replaced by the Contractor without extra cost.

Improperly set glass which does not fully meet requirements of its grade shall not be accepted and shall be replaced without extra cost.

The Contractor shall provide and install complete set ready for use, mirrors in all comfort rooms and elsewhere shown on the Plans. Size and location for each mirror shall be as indicated on the Plans.

6.2 Workmanship

Examine areas to receive glazing. Notify Consulting Architect/Engineer of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

All glass shall be accurately cut to fit opening and set with equal bearing on the entire width of pane.

Putty shall be neatly run in straight lines as parallel with inside of glazing rebate; corners shall be carefully made; all excess putty shall be removed and surfaces left clean.

Apply a thin layer of putty to rebate and set glass or putty, pressing until an even bed is secured; place spring wire or angle glazing clips and run face putty; remove excess putty from other side flush with edge of rebate.

6.3 Fittings and Accessories

Verify dimensions, tolerances, and method of attachment with other work.

Install in accordance with Manufacturer's/Contractor's instructions, approved Shop Drawings, and Engineering calculations.

Point support fittings to be mounted to structural post and beams.

Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

Provide alignment attachments and shims to permanently fasten system to building structure.

Align assembly plumb and level, free of twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

END OF SECTION

DIVISION 10 FINISHES

PART I-GENERAL

1. PORTLAND CEMENT PLASTERING

Cement and lime shall be stored off the ground under watertight cover, and away from damp walls and surfaces until ready for use. Damaged or deteriorated materials shall be removed from the premises immediately. Manufactured materials shall be delivered in the original unbroken packages or containers that are labeled plainly with the manufacturer's names and brand. Container for tiles shall be grade-sealed. Materials shall be handled in a manner that will prevent the intrusion of deleterious materials that will affect its quality and appearance.

2. TILEWORKS

Slabs/Tiles found damaged, which in the opinion of the Consulting Architect/Engineer, may affect the appearance or aesthetic of the floor system, shall not be used in the work.

3. PAINTING AND COATING

All material to be used under this item shall be stored in a single place and such place shall be kept neat and clean at all time. Necessary precaution to avoid fire must be observed by removing oily rags, waste, etc. at the end of the daily work.

All cloths and cotton waste which constitute fire hazards shall be placed in metal containers or destroyed at the end of daily works. Upon completion of daily work, all staging, scaffolding and paint containers shall be removed. Paint drips, oil, or stains on adjacent surfaces shall be removed and the entire job left clean and acceptable to the Consulting Architect.

3.1 Paint Schedule

Table 8. Paint Schedule

Exterior Finishes

a) Plain cement plastered finish to be painted paint	3 coats	Acrylic base masonry
b) Concrete exposed aggregate and/or tool repellent finish	1 coat	water
c) Ferrous metal enamel paint	1 coat	primer and 2 coats
d) Galvanized metal paint	1 coat	zinc chromate primer and 2 coats
e) Wood painted finish	3 coats	oil based paint
f) Wood varnished finish repellent		Varnish water

Interior Finishes

a) Plain cement plastered finish to be painted paint	3 coats	Acrylic base masonry
b) Concrete exposed aggregate and/or tool Surface		Clean
c) Ferrous metal enamel paint	1 coat primer and 2 coats	
d) Woodwork sea-mist lacquer	3 coats of 3 parts thinner 1 part	
e) Wood varnish sealer to one	1st coat, of one part sanding	
f) Wood painted finish	part solvent 2nd coat of 2/3 sanding sealer	
g) Ceiling boards textured finish to dry then	to 1/3 solvent 3 coats of oil base paint 1 coat oil based paint allow	
	patch surfaces unevenness and apply textured paint coat	

3.2 Application

Paints and coatings shall be applied to:

All Existing and Proposed Exterior and Interior Walls

All Existing Concrete Mouldings, Logo, Seals, Corbels, Decorative Columns

All Existing soffit and Proposed Fiber Cement Board Ceiling

All Existing Steel Grille Doors and Windows

All Exposed plumbing, electrical, mechanical items as necessary

All Wooden Panel doors, Cabinets, Jambs, Baseboards, Casings, mouldings and other exposed wood works
Fences, Gates and Columns

All Exposed Surfaces as necessary

PART II- PRODUCTS

1. PORTLAND CEMENT PLASTERING

Portland cement

Portland cement shall conform with comply with ASTM C150, type I

Fine Aggregates

Fine aggregates shall be clean, washed sharp, river sand and free from dirt, clay, organic matter or other deleterious substances. Sand derived from crushed gravel or stone may be used with the Consulting Engineer's approval but in no case shall such sand be derived from stone unsuitable for use as coarse aggregates.

2. TILEWORKS

2.1 Ceramic/Porcelain Tiling

It shall be of the standard good quality grade, gloss smooth or rough finish; color, texture and size code should be strictly adhered as shown in the Plans and approved by the Consulting Architect.

Floor Tiles

Tiles shall be standard grade, rustic tiles, ceramic/porcelain, and 6 mm thick. Sizes shall be 0.60x0.60m and 0.30x0.30m.

The surface, color, type and pattern shall be as specified in the Plans or as approved by the Consulting Architect.

Wall Tiles

Tiles shall be standard grade, polished, ceramic/porcelain, and 6 mm thick. Sizes shall be 0.60x0.60m and 0.30x0.30m.

The surface, color, type and pattern shall be as specified in the Plans or as approved by the Consulting Architect.

2.2 Granite Tiling

Provide granite cut size tile 25 mm, 0.60 m width, length to verify at site for slab on counter at toilets and pantry, with all tiles of uniform grain and pattern.

2.3 Tile Adhesive

Tile adhesive (tile bonding agent) shall be used as the dry set mortar to install tiles on walls and floors employing the thin-set method conforming to ANSI A108.1b.

2.4 Mortar Bed

2.4.1 Portland cement

Portland cement shall conform with comply with ASTM C150, type I

2.4.2 Fine Aggregates

Fine aggregates shall be clean, washed sharp, river sand and free from dirt, clay, organic matter or other deleterious substances. Sand derived from crushed gravel or stone may be used with the Engineer's approval but in no case shall such sand be derived from stone unsuitable for use as coarse aggregates.

3. PAINTING AND COATING

3.1 Glazing Putty

Putty shall be an alkyd type product for filling minor surface unevenness.

3.2 Concrete Neutralizer

Concrete neutralizer shall be first grade quality concentrate diluted with clean water and applied as surface conditioner of new interior and exterior walls thus improving paint adhesion and durability.

3.3 Silicone Water Repellant

Silicone water repellant shall be transparent water shield especially formulated to repel rain and moisture on exterior masonry surfaces.

3.4 Patching Compound

Patching compound shall be fine powder type material like calciumine that can be mixed into putty consistency, with oil base primers and paints to fill minor surface dents and imperfections.

3.5 Tinting Colors

Tinting color shall be first grade quality, pigment ground in alkyd resin that disperses and mixes easily with paint to produce the color desired. Use the same brand of paint and tinting color to effect good paint body.

3.6 Wood filler

Wood paste filler shall be quality filler ready mixed in can for filling and sealing open grains of interior wood. It shall produce a level finish for succeeding coats of paint, varnish, or lacquer and other related products.

3.7 Wood Stain

Wood stain shall contain colored pigments and oil which penetrate the wood and provide a rich and lasting protective stain.

3.8 Wood Putty

Putty shall be oil based type for alkyd enamel top coating and two-component type for polyurethane top coating

3.9 Sanding sealer

Sanding sealer shall be quality sealer for wood surfaces that provides a non-absorbent base for color treatment which are applied on it. It shall exhibit good hold out and sealing properties, fast drying and easy to smooth by sandpaper.

3.10 Varnish

Varnish shall be homogeneous solution of resin, drying oil, drier and solvent. It shall be extremely durable clear coating, highly resistant to wear and tear without cracking, peeling, whitening, spotting, etc. with minimum loss of gloss for a maximum period of time.

3.11 Lacquer

Lacquer shall be any type of organic coating that dries rapidly and solely by evaporation of the solvent. Typical solvent are acetates, alcohols and ketones. Although lacquers were generally based on intrecellulose, manufacturers currently use, vinyl resins, plasticizers and reacted drying oils to improve adhesion and elasticity.

3.12 Clear polyurethane

Coating shall be two component thermosetting type.

3.13 Sandpaper

Shall be waterproof type

PART III-EXECUTION

1. PORTLAND CEMENT PLASTERING

1.1 Mixture

Mortar mixture for brown coat shall be freshly prepared and uniformly mixed in the proportion by volume of one (1) part Portland Cement, three (3) parts sand and one fourth (1/4) part hydrated lime.

Finish coat shall be pure Portland cement properly graded conforming to the requirements of Item 700, Hydraulic Cement and mixed with water to approved consistency and plasticity.

1.2 Surface Preparation

After removal of formworks reinforced concrete surfaces shall be roughened to improve adhesion of cement plaster.

Surfaces to receive cement plaster shall be cleaned of all projections, dust, loose particles, grease and bond breakers. Before any application of brown coat is commenced all surfaces that are to be plastered shall be wetted thoroughly with clean water to produce a uniformly moist condition.

1.3 Application

Brown coat mortar mix shall be applied with sufficient pressure starting from the lower portion of the surface to fill the grooved and to prevent air pockets in the reinforced concrete/ masonry work and avoid mortar mix drooping. The brown coat shall be lightly broomed/ or scratch before surface had properly set and allowed to cure.

Finish coat shall not be applied until after the brown coat has seasoned for seven days and corrective measures had been done by the General Contractor on surfaces that are defective. Just before the application of the finish coat, the brown coat surface shall be evenly moistened with potable water. Finish coat shall be floated first to a true and even surface, then trowel in a manner that will force the mixture to penetrate into the brown coat. Surfaces applied with finish coat shall then be smooth with paper in a circular motion to remove trowel marks, checks and blemishes. All cement plaster finish shall be 10 mm. thick minimum, on vertical concrete and/ or masonry walls.

Cement plaster shall not be applied directly to:

Concrete or masonry surface that had been coated with bituminous compound and,

Surfaces that had been painted or previously plastered.

1.4 Workmanship

Cement plaster finish shall be true to details and plumbed. Finish surface shall have no visible junction marks where one (1) day's work adjoins the other. Where directed by the Supervising/Consulting Engineer or shown on the Plans vertical and horizontal groove joints shall be 25 mm wide and 10 mm deep.

2. TILEWORKS

2.1 Ceramic/Porcelain Tiling

The work consist of furnishing all materials, labor and performing all operations in connection with tile finishing of floors and walls, complete including mortar beds for the tile. Tile work shall not be started until roughing-ins for plumbing and electrical work has been completed and tested. The work of all other trades in the area where the work is to be done shall be protected from damage in a workmanship manner as directed by the Engineer.

2.1.1 Mortar for Tiles

A scratch coat for wall tile shall be approved tile adhesive. Scratch coat shall have a minimum thickness of 9 mm. The buttering mortar for setting wall tiles and mortar setting bed for floor tiles shall have the same material as that of scratch coat.

2.1.2 Floor Tiling

2.1.2.1 Preparation of Surfaces

Before tile is applied with a dry-set mortar bed, the structural floor shall be tested for levelness or uniformity of slope by flooding it with water. Areas with water ponds shall be filled, leveled and retested before the setting bed is applied. The slab shall be soaked thoroughly with clean water on the day before the setting bed is applied. Immediately preceding the application of the setting bed, the slab shall again be wetted thoroughly but no free water shall be permitted to remain on the surface. A skim coat of tile adhesive shall then be applied not more than 1.5 mm thick. The mortar shall be spread until its surface is true and even, and thoroughly compacted, either level or sloped uniformly for drainage, where required. A setting bed, as far as can be covered with the tile before the mortar shall have reached its initial set, must be placed in

one(1) operation, but in the event that more setting mortar has been placed than can be covered, the unfinished portion shall be removed and cut back to a clean leveled edge.

2.1.3 Installation

2.1.3.1 Floor Tile

Determine and mark lay-out of ceramic tiles as to joint location, position of trims and fixtures so as to minimize cutting less than one half size of the tile.

2.1.3.1.1 Limits of tile

Extend tile into recess and under equipment and fixtures to form a complete covering without interruptions.

Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.

2.1.3.1.2 Joining pattern

Lay tile in grid pattern unless otherwise indicated on the Plans or directed by the Consulting Architect.

Align joints when adjoining tiles on floor, base, trim, and walls are the same size.

All tiles shall be soaked in clean water to a minimum of one (1) hour before they are installed. Absorptive mounted tile shall be damped by placing tile on a wetted cloth in a shallow pan before installing. Before the initial set has taken place in the setting bed, a skim of tile adhesive .75 mm to 1.5 mm thick, shall be trowelled or brushed over the setting. The tiles shall then be pressed firmly upon the setting bed, and carefully tapped into the mortar until true and even with the place of the finished floor base. Tapping and leveling shall be completed within one (1) hour after placing tiles. Borders and defined lines shall be laid before the field or body of the floor. Where floor drain is provided, the floor shall be sloped properly to the drains. Cutting of tiles, where necessary, shall be done along the outer edges of tile against trim, base, thresholds, pipes, built-in fixtures, and similar surfaces and shall be geared and joined carefully. Tiles shall be secured firmly in place, and loose tiles or tiles sounding hollow shall be removed and replaced to the satisfaction of the Consulting Architect. All lines shall be kept straight, parallel and true and all finished surface brought to true and even planes.

2.1.3.2 Wall Tile and Baseboards

Ceramic tiles shall be soaked in clean water prior to installation for a minimum of one hour.

Determine and mark lay-out of ceramic tiles as to joint location, position of trims and fixtures so as to minimize cutting by less than one half the size of the tile.

Thoroughly dampen the surface of wall but not to saturate the surface.

Apply a bond coat mix with consistency of cream paste 1.5mm thick to the wall surface or to the back of the tile to be laid.

Lay the tiles true to profile then exert pressure and tamp tile surface before the bond coat mix has initially set.

Continue the next full tile to be laid and pressed firmly upon the setting bed tamped until flush and in place of other tiles.

Intersections and returns shall be formed accurately using the appropriate trim

All lines shall be kept straight and true to profiles, plumbed and internal corners rounded using the appropriate trim.

2.1.3.2.1 Jointing

Joints shall be parallel and uniform in width, plumb, level and in alignment. End joints in broken-joint shall be made, as far as practicable, on the center line of the adjoining tiles. Joint widths shall be uniform and measured to accommodate the tiles in the given spaces with a minimum cutting.

2.1.4 Grouting

Grouting shall be done as soon as the mortar beds have sufficiently set. All cement shall be Portland cement, colored or white, as required. Where light colored mortar is required in joints, a mixture of white cement and nonfading mineral oxide shall be used to produce the desired colors. The quantity of mineral oxides shall not exceed 10% of the volume of cement in any case.

2.1.5 Cleaning

Upon completion of grouting, the tile shall be thoroughly cleaned and maintained in this condition until completion of the contract.

Apply a protective coat of neutral cleanser solution diluted with water in the proportion of 1:4 or one liter cleanser concentrate to one gallon of water.

In addition, cover tile flooring with heavy duty non-staining construction paper, taped in place.

Just before final acceptance of the work, remove paper and rinse the protective coat of neutral cleanser from the tile surface.

Do not let the protective paper get torn or removed

2.2 Granite Tiling

2.2.1 Setting Materials

Provide a mortar system of Portland cement, sand and water.

2.2.2 Others Materials

Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor, subject to the approval of the Consulting Architect.

2.2.3 Surface Conditions

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

2.2.4 Installation

2.2.4.1 Floor Tiles and Counter Slabs

Measure mortar materials in approved containers. Mix all materials in proportions by volume. Water and aggregates shall be introduced and mixed gradually to ensure a uniform distribution. Set mortar beds in a volume proportion of one part Portland cement, four parts dry sand and $\frac{1}{2}$ part lime.

Mortar setting beds shall be a minimum thickness of 25 millimeters.

Apply a coat of tile adhesive, one to two millimeters thick over the setting bed. Press tiles and slab firmly on the bed, keeping lines straight, parallel and true.

2.2.4.2 Pointing

Pointing material shall be polyurethane or polyester resin of best quality standard.

2.2.4.3 Sanding

Flooring shall be sanded with an approved equipment intended to provide smooth, even, uniform finish without burns. Final finished flooring shall be applied with heavy duty abrasion resistant wax to provide a lasting mirror like finish

2.2.4.4 Cleaning

Clean surrounding areas of slabs, tiles, and debris.

3. PAINTING AND COATING

The Contractor prior to commencement of the painting, varnishing and related work shall examine the surfaces to be applied in order not to jeopardize the quality and appearances of the painting varnishing and related works.

3.1 Surface Preparation

All surfaces shall be in proper condition to receive the finish. Woodworks shall be hand-sanded smooth and dusted clean. All knot-holes pitch pockets or sappy portions shall be sealed with natural wood filler. Nail holes, cracks or defects shall be carefully puttied after the first coat, matching the color of paint.

Interior woodworks shall be sandpapered between coats. Cracks holes of imperfections in plaster shall be filled with patching compound and smoothed off to match adjoining surfaces.

Concrete and masonry surfaces shall be coated with concrete neutralizer and allowed to dry before any painting primer coat is applied. When surface is dried apply first coating. Hairline cracks and unevenness

shall be patched and sealed with approved putty or patching compound. After all defects are corrected apply the finish coats as specified on the Plans. Color samples to be approved by the Consulting Architect.

Metal shall be clean, dry and free from mill scale and rust. Remove all grease and oils from surfaces. Wash unprimed galvanized metal with etching solution and allow it to dry. Where required to prime coat surface with red lead primer same shall be approved by the Engineer.

In addition the General Contractor shall undertake the following:

Voids, cracks, nick etc. will be repaired with proper patching material and finished flushed with surrounding surfaces.

Marred or damaged shop coats on metal shall be spot primed with appropriate metal primer.

Painting and varnishing works shall not be commenced when it is too hot or cold.

Allow appropriate ventilation during application and drying period.

All hardware will be fitted and removed or protected prior to painting and varnishing works.

3.2 Mixing and Thinning

At the time of application paint shall show no sign of deterioration. Paint shall be thoroughly stirred, strained and kept at a uniform consistency during application. Paints of different manufacture shall not be mixed together. When thinning is necessary, this may be done immediately prior to application in accordance with the manufacturer's directions, but not in excess of 1 pint of suitable thinner per gallon of the paint.

3.3 Workmanship in General

All paints shall be evenly applied. Coats shall be of proper consistency and well brushed out so as to show a minimum of brush marks.

All coats shall be thoroughly dry before the succeeding coat is applied.

Where surfaces are not fully covered or cannot be satisfactorily finished in the number of coats specified such preparatory coats and subsequent coats as may be required shall be applied to attain the desired evenness of surface without extra cost to the Procuring Entity.

Where surface is not in proper condition to receive the coat the Consulting Architect shall be notified immediately. Work on the questioned portion(s) shall not start until clearance be proceed is ordered by the Consulting Architect.

Hardware, lighting fixture and other similar items shall be removed or protected during the painting varnishing and related work operations and re-installed after completion of the work.

3.4 Application

3.4.1 Brush application

Paints when applied by brush shall become non-fluid, thick enough to lay down as adequate film of wet paint. Brush marks shall flawed out after application of paint.

Brush out and work the brush coats onto the surface in an even film.

Cloudiness, spotting, holidays, laps, brush, marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

3.4.2 Spray application

Paints made for application by roller must be similar to brushing paint. It must be non-sticky when thinned to spraying viscosity so that it will break up easily droplets.

Paint is atomized by high pressure pumping rather than broken up by the large volume of air mixed with it. This procedure changes the required properties of the paint.

Except as specifically otherwise approved by the Consulting Architect, confine spray application to metal framework and similar surfaces where hand brushwork would be inferior.

Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.

Do not double back with spray equipment to build up thickness of two coats in one pass.

For complete work, match the approved samples as to texture, color, and coverage, Remove, refinish, or repaint work not in compliance with the specified requirements.

3.5 Touch-up and Finishing

Touch up shop-applied prime coats which have been damaged, and touchup bare areas prior to start or finish coats application.

Slightly vary the color of succeeding coats.

Do not apply additional coats until the completed coat has been inspected and approved.

Only the inspected and approved coats of paint will be considered in determining the number coats applied.

Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.

On removable panels and hinged panels, paint the backsides to match the exposed sides.

3.6 Drying

Allow sufficient drying time coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.

Consider oil-base and oleo-resinous solvent type paint as dry for re-coating when the paint feels, firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or less of adhesion of the undercoat.

3.7 Miscellaneous surfaces and procedures

3.7.1 Exposed mechanical items

Finish electric panels, access, conduits, pipes, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.

3.7.2 Hardware

Paint prime coated hardware to match adjacent surfaces;

Paint metal portions of head seals, jamb seals, and astragal seals to match the color of the doorframe unless otherwise directed by the Architect.

3.7.3 Wet areas

In toilet rooms and contiguous areas, add an approved fungicide to paints.

For oil based paints, use 1-% phenol mercuric or 4% pentachlorophenol.

For water emulsion and glue size surfaces, use 4% sodium pentachlorophenol.

Exposed vents: Apply two coats of heat resistant paint approved by the Architect.

4. SUSPENDED CEILING ASSEMBLY

All materials and workmanship shall be the best of their respective kinds, fabricated to true, plumb and straight lines. All ferrous metals shall have a rust-inhibitive finish of approved paint.

When fastening to in-place construction, provide anchorage devices and fittings to properly secure ceiling assembly to in-place construction. Examples of such devices include threaded fittings (for concrete inserts), toggle bolts and through-bolts.

END OF SECTION

DIVISION 11 SPECIALTIES

PART I-GENERAL

Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation. Deliver toilet compartments in manufacturer's original packaging and store in an upright condition.

PART II-PRODUCTS

1. INTERIOR SPECIALTIES

1.1 Plastic Laminate Toilet Compartments

1.1.1 Board

Toilet compartments shall be 6 mm thick phenolic board. Compartments shall be floor and or wall anchored.

1.1.2 Hinges

Hinges shall be self-closing surface mounted, through bolted, with gravity cams, adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.

1.1.3 Brackets

Brackets shall be stainless steel and according to manufacturer's manual.

1.1.4 Latch and Keeper

Surface-mounted slide latch with flat rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.

1.1.5 Coat Hook

Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors.

1.1.6 Door Pull

Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

1.2 Room and Directional Signages

Room and Directional Signages shall be in vinyl sticker attached to 4.5 mm thick Aluminum Composite Panel. Hangers and hooks shall be 304L. Designs and configuration shall be as shown in Plans.

PART II-EXECUTION

1. INTERIOR SPECIALTIES

1.1 Plastic Laminate Toilet Compartments

1.1.1 Fabrication

Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

Door Size and Swings shall be as shown on Plans.

Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.

Proceed with installation once conditions meet manufacturer's requirements.

1.1.2 Installation

Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

Install toilet partitions and screens in spaces with operating, temperature controlled HVAC systems. Shield partitions and screens from direct sunlight.

Install with clearances indicated on Plans.

Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls

Remove packaging and construction debris and legally dispose of off-site.

Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

1.2 Room and Directional Signages

All Room and Directional Signages shall be in place as indicated on the Plans or where directed by the Consulting Architect. Signs shall be secured by hooks and hangers as approved and of sizes required to assure rigid attachment. Designs and color samples shall be as shown in plans and approved by the Consulting Architect.

All exposed surfaces shall be protected until final acceptance of the work in a manner sufficient to prevent damage or discoloration. Any work damaged or discoloured in any way before final acceptance of work shall be replaced without additional cost to the Procuring Entity

END OF SECTION

DIVISION 14 PLUMBING

PART I-GENERAL

1. PLUMBING WORKS

All plumbing works herein shall be executed in accordance with the requirements of the National Plumbing Code, and the rules and regulations of the province.

The General Contractor shall verify all existing utilities at site and coordinate the works with Phase 1 plumbing works connecting point.

Coordinate the drawings with other related drawings and specifications. The Consulting Master Plumber shall be notified immediately of any discrepancy in the Plans.

The work throughout will be executed in the best and most thorough manner known to the satisfaction of Consulting Architect/Engineer.

All pipes shall be installed as indicated. Piping above the ground shall be run parallel with the lines of the building unless otherwise indicated on the Plans. Any relocation required for the proper execution of other trades shall be with prior approval of the Consulting Master Plumber.

Sanitary and Drainage lines shall have a minimum slope of 1%.

All service pipes, valves and fittings shall be kept at sufficient distance from other work to permit finished covering not less than 12.5 mm. from such work or from finished covering on the different service.

All pipes shall be cut accurately to measurements and shall be worked into place without springing or forcing. Care shall be taken so as not to weaken the structural portions of the building.

Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.

Cut pipe accurately, and work into place without springing or forcing, properly cleaning windows, doors, and other openings. Excessive cutting or other weakening of the building will not be required.

Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction..

Support piping independently at pumps and similar locations, so that weight of pipe will not be supported by the equipment.

Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill over an open sight drain, or other acceptable discharge point, and terminate with a plain end unthreaded pipe 6" above the drain.

Install piping equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Procuring Entity.

Provide access doors where valves, motors or equipment requiring access for maintenance are located on walls or chases or above ceilings. Coordinate location of access doors with other trades as required.

2. THREADED PIPE JOINTS

All pipes shall be reamed before threading. All screw joints shall be made with graphite and oil or with an approved graphite compound applied to make threads only. Threads shall be full cut and not more than three threads on the pipe shall remain exposed.

3. EXPANSION AND CONTRACTION OF PIPES

Accessible contraction-expansion joints shall be made whenever necessary. Horizontal run of pipe over 15 m. length shall be anchored to the wall to the supporting structure about midway on the run to force expansion and contraction equally toward the ends or as shown on the Plans.

4. VALVES AND HOSE BIBS

Valves shall be provided on all supplied fixtures as herein specified

Provide union and shut off valves suitably locked to facilitate maintenance and removal of equipment and apparatus.

Valve shall not be installed with its stem below the horizontal. All valves shall be gate valves unless otherwise indicated on the Plans.

Valves up to and including 50 mm. diameter shall be threaded ends, rough bodies and finished trimmings, except those on chromium plated brass pipe.

Valves 63 mm. in diameter and larger shall have iron bodies, brass mounted and shall have either screws or flange ends.

Hose bibs shall be made of brass with 12.5 mm inlet threads, hexagon shoulders and 19 mm. male.

5. INSPECTION, WARRANTY TEST AND DISINFECTION

All pipes, fittings, traps, fixtures, appurtenances and equipment of the plumbing and drainage system shall be inspected and approved by the Consulting Engineer to insure compliance with all requirements of all Codes and Regulations referred to in this Specification.

6. DEFECTIVE WORK

All defective materials replaced and tested will be repeated until satisfactory performance is attained.

Any material replaced for the satisfactory performance of the system made shall be at the expense of the Contractor.

Caulking of screwed joints or holes will be permitted

PART II- PRODUCTS

1. WATER DISTRIBUTION SYSTEM

All piping materials, fixtures and appliances fitting accessories whether specifically mentioned or not but necessary to complete this item shall be furnished and installed.

Pipes and fitting for sanitary and potable water lines as approved shall be Polypropylene Random Pipes and Fittings (PPR) PN 20. Hot water line shall be XLPE (RED color) and shall be tested at 150 psi for the period of two hours before covering.

Pipes and fittings shall be made of virgin materials. Fittings shall be molded type and designed for solvent cement joint connection for water lines and rubber O-ring seal joint for sanitary lines.

Sizes of water supply pipes to fixtures shall be as shown in Plans and in accordance with manufacturer's instructions.

2. STORM DRAINAGE SYSTEM

Pipes for storm drainage shall be Unplasticized Polyvinyl Chloride (uPVC) series 1000 (High Impact)

5. PLUMBING FIXTURES, FITTINGS AND ACCESSORIES

All fitting, trimmings and fixtures shall be as approved by the Consulting Architect/Engineer. Exposed traps and supply pipes for fixtures shall be connected to the roughing-in, piping system at the wall unless otherwise indicated on the Plans. Built -in fixtures shall be watertight with provision of water supply and drainage outlet, fittings and trap seal.

Water closets shall be floor mounted, close coupled and made of vitreous china complete with fittings.

Urinals shall be wall hung, made of vitreous china complete with fittings.

Lavatory shall be countertop, made of vitreous china complete with fittings.

Grab bars shall be made of tubular stainless steel pipe provided with safety grip and mounting flange.

Floor drain shall be made of stainless steel beehive type measuring 100 mm. x 100 mm., and provided with detachable stainless strainer expanded metal lath type.

Faucet(s) shall be made of stainless steel for internal use.

Tissue paper holders, soap dispensers and hand dryers shall be approved by the Consulting Architect

Hose-bib(s) shall be made of bronze cast finish.

Sink for pantry shall be stainless steel, design to be approved by the Consulting Architect.

6. VALVES

Gate Valve - 50mm & larger, shall be rising stem iron body with bronze trim, flanged connection, min., of 150 psig working pressure. 50mm & smaller, shall be non-rising stem, all bronze, female threaded, min. of 150 psig working pressure.

Check Valve - 50mm & larger shall be iron body with bronze trim, flanged connection, min. of 150 psig working pressure. 50mm & smaller same except female threaded connection.

Float Valve - shall be the float & lower type globe valve, single seated-tight closing, bronze or iron material, flanged connection, with float.

PART III-EXECUTION

The Contractor before any installation work is started shall carefully examine the Plans and shall investigate actual structural and finishing work condition affecting all his work. Where actual condition necessitates a rearrangement of the approved pipe lay-out, the Contractor shall prepare Plan(s) of the proposed pipe lay-out for approval by the Supervising/Consulting Engineer.

1. WATER DISTRIBUTION SYSTEM

The water piping shall be extended to all fixtures, outlets, and equipment from the gate valves installed in the branch near the riser.

No water piping shall be buried in floors, unless specifically indicated on the Plans and approved by the Consulting Engineer.

Provide valves in water system. Locate for easy accessibility and maintenance and arrange so as to give complete regulation of apparatus, equipment, and fixtures.

Provide valves in at least the following locations: In branches and/ or headers of water piping serving group fixtures, for shutoff risers and branch mains, where shown on the Drawings.

The cold water system shall be installed with a fall towards a main shutoff valve and drain. Ends of pipes and outlets shall be capped or plugged and left ready for future connections.

The cold water connections to the domestic hot water heater shall be provided with gate valves and the return circulation connection shall have gate and a check valve.

All connection to domestic hot water heaters shall be equipped with unions between valve and tanks.

1.1 Pressure Tests for Water Lines

After the pipe have been installed, the joints completed and with joints exposed for examination, all newly installed pipe or any valve section therefore, shall be subjected to hydrostatic pressure $1\frac{1}{2}$ the designed working pressure of the system or as specified by the Consulting Architect.

1.2 Leakage Tests for Water Lines

Leakage test shall be conducted after satisfactory completion of the pressure and shall consist of an examination of all exposed joints for leakage as well as on overall leakage test completed pipelines.

2. STORM DRAINAGE SYSTEM

Horizontal lines shall be supported by well secured length heavy strap hangers. Vertical lines not embedded shall be secured strongly by hooks to the building frame and a suitable brackets or chairs shall be provided at the floor from which they start.

Overhead horizontal runs of pipes shall be hung with adjustable wrought iron pipe hanger spaced not over 3.0 meters apart.

Run horizontal sanitary and storm drainage piping at a uniform grade of $\frac{1}{4}$ "per ft., unless otherwise noted.
Run horizontal water piping with an adequate pitch upwards in direction of flow to complete drainage.

Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Plans.

All changes in pipe sizes on drain lines shall be made with reducing fittings or recessed reducers. All changes in directions shall be made by appropriate use of 45 degrees wyes, half wyes, long sweep quarter bends or elbows may be used in drain lines where the change in direction of flow is from the horizontal to the vertical and on the discharge from waste closets. Where it becomes necessary to use short radius fittings in other locations the approval of the Supervising/Consulting Engineer shall be obtained prior to installation of the same.

Cleanouts at the bottom of each interior downspout and where else indicated shall be the same size as the pipe up to and including 102 mm., 152 mm., for larger pipes.

Secure the Consulting Architect/Engineer's approval of locations for cleanouts in finished areas prior to installation.

Provide cleanouts of same nominal size as the pipes they serve: except where cleanouts are required in pipes 4" and larger provide 4 "cleanouts.

Vent pipe shall be flashed and made watertight at the roof with roof cement or approved equivalent. Flashing shall be turned down into pipes.

2.1 Drainage System Test

The entire drainage and venting system shall have all necessary openings which can be plugged to permit entire system to be filled with water to the level of the highest stack vent above the roof.

The system shall hold this water for a full 30 minutes during which time there shall be no drop greater than 102 mm.

Where only the portion of the system is to be tested, the test shall be conducted in the same manner as described for the entire system except that a vertical stack 3.0 meter highest horizontal line to be tested

may be installed and filled with water to maintain sufficient pressure or water pump may be used to supply the required pressure.

If and when the Consulting Engineer decides that an additional test is needed, such as air to smoke test on the drainage system, the Contractor shall perform such test without any additional cost.

4. DRAINAGE CANAL

The drainage canal shall be constructed in such as watertight as possible.

5. PLUMBING FIXTURES, FITTINGS AND ACCESSORIES

Each fixtures and place of equipment requiring connection to the drainage system except fixtures with continuous waste shall be equipped with a trap. Each trap shall be placed as near to the fixture as possible. Traps installed on threaded pipe shall be recessed drainage pattern.

Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back-siphonage.

All fixtures and equipment shall be supported and fastened in a safe and satisfactory workmanship as practiced.

All fixtures, where required to be wall mounted on concrete or concrete hollow block wall, fasten with brass expansion bolts. Expansion bolts shall be 6 mm. diameter with 20 mm. threads to 25 mm. into solid concrete, fitted with loose tubing or sleeves of proper length to acquire extreme rigidity.

Insert shall be securely anchored and properly flushed into the walls. Insert shall be concealed and rigid.

Bolts and nuts shall be horizontal and exposed. It shall be provided with washers and chromium plate finish

4.1 Installation

Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.

Provide supplies in proper alignment with fixtures and with each other.

Provide flush valves in alignment with the fixture, without vertical or horizontal offsets.

4.2 Protection and Cleaning

During installation of fixtures and accessories and until final inspection and turn over, protect items with strippable plastic or other approved means to maintain fixtures in perfect conditions.

All exposed metal surfaces shall be polished clean and rigid of grease, dirt or other foreign materials upon completion.

Upon completion, thoroughly clean all fixtures and accessories to leave the work in polished condition.

DIVISION 15 MECHANICAL

PART I-GENERAL

The contractor for the installation of the air conditioning and ventilation system shall be a qualified contractor and installer, regularly engaged in the installation and must have at least one year experience on the trade.

This item shall consist of furnishing and installation of air conditioning, refrigeration and ventilation systems, inclusive of necessary electrical connections, ductworks, grilles, pipes and condensate drains and all other necessary accessories, ready for service in accordance with the Plans and Specifications.

All permits and fees, private or government shall be secured by owner prior to the start of work.

Furnish and install split type air-conditioning units, ventilation and the fire protection system as per plan. System shall include piping installation, brackets and supports, circuit breaker wires, refrigerant piping and other to complete installation.

Do all necessary civil works in the installation of outdoor and indoor unit window type and fire hose cabinet.

All mechanical installation should be supervised by RME / PME according to RA 8495 known as ME Law.

Mechanical plans should bear certified signs and seals by Professional Mechanical Engineer.

Revision of Plan will be consulted to the Consulting Engineer.

Design standard will be ASHRAE.

All materials for installation will be approved by the manufacturing standard.

All exposed refrigerant pipes will be covered with aluminum cladding. Refrigerant pipings after pressure testing shall be evacuated using triple evacuation prior to the charging. Leak testing of all refrigerant pipes will be 24 hours at 0.5 above working pressure. All refrigerant pipes will be embedded to the wall.

All aircon drainage pipe should be properly installed and insulated.

All system will be flushed with nitrogen prior to charging of refrigerant. Pressure purging of nitrogen will be in strict compliance during soldering of all tubings. Pressure test for nitrogen 0.5 above working pressure 24 hours to all system.

All drain pipes will be in separate connection to all service pipes and will be tested 24 hours.

ACCU should be installed atleast 3.0m away from the building for noise compliance.

Hangers and supports and brackets shall be pre-painted with two coats of epoxy primer finish with two coats of aluminum or silver paint. All piping shall be bracketed, supported, and hang at least every 3m on BI pipe.

BI pipe installed shall be painted with two coats and epoxy primer and finish with two coat of red enamel paint.

All units shall be provided with vibration insulator as per manufacturer specification.

GUARANTEE AND SERVICE

All equipment, materials and workmanship shall be guaranteed for a period of one (1) year from the date of completion at anytime within the period of guarantee and upon notification the Contractor shall repair and rectify the deficiencies, including replacement of parts or entire units.

PART II- PRODUCTS

The types, sizes, capacities, quantities and power characteristics of the compressor, evaporator, condenser chilled water pump and condenser water pump shall be as specified or as shown on the Plans.

1. REFRIGERANT PIPES

Refrigerant pipes shall be $\frac{3}{4}$ " , 1 5/8" , 3/8" , 7/8" copper tubing, type L or K complete with fittings as shown in Plans.

Fittings for copper tubing shall be cast bronze fitting designed expressly for brazing.

2. CONDENSATE DRAIN SYSTEM

Condensate drain pipe shall be PVC pipe 1mm $\varnothing$ x 3 m length complete with fittings.

3. PIPE INSULATIONS

Refrigerant piping shall be insulated with 3/8" x $\frac{3}{4}$ " , $\frac{3}{4}$ " x $\frac{3}{4}$ " , 7/8" x $\frac{3}{4}$ " and 1 5/8" x $\frac{3}{4}$ " rubber insulations.

Drain pipe shall be insulated 1 1/8" x 3/8" rubber insulation.

4.4 Diffusers

The type, shape, capacity size and location shall be as shown in the Plans. Diffusers shall be complete with frame and gasket, equalizing deflector and volume control as indicated or specified and shall have factory applied prime coat of paint.

Samples of supply and return air diffusers shall be submitted for approval before mass fabrication and installation.

5. ELECTRICAL WORKS

Power supply shall be provided by the Contractor at the pull installed inside the machine room and shall furnish and install the circuit breaker, starter and panel boards with suitable ratings and capacities,

conduits, wirings, fittings, devices and all other equipment and electrical connections needed to complete the electrical installation of the system. All electrical works shall comply with the latest edition of the Philippine Electrical Code with the applicable ordinance of the local government and all the rules and requirements of the local power company.

PART III-EXECUTION

1. OPERATION

The air conditioning system shall be entirely automatic in operation and shall not require the presence of an attendant except for period inspection for lubrication. All equipment and materials shall be inspected upon the delivery and shall be tested after installation. Piping shall not be buried, concealed, or insulated until it has been inspected, tested and approved. Walls, floors and other parts of the building and equipment damaged by Contractor in the execution of the work shall be replaced as shown as the Plans.

2. OPERATING TESTS

Refrigerating equipment shall be tested for 8-hours per day for three (3) consecutive days as longer when so directed, under the supervisions of manufacturer's qualified and authorized representative who will make necessary adjustments and instruct designated plant operating personnel for each operation and maintenance of refrigerating equipment and controls.

Operating test of complete air conditioning system shall be 6-hours minimum for each system. Tests of air flow, temperature and humidity shall be made to demonstrate that each complies with the requirements of the plans and specification.

3. MISCELLANEOUS

All standard tools and equipment shall be furnished for proper and regular maintenance of installed equipment.

END OF SECTION

DIVISION 16 ELECTRICAL

PART I-GENERAL

This Item shall consist of the furnishing and installation of the complete conduit work consisting of electrical conduits; conduit boxes such as junction boxes, utility boxes, octagonal and square boxes; conduit fittings such as couplings, locknuts and bushing and other electrical materials needed to complete the conduit roughing-in works. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

All works shall comply with the provision of the latest edition of the Philippine Electrical Code, the regulations of the local authority concerned in the enforcement of the electrical laws and ordinances and with the rules and regulations of the utility company.

Coordinate as necessary with other trades to assure proper adequate provision in the work of those trades for interface of the work of this section.

Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total work.

Where lighting fixtures and other electrical items are shown in conflict with locations of structural members or other equipment, provide required support and wiring to clear the encroachment.

Data indicated on the Plans and in these Specifications are exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the Plans and actual measurements at the site of construction.

Branch circuit wiring and arrangement of home runs have been designed for maximum economy consistent with adequate sizing for voltage drops and other considerations. Install the wiring with circuits arranges exactly as shown on the Drawings, except as otherwise approved in advance by the Architect.

The Electrical Drawings are Diagrammatic, but are required to be followed as closely as actual construction and work of other trades will permit. Deviations shall be without additional cost to the Procuring Entity.

1. IDENTIFICATION

Identify all panel boards, cabinets, safety switches, and other apparatus used for operation and control of circuits, appliances, and equipment.

Provide plastic laminate nameplates, black face with white core letters, showing proper and completion identification.

2. TEST AND GUARANTEE

All installation shall be completed on or before final acceptance of the project including the tests and commissioning. Equipment shall be demonstrated to operate in accordance with the requirements of this specification. The Contractor shall furnish all instruments, tools and personnel required for the tests. As an exception to requirements that may be stated elsewhere in the contract agreement, the Engineer shall be given five (5) working days notice prior to each test. All defects disclosed as a result of such test that are due to the Contractor and shall be remedied to the satisfaction of the Engineer.

Upon completion of the electrical construction work, the Contractor shall provide all test equipment and personnel and to submit written copies of all test results. The Contractor shall guarantee the electrical installation are done and in accordance with the approved Plans and Specifications. The Contractor shall guarantee that the electrical system are free from all grounds from all defective workmanship and materials and will remain so for a period of one year from date and acceptance of works. Any defect shall be remedied by the Contractor at his own expense.

Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all trades of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.

After the installation is completed, the contractor shall conduct test as required and an operating test for approval. Equipment shall be demonstrated to operate in accordance with the requirement of this specification. Test shall be performed in the presence of the owner or their authorize representatives. The contractor shall furnish all instruments required for the test and shall furnish the owners/ representative all catalogs/ manuals of equipment tested. All defects disclosed as result such test shall be remedied by and at the expense of the contractor.

Make written notice to the Consulting Architect adequately in advance of each of the following stages of construction:

In the underground condition prior to placing concrete floor slab when all associate electrical work is in place.

When all rough-in is complete, but not covered;

At completion of the work of this section.

When material and/or workmanship is found to not comply with the specified requirements, within three days after receipt of notice such non-compliance remove the non complying items from the job site and replace them with items complying with the specified requirements, all at no additional cost to the owner.

In the Architect's presence:

Test all parts off the electrical system proves that all such items provided under this section function electrically in the required manner.

Immediately submit to the Consulting Architect a report of maximum and minimum voltages and a copy the recording voltmeter chart.

Also measure voltages between phases and between phase wires and neutrals, and report these voltages to the Architect.

The electrical system installation furnished under this contract shall be guaranteed for a period of one year from date of acceptance thereof against defective materials, equipments and workmanship. Upon the receipt of noticed from the architect of the failure of any part or parts of this installation or equipments parts shall be replaced promptly with new parts at the expense of the contractor and in a manner satisfactory to the owner.

2.1 Devices Subject to Manual Operation

Each device subject to manual operation shall be tested five (5) times demonstrating satisfactory operation each time.

2.2 Test On 600 Volts Wiring

Test of all 600 volts wiring to verify that no circuits or accidental grounds exist. Perform insulation resistance test on all wiring using an instrument which apply a voltage of approximately 500 volts to provide a direct reading of resistance; minimum resistance shall be 250,000 ohms that the resistance to ground is not excessive. Test each ground rod for resistance to ground before making any connections to the rod, then tie entire grounding system together and test for resistance to ground. Make resistance measurements in normally dry weather condition, not less than 48 hours after rainfall. Submit written results of each test to the Engineer and indicate the locations of the rod as well as the resistance and soil conditions at the time of the measurements were made.

2.3 Standards

The materials to be furnished under these specifications shall be the "STANDARD". Products or manufacturers regularly engaged in the production of such equipment, materials, devices, and shall be the manufacturers latest standard design that complies with the standard approving authority such as; JIS-JAPAN ELECTRICAL STANDARD, UL- AMERICAN STANDARD, IEC-EUROPEAN ELECTRICAL STANDARD and PS-PHILIPPINE STANDARD.

PART II- PRODUCTS

All materials shall be brand new and shall be of the approved type meeting all the requirements of the Philippine Electrical Code and bearing the Philippine Standard Agency (PSA) mark. The electrical materials to be used shall be of the standard products of the manufacturers regularly engaged in the production of equipment and materials required for this project and shall be the manufacturer's latest standard design that complies with the specification requirements. The Contractor shall submit for approval a complete description of all materials and equipment to be used before commencing the work. The descriptions shall include catalogue numbers, illustrations, diagrams, dimensional data, etc., as required to describe fully the materials.

1. CONDUITS

Rigid Steel Conduit shall be electrical metal tubing (EMT) conduit, hot dip galvanized, conforming to ANSI Standard C80.1, or "American Standard Specifications for Steel Conduit, zinc coated" unless shown otherwise in the Plans. The conduit fittings and covers shall be galvanized, threaded, or cadmium plated, grey iron or malleable iron castings. Composite rubber gasket shall be provided in all openings requiring covers. Outlets and pull boxes shall be of the sizes and types shown in the Plan.

Rigid uPVC Conduit shall be NEMA TC2, type EPC-PVC and shall be schedule 40. Enamel coated steel conduits and conduits with rough inner surfaces are not acceptable.

2. CONDUIT BOXES AND FITTINGS

All conduit boxes and fittings shall be Code gauge steel and galvanized. Outlet boxes and fittings shall be galvanized pressed steel of standard make. In general, outlet boxes shall be at least 100 mm. square or octagonal, 53 mm. deep and 16 mm. minimum gauge.

Pull boxes shall be of 4"x 4" uPVC for 20mm diameter and 25mm diameter conduit if required. Larger sizes than 4"x4" boxes shall be made galvanized metal box gauge 18 minimum fitted with screws and metal cover. The feeders/ wires passing through this pull shall be tagged to indicate circuit, panel numbers, or other necessary electrical characteristics/ designations.

3. LIGHTING FIXTURES

All lighting fixtures and lamps of type and sizes as specified and listed on the Lighting Fixture Schedule and shall be furnished and installed complete. Color characteristics shall be approved by Consulting Architect/Engineer.

All Fluorescent lamps shall be 25 watts, T8 medium bi pin dust proof recessed type, cool white color characteristics.

Cove lighting shall be 2.4 watts/meter high power rope light.

LED downlights shall be 4 watts recessed type with 6" square frosted glass cover/case and 8" x 8" 20 watts square. Location shall be as shown on Plans.

LED spotlight 5 Watts Retractable.

Emergency lighting shall be 6 watts LED light, maintenance free, long life, pure lead acid battery with complete automatic battery charger. Provide 90 minutes of emergency operation.

Lighting for Stairs shall be 2.4 watts/meter high power rope light.

Provide units having an attached pull box, and with UL label. Provide local label in addition if so required by governmental agencies having jurisdiction.

Fixtures are designated by letters and illustrations shall be indicative of the general type desired and shall not restrict selection to fixtures of any particular manufacturer. Fixtures of similar design and equivalent light distribution and brightness characteristics having equal finish and quality may be acceptable but subject to the approval of the Consulting Engineer/Architect.

4. GROUNDING SYSTEM

All materials to be used shall conform to the Bureau of Product Standards (BPS) specifications.

5. WIRES AND WIRING DEVICES.

Wires and cables shall be of the approved type meeting all the requirements of the Philippine Electrical Code and bearing the PSA mark unless specified or indicated otherwise, all power and lighting conductor shall be insulated for 600 Volts. All wires shall be copper, soft drawn and annealed, smooth and cylindrical form and shall be centrally located inside the insulation. All wiring devices shall be standard product of reputable electrical manufacturers. Wall switches shall be rated at least 10A, 250 Volts and shall be spring operated, flush, tumbler type. Duplex convenience receptacles shall be rated at least 15A, 250 Volts, flush, parallel slot single heavy duty receptacles shall be rated at least 20 A, 250 Volts, wire, flush, polarize type.

Conductors in conduits shall be moisture and heat-resistant rubber or thermoplastic insulated. In dry locations, wires and cables shall be type THW for sizes 8 mm. and smaller and type THW or THHN for sizes 14 sq. mm. and larger. In damp or wet locations as defined by the Philippine Electric Code, wires and cables shall be type THW. All conductors shall have 600 volts insulation unless otherwise specified in the drawings. Wire shall be stranded copper for 5.5 mm. diameter and larger sizes. Wires for the telephone and signaling systems shall be twisted telephone wires, thermoplastic insulated. The number and sizes shall be as specified in the Plans.

Each outlet in the wirings shall be provided with an outlet box suit the conditions encountered. Boxes shall be of uPVC; shall have a sufficient volume to accommodate the number of conductors entering the box in accordance with the requirements of the Philippine Electrical Code. Location of outlets shown on the drawing is approximate; the contractor shall study the building plans in relation to the spaces and equipments surrounding each outlet so that the outlets are symmetrically located according to room layout. Boxes shall be installed in concealed location, weatherproofed outlets covers shall be installed for outdoor locations. Convenience outlet shall be duplex type 1- 20 A, 220V 2 wires. Special purpose outlets shall be 1- 30 A, 380V and 1 – 40A 380V 3 wires configuration. For hallways, lobby and offices referred to detail drawings.

Proposed lighting circuit homeruns shall be 3.5 mm² THHN stranded and laid from panel to load as indicated in the plan. This is a spare load for future used (flood lighting and landscaping lighting).

6. POWER LOAD CENTER, SWITCHGEAR AND PANELBOARDS

This item shall consist of the furnishing and installation of the power load center unit substation or low voltage switchgear and distribution panel boards at the location shown or the approved Plans complete with transformer, circuit breakers, cabinets and all accessories, completely wired and ready for service.

All materials shall be brand new and shall be of the approved type. It shall conform with the requirements of the Philippine Electrical Code and shall bear the Philippine Standard Agency (PSA) mark.

The service entrance shall be installed in concrete encasement, these includes power, communication and television. There is no definite location layout of the building service entrance on the plan. The contractor shall coordinate with the owner representative for the actual location.

6.1 Power Load Center Unit Substation

The Contractor shall furnish and install as indoor-type Power Load center Unit Substation at the location shown on the approved Plans if required. It shall be totally metal-enclosed, dead front and shall consist of the following coordinated component parts:

6.2 High Voltage primary Section

High voltage primary incoming line section consisting of the following parts and related accessories:

One (1) Air-filled interrupter Switch, 2-position (open-close) installed in a suitable air filled metal enclosure and shall have sufficient interrupting capacity to carry the electrical load. It shall be provided with key interlock with the cubicle for the power fuses to prevent access to the fuses unless the switch is open.

Three (3) power fuses mounted in separate compartments within the switch housing and accessible by a hinged door.

One (1) set of high voltage potheads or 3-conductor cables or three single conductor cables.

Lighting arresters shall be installed at the high voltage cubicle if required. Items (a) and (b) above could be substituted with a power circuit breaker with the correct rating and capacity.

6.3 Transformer Section

The transformer section shall consist of a power transformer with ratings and capacities as shown on the Plans. It shall be oil liquid-filled non-flammable type and designed in accordance with the latest applicable standards.

The transformers shall be provided with four (4) approximately 2 ½ % rated KVA taps on the primary windings in most cases one (1) above and three (3) below rated primary voltage and shall be changed by means of externally gang-operated manual tap changer only when the transformer is deenergized. Tap changing under load is acceptable if transformer has been so designed. The following accessories shall be provided with the transformer, namely: drain pad, top filter press connection, lifting lugs, diagrammatic nameplate, relief valve, thermometer and other necessary related accessories.

The high voltage and low voltage bushings and transition flange shall be properly coordinated for field connection to the incoming line section and low voltage switchboard section, respectively.

6.4 Low-Voltage Switchboard Section

The low-voltage switchboard shall be standard modular-unitized units, metal-built, dead front, safety type construction and shall consist of the following:

6.5 Switchboard Housing

The housing shall be heavy gauge steel sheet, dead front type, gray enamel finish, complete with frame supports, steel bracings, steel sheet panelboard, removable rear plates, copper busbars, and all other necessary accessories to ensure sufficient mechanical strength and safety. It shall be provided with grounding bolts and clamps.

6.6 Secondary Metering Section

The secondary metering section shall consist of one (1) ammeter, AC, Indicating type; one voltmeter, AC, Indicating Type, one (1) ammeter transfer switch for 3-phase; one (1) voltmeter transfer switch for 3-phase; and current transformers of suitable rating and capacity.

The abovementioned instruments shall be installed in one compartment above the main breaker and shall be complete with all necessary accessories completely wired, ready for use.

6.7 Main Circuit Breaker

The main circuit breaker shall be draw-out type, manually or electrically operated, manual trip bottom, magnetic tripping devices, adjustable time over current protection and instantaneous short circuit trip and all necessary accessories to ensure safe and efficient operation.

6.8 Feeder Circuit Breakers

There shall be as many feeder breakers as are shown on the single line diagram or schematic riser diagram and schedule of loads and computations on the Plans. The circuit breaker shall be drawn out or molded case as required. The circuit breakers shall each have sufficient interrupting capacity and shall be manually operated complete with trip devices and all necessary accessories to insure safe and efficient operation. The number, ratings, capacities of the feeder branch circuit breakers shall be shown on the approved Plans.

Circuit breakers shall each be of the indicating type, providing "ON" – "OFF" and "TRIP" positions of the operating handles and shall each be provided with nameplate for branch circuit designation. The circuit breaker shall be so designed that an overload or short on one pole automatically causes all poles to open.

6.9 Low-Voltage Switchgear (For projects requiring low-voltage Switchgear only)

The Contractor shall furnish and install a low-voltage switchgear at the location shown on the Plans. It shall be metal-clad, dead front, free standing, safety type construction and shall have copper busbars of sufficient size, braced to resist allowable Root Mean Square (RMS) symmetrical short circuit stresses, and all necessary accessories.

The low-voltage switchgear shall consist of the switchgear housing, secondary metering, main breaker and feeder branch circuit breakers and all necessary accessories, completely wired, ready for service.

6.10 Grounding System

All non-current carrying metallic parts like conduits, cabinets and equipment frames shall be properly grounded in accordance with the Philippine Electrical Code, latest edition.

The size of the ground rods and ground wires shall be as shown on the approved Plans. The ground resistance shall not be more than 5 ohms.

6.11 Panelboards and cabinets

Panelboards shall conform to the schedule of panelboards as shown on the approved Plans with respect to supply characteristics, rating of main lugs or main circuit breaker, number and ratings and capabilities of branch circuit breakers.

Panelboards shall consist of a factory completed dead front assembly mounted in an inclosing flush type cabinet consisting of code gauge 14 (2.0 mm thick) galvanized sheet steel box with trim and door. Each door shall be provided with catch lock and two (2) keys. Panelboards shall be provided with directories and shall be printed to indicate load served by each circuit.

Panelboard cabinets and trims shall be suitable for the type of mounting shown on the approved Plans. The inside and outside of panelboard cabinets and trims shall be factory painted with one rust-proofing primer coat and two finish shop coats of pearl gray enamel paint.

Main and branch circuit breakers for panelboards shall have the rating, capacity and number of poles as shown on the approved Plans. Breakers shall be thermal magnetic type. Multiple breaker shall be of the common trip type having a single operating handle. For 50-ampere breaker or less, it may consist of single-pole breaker permanently assembled at the factory into a multi-pole unit.

Panel boards shall be of the dead front safety type components to UL and provided with size and number of circuit. As indicated (panel directory) MDPI and MDP2 panelboard shall be free standing type. Other power panel shall be installed flush on walls. Panelboards main breaker shall be molded case, center main. All branch breakers shall be of bolt-on type. A ground terminal bus shall be installed at bottom of every panel with branch terminal screw equivalent to the number of branch circuit. A cable trench under the free standing panel shall be provided. The trench dimension shall be of suitable clearance for cable bends.

7. MOTORS

Motors shall have enclosed frames, class B insulation and continues duty classification based on 40 C ambient temperature referenced. Each motor have its owned equivalent motor controller as shown in the plans.

7.1 Motor Controllers and Control Devices

Motor controllers and control devices shall be suitable for performing the functions specified. Motor control equipments shall conform to NEMA standards specifications. Each motor controller shall be provided with thermal overload protection.

8. PUMP CONTROL CONDUIT

Pump control conduit, a continuous run conduit with 6 – 2mm sq. THWN stranded wire installed from water pump controller to limit or level switch installed at roof water tank. This is for pump automatic control operation.

9. SNAP SWITCHES

Snap switches shall be flush mounted. Rating should be 15A, 220V.

10. SAFETY SWITCHES

Provide safety switches of heavy-duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking fusible and non-fusible as shown on the Drawings.

PART III-EXECUTION

All works throughout shall be executed in the best practice in a workmanlike manner by qualified and experienced electricians under the immediate supervision of a duly licensed Electrical Engineer.

1. CONDUITS

Conduits should be cut square with hacksaw and ends reamed. Running or non-tapered threads shall not be used. Each run of conduit between boxes or equipment shall be electrically continuous. Threads shall conform to the American Standard for tapered pipe threads. In making bends only conduit bending apparatus will be used. The use of a pipe tee or vise for bending conduits shall not be permitted. Conduits entering slip holes in boxes shall be secured with a locknut on each side of the box wall and terminated with a bushing.

All joints between lengths of conduits and threaded connections to boxes, fittings and equipment enclosures shall be made watertight. Conduits shall be sloped towards drain points. Conduits shall be rigidly supported and braced to avoid shifting during placement of concrete. Conduits extending out of floors, walls, or beams shall be at right angles to the surfaces.

Spacing of conduits shall be such as to permit the flow of concrete between them. A minimum spacing of not less than 5 cm. shall be maintained, except where conduits enter boxes. Where conduits are placed in two or more layers or rows, the conduits in the upper or inner layers shall be placed directly over or behind the lower or outer layers, respectively.

Conduits terminating at the face of concrete for initial or future extensions as exposed runs shall be terminated with plugged couplings set flush with the floor, ceilings or wall. Galvanized iron plugs shall be provided for conduits, which are to be extended in the future. Where it is not practical to employ flush couplings, the conduit ends shall be suitably boxed or otherwise protected and plugged.

Conduits running in floors and terminating at motors or other equipment mounted on concrete bases shall be brought up to the equipment within the concrete base wherever possible. Conduit boxes shall be flush with the finished wall with covers and openings easily accessible. The Contractor shall remove and reset all boxes not properly installed or shifted out of line during concreting to the satisfaction of the Engineer.

2. CONDUIT BOXES & FITTINGS

Each outlet in the drawing or raceway system shall be provided with an outlet box to suit the conditions encountered. Boxes for exposed work or in wet locations shall be of the cast metal type having threaded hubs. Boxes for concealed work shall be the cadmium-plated or zinc-coated sheet metal type. Each box shall have sufficient volume to accommodate the number of conductors entering the box... Boxes shall not be less than 50 mm deep unless shallower boxes are required by structural conditions that are specifically approved by the Engineer. Ceiling and bracket outlet boxes shall not be less than 100 mm octagonal except that smaller boxes may be used where required by the particular fixtures to be installed. Switch and receptacle boxes shall be approximately 100 mm x 50 mm x 50 mm. Telephone outlets shall be 100 mm square except that 100 mm x 54 mm x 40 mm boxes may be used where only one raceway enter the outlet. Boxes installed in concealed locations shall be set flush with the finished surfaces and shall be provided with the proper extension rings or plaster covers where required. Boxes shall be installed in a rigid and satisfactory manner and shall be supported by bar hangers in frame construction, or shall be fastened directly with wood screws on wood. Location of outlets shown on the drawings are approximates; the Contractor shall study the building plans in relation to the spaces and equipment surrounding each outlet so that the lighting fixtures are symmetrically located according to the room layout. When necessary, with the approval of the Consultant, outlets shall be relocated to avoid interference with mechanical equipment or structural features.

Provide conduit boxes for pulling and splicing wires and outlet boxes for installation of wiring devices. As a rule, provide junction boxes or pull boxes in all runs greater than 30 meters in length, for horizontal runs. For other lengths, provide boxes as required for splices or pulling. Pull boxes shall be installed in conspicuous but accessible locations.

Support boxes independently of conduits entering by means of bolts, red hangers or other suitable means.

Conduit boxes shall be installed plumb and securely fastened. They shall be set flush with the surface of the structure in which they are installed where conduits are run concealed.

All convenience and wall switch outlet boxes for concealed conduit work shall be deep, rectangular flush type boxes. Four inch octagonal flush type boxes shall be used for all ceiling light outlets and shall be of the deep type where three or more conduits connect to a single box. Floor mounted outlet boxes required shall be waterproof type with flush brass floor plate and brass bell nozzle.

All boxes shall be painted with anti-rust red lead paint after installation. All conduits shall be fitted with approved standard galvanized bushing and locknuts where they enter cabinets and conduit boxes.

Junction and pull boxes of code gauge steel shall be provided as indicated or as required to facilitate the pulling of wires and cables.

3. LIGHTING FIXTURES

4. GROUNDING SYSTEM

All grounding system installation shall be executed in accordance with the approved plans. Grounding system shall include building perimeter ground wires, ground rods, clamps, connectors, ground wells and ground wire taps as shown in the approved design.

5. WIRES AND WIRING DEVICES

This item shall consist of the furnishing and installation of all wires and wiring devices consisting of electrical wires and cables, wall switches, convenience receptacles, heavy duty receptacles and other devices shown on the approved Plans but not mentioned in this Specification.

All wiring installation herein shall be done under the direct supervision of a licensed Electrical Engineer at the expense of the Contractor. The Contractor shall submit the request for the Clearance to Proceed duly approved by the owner's representative.

Conductors of wires shall not be drawn in conduit until after the cement plaster is dry and the conduits are thoroughly cleaned and free from dirt and moisture. In drawing wires into conduits, sufficient slack shall be allowed to permit easy connection for fixtures, switches, receptacles and other wiring devices without the use of additional splice:

All conductors of convenience outlets and lighting branch circuit home runs shall be wired with a minimum of 3.5 mm. in size. Circuit homeruns to panel boards shall not be smaller than 3.5 mm. but a homerun to panel board more than 30 meters shall not be smaller than 5.5 mm. No conductor shall be less than 2 mm. in size.

All wires of 14 mm. and larger in size shall be connected to panel and apparatus by means of approved type lugs or connectors of the solderless type, sufficiently large enough to enclose all strands of the conductors and securely fasten. They shall not loosen under vibration of normal strain.

All joints, taps and splices on wires larger than 14 mm. shall be made of suitable solderless connectors of the approved type and size. They shall be taped with rubber and PVC tapes providing insulation no less than that of the conductors.

No splices or joints shall be permitted in either feeder or branch conductors except within outlet boxes or accessible junction boxes (pull boxes). All joints in branch circuit wiring shall be made mechanically and electrically secured by approved splicing devices taped with rubber and PVC tapes in a manner which will make their insulation as that of the conductor.

All wall switches and receptacle shall be fitted with standard bakelite face plate covers. Device plate for flush mounting shall be installed with all four edges in continuous contact finished wall surfaces without the use of coiled wire or similar devices. Plaster fillings will not be permitted. Plate installed in wet locations shall be gasketed.

When more than one switch or device is indicated in a single location gang plate shall be used.

6. POWER LOAD CENTER, SWITCHGEAR AND PANELBOARDS

The Contractor shall install the Power Load center Unit Substation or Low-Voltage Switchgear and panel boards at the locations shown on the approved Plans.

Standard panels and cabinets shall be used and assembled on the job. All panels shall be of dead front construction furnished with trims for flush or surface mounting as required.

Unless indicated or specified otherwise herein, all materials and workmanship shall conform to specification, and to the applicable standards, codes. Regulations and specification listed therein. Workmanship shall be or the "HIGHEST GRADE". Electrical materials shall be new and approved "STANDARD". Defective equipment or equipments damaged shall be replaced or repaired. The contract drawings indicate the extent and several arrangements of conduit and wiring systems. For any departures from the contract drawings are deemed necessary by the contractor, details of such departures and the reasons therefore shall be submitted as soon as practicable to the owners. All panel boards, lighting fixture, convenience outlet and switches shall be presented to the principal architect and to the electrical designer for approval before installation.

7. MOTORS

Motors furnished and installed shall be of sufficient size, and shall not exceed their full rated load when driven equipment is operating at specified capacity under the most severe condition likely to be encountered.

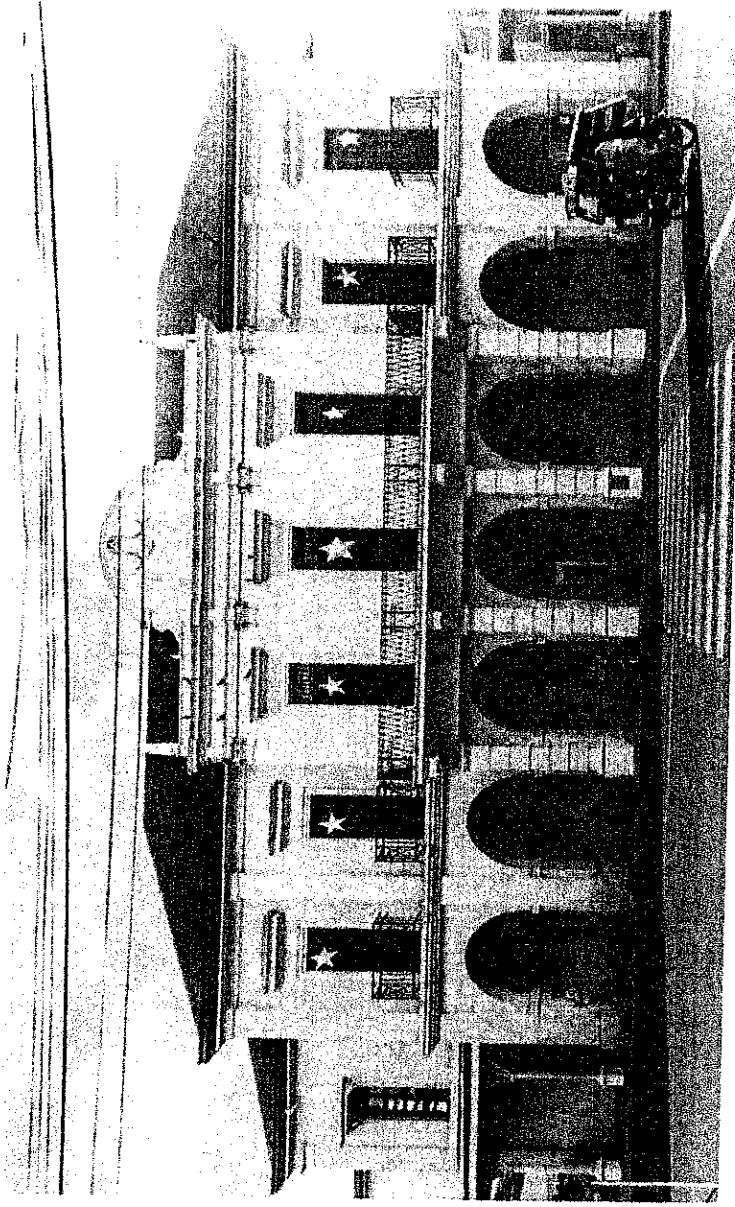
END OF SECTION

II. TERMS OF REFERENCE

PROJECT TITLE AND LOCATION

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN, BOHOL)

Km. 0, Old Capitol Complex, CPG Ave. Tagbilaran City, Bohol



I. PROJECT BACKGROUND

In 1860, a Casa de Cabecera of the Provincial Capitol Building was constructed in between almost equally aged buildings of what is presently known as Tagbilaran Branch of the Philippine National Bank and the Escuela de Niñas building in Tagbilaran, Bohol. This building was constructed to serve as a tribunal and military quarters for a Spanish military force. The Provincial Capitol Building is exemplary significant because it features the use of large rough-cut blocks of coral stone in the construction. Over the years, the Provincial Capitol Building has undergone a number of repairs and renovations but the original style in which the building was built has not changed. This building has stood the test of time and witnessed the historical events that have transpired in the streets and corners of Tagbilaran, Bohol. Hence, on July 22, 2012 on the occasion of the 158th Bohol Day, the National Museum of the Philippines (NMP) has declared the building as Important Cultural Property (ICP), now known as, Bohol Area Museum & Satellite Office or NM Bohol.

After the declaration, the Provincial Capitol Building suffered minor damage during the 7.2 Magnitude earthquake that hit Bohol in October 15, 2013. On July 19, 2014, Governor Edgar Chatto of Bohol signed the Deed of Donation of the Provincial Capitol Building with NMP Director-General Jeremy Barns for the conversion of the building to become the branch of the National Museum in Bohol. The NMP started the restoration of the building to its original form with the exceptional Spanish-American architectural ensemble that illustrates significant stages in Philippine History. Finally, the National Museum Bohol was inaugurated on July 22, 2018, the 164th Bohol Day celebration.

II. OBJECTIVE

The National Museum of the Philippines has a legacy of enhancing universal access by all Filipinos to exhibits and displays that showcase our national patrimony and heritage. Likewise, the agency aims to reach and promote these heritage to the public by encouraging more visits to the museums.

Therefore, this project of providing necessary repair and maintenance works to National Museum Bohol that will further enhance the public's regional museum experience in turn allows the agency to better achieve its goals and fulfill expectations to the benefit of the entire Filipino people and the wider world.

III. SCOPE OF WORKS

This shall pertain to necessary works needed to complete the proposed project and shall include but is not limited to the supply, fabrication and installation of all materials, labour and equipment; provision for specialized activities, technical knowledge and skills; together with the liaison and coordination of applicable works such as applications of permits, licenses and notices to statutory authorities.

GENERAL WORKS:

1. The Contractor is expected to have conducted a site inspection prior to the actual mobilization, so as to acquaint and familiarize themselves with the location and condition of the project.
2. The Contractor shall obtain all official documents and payment of required fees and other costs incidental to the fulfillment of the requirements of the contract.
3. The Contractor shall safeguard the works and all building materials whether acquired or existing through proper warehousing and timely inventory. This shall include but is not limited to the installation of temporary facilities such as repository or warehouse, office and bunkhouse.
4. The Contractor is held responsible in ensuring the safety and protection of all persons engaged in the execution of the project. They shall also provide good general housekeeping practices.
5. The Contractor shall see to it that the area is clean and in its original condition after the contract is completed. Any damage caused by the Contractor shall be restored by them at no additional cost to the National Museum.
6. All other items of work not specifically mentioned but are necessary to complete the works shall be provided by the Contractor at at no additional cost to the National Museum.

A. PRELIMINARIES / GENERAL REQUIREMENTS

1. Mobilization / Demobilization
2. Project Identification Signage
3. Temporary Facilities (includes warehousing and utility consumption)
4. General Cleaning & Hauling of Debris
5. Safety, Security and Housing
6. Covid-19 Safety Precautionary Measures

B. REPAIR AND MAINTENANCE WORKS

1. **Repair of Courtyard Skylight with Installation of Heat Index Reduction (verify on-site based on detail drawings / plan)**
 1. Dismantling of Existing Polycarbonate
 2. Supply & Installation of New Polycarbonate Roofing
 3. Hole dismantling from existing wall for Exhaust Fan
 4. Supply & Installation of Industrial Exhaust Fan (Specs: 1000mm min. blade diameter) w/ Shutting Louvers (Specs: 1000mm min. blade diameter), electrical components (switch), gravity-shutting white painted louver cover, and G.I sheet exhaust housing duct w/ wire mesh fencing painted: white optional) - see detail drawing
2. **REPAIR OF AIR-CONDITIONING UNITS (5 UNITS)**

Supply and Installation Cassette Type Non-Inverter AC Units w/ Complete Standard accessories supply of labor, materials and other works to complete the system

 - a. **GALLERY 3: PAGBANHAW A (GF)**

- **Description:** Daikin Cassette Type Non-Inverter, 4.0HP
- **Model:** Daikin (Model #: FHC40EXVL; Serial #: K000925) – AC7
- **Issue:** Defective Compressor
- **Qty:** 1
- b. GALLERY 8 (2F)**
 - **Description:** Daikin Cassette Type Non-Inverter, 4.0HP
 - **Model:** Daikin (Model #: FHC40EXVL; Serial #: K001108) – AC35
 - **Issue:** Leaking Condenser
 - **Qty:** 1
- c. STAFF OFFICE (GF)**
 - **Description:** Daikin Cassette Type Non-Inverter, 4.0HP
 - **Model:** Daikin (Model #: FHC40EXVL; Serial # K001088) – AC18
 - **Issue:** Defective compressor
 - **Qty:** 1
- **Description:** Daikin Cassette Type Non-Inverter, 4.0HP
 - **Model:** Daikin (Model #: FHC40EXVL; Serial # K001089) – AC17
 - **Issue:** Defective Board
 - **Qty:** 1
- d. NATURAL HISTORY (2F)**
 - **Description:** Daikin Cassette Type Non-Inverter, 4.0HP
 - **Model:** Daikin (Model #: FHC40EXVL; Serial #: K000658) – AC32
 - **Issue:** Condenser Problem
 - **Qty:** 1

3. UPGRADING OF EXISTING CLOSED-CIRCUIT TELEVISION UNITS SYSTEM - Verify on-site based on plan

- **Location:** Ground Floor
- **Qty:** 9 Units

- 4. REPAIR OF CONCRETE CRACKS (14.33 Ln. Mtr)**
- **Location:** Azotea Ballusters
 - **Issue:** Visible/Severe cracks
 - **Qty:** 5 Areas (see measurement above) – C1 to C5
 - **Location:** First Column at the Baluster in Gallery 8
 - **Issue:** Visible Crack
 - **Qty:** 3 ln.m
 - **Location:** Ballusters at Gallery 7
 - **Issue:** Visible Cracks
 - **Qty:** 1, 290 ln/m

5. SUPPLY AND INSTALLATION OF BOLLARDS (Solar powered LED, Steel-grade, black - verify location in plan)

- Location: Ground Floor Rear Area
- Qty: 12 Units

6. REPAIR OF WATER PIPE LEAK AT THE POWER ROOM

- Description: Water Pipes and Motor Pump
- Model: Pedrollo
- Issue: Continuous Water Leaking
- Qty: 1 Lot

7. FLOOR WATERPROOFING & RE-TILING WORKS

- Description: 2nd Floor Azotea Floor Waterproofing & Re-tiling
- Issue: Entire Azotea needs waterproofing though some portions have new waterproofing. After heavy rains, water accumulates in some areas due to uneven sloping. Irregular tile color due to unavailability of tiles after waterproofing
- Qty: 120 sqm

8. DOOR REPAIR WORKS

a. STAFF OFFICE

- Location: Wooden Door at the Back of the Staff Office
- Issue: Water will flow inside if it will rain heavily; rotten door frame
- Qty: 1 Door Panel

b. GALLERY 7

- Description: Glass Doors
- Issue: Detached Handle
- Qty: 2 Glass Door Handles

9. WINDOW REPAIR WORKS

a. PAGPAULI (ABUEVA) GALLERY

- Location: Wooden Windows at Pagpauli Gallery – W1, W2, W3
- Issue 1: Damage window jamb due to termite infestation
- Issue 2: Rain water flows inside the window due to the absence of canopy; window is on the same level with the parking area
- Qty: 3 windows, 6 panels (*Note: All windows have the same sizes*)

Window Jamb

(Length 143cm, Width 3cm x 13cm, Height 147cm)

Window Frame

(Height 138cm, Width 66cm, Thickness 4.5cm)

10. CEILING REPAIRS WORKS

- Location: Pagpauli (Abueva) Gallery

- Issue: Yellow stains and flaking in ceiling due to water leaking from Azotea which needs new water proofing of the entire area
- Qty: 95 sqm
- Location: Ceiling at Gallery 8
- Issue: Leak during heavy rains
- Qty: 45 sqm

11. WOODEN FLOOR REPAIR WORKS

- Location: Wood Floor Slabs at Gallery 7
- Issue: removal of Biological Mushroom Growth sqm; Wet Floor after Heavy Rain
- Qty (10 sqm)
 - a. D1 80cmx410cm;
 - b. D2 170cmx410cm

12. REPAIR OF TOILETS (28 sqm)

- Location: Toilet Bowls at Female Guest Toilet – 12 sqm
- Model: Cool
- Issue: Clogged
- Qty: 3 units
- Location: Lavatory Faucet at Male Guest Toilet – 12 sqm
- Model: None
- Issue: Leaking Faucet
- Qty: 1 unit
- Location: Floor Tiles at Lavatory Toilet
- Model: Ceramic Tiles
- Issue: Improper Tile sloping (water flows in the other direction)
- Qty: 1 Area (228cm length, 124cm width) – 4sqm

13. MISCELLANEOUS REPAIRS

- a. Repair of Roof Gutter (Coral Stone Wall - National History Gallery) - verify on-site
- b. Supply and Installation of Roof Canopy for Doors (5 sets) and windows (13 set) - verify exact location on plan

III.A NOTE: All works shall be read in conjunction with the working drawings, any discrepancy shall be timely coordinated with the National Museum of the Philippines- Facilities Management Division.

IV. EXPECTED OUTPUTS

1. The Contractor must provide confirmation of National Museum's building design requirements.
2. The Contractor shall provide all the materials, labor, equipment and services necessary for the construction of the project and other incidental expenses.
3. The Contractor shall secure the property, provide temporary utilities on site, manage their own personnel, dispose and recycle construction waste, monitor schedule and cash flows and maintain daily logbook of activities.
4. Submit for approvals plan that outlines the safety measures that will be implemented to the people not directly related to the construction of the project, the safety and protection of their workers during the construction, prevention and occurrence of fire.
5. Furnish the National Museum with a set of the original copy of As-built plans.
6. Abide with the contract including the General Condition and Specification which form part of the contract.
7. The contractor must ensure high standard of workmanship and structurally sound construction methods if found not in compliance to the standard provision as specified in the building code & related laws, he/she must report the same to FMD for proper disposition otherwise, it is covered by the contractor's liability.
8. The Contractor shall ensure that all its staff to be assigned at this project have been well-screened, technically and professional trained, courteous, cooperative, efficient, reliable, trustworthy, well-groomed, physical and mentally fit. No personnel shall be assigned who has not been approved by the FMD.

V. EXPECTED TIME FRAME

The Project's actual construction is expected to be completed in **Ninety (90) Calendar Days**.

VI. CONSTRUCTION SUPERVISION

The project will be implemented under the direct supervision of the National Museum of the Philippines - Facilities Management Division in coordination with NM-BOAMSO / RAOD

VII. THE CONTRACTOR

The National Museum of the Philippines requires the services of a building contractor with legal, technical and financial capability to implement the abovementioned project. The Bidder will be required to submit at least one (1) similar contract/s awarded comprising of National Heritage Site and completed from Y2017 up to present with an amount of at least Fifty Percent (50%) of the Approved Budget for the Contract (ABC) must have proven relevant experience with proper client references, and with a valid PCAB license Category B (Size Range: Medium A) or higher.

VIII. SOURCE OF FUND

Budget is available and should be chargeable against the General Fund under MOOE – Repair and Maintenance – Buildings and Other Structures - Budget Allotment for FY 2021

IX. APPROVED BUDGET FOR CONTRACT

Three Million Five Hundred Thousand and 0/100 Pesos (Php3,500,000.00). Inclusive of all applicable taxes.

X. PROCUREMENT PROCESS

Competitive Bidding - Procurement of services of a building contractor for the abovementioned project shall be in accordance with the provisions of the Government Procurement Reform Act (R.A 9184) and its Revised Implementing Rules and Regulations.

XI. WARRANTY

A one (1) year warranty from the completion of the project of the end-user to ensure the integrity of the project.

XII. LIQUIDATED DAMAGES

When the contractor fails to satisfactorily deliver goods under the contract within the specified delivery schedule, inclusive of duly granted time extensions, if any, the contractor shall be liable for damages for the delay and shall pay the procuring entity liquidated damages, not by way of penalty, an amount equal to 1/10 of 1% of the cost of the delayed contract scheduled for completion for every day of delay until such works are finally delivered and accepted by the procuring entity concerned. In no case shall the sum of the liquidated damages exceed 10% of the total contract price, in which the procuring entity concerned may rescind the contract and impose appropriate sanctions over and above the liquidated damages.

XIII. PRE-TERMINATION CLAUSE

The contract is effective on the date indicated in the NTP and shall remain in full force for 120 Calendar Days or until terminated by either party (National Museum or Contractor) upon prior written notice by either party. Termination process shall follow the prescribed procedure under IRR-A R.A. 9184. The National Museum reserves the right to pre-terminate the contract after Fifteen (15) calendar days via written notice to the Contractor, if in National Museum's opinion, after due verification of facts, the Contractor is not providing satisfactory services or is not complying with the Terms and Conditions of the Contract. The grounds for the termination of the Contractor by the National Museum include but not limited to the following:

1. Violation(s) in any of the Terms and Conditions of the Contract; and
2. Any other act of omission by the Contractor or its service technicians which is detrimental or prejudicial to the interest of the National Museum, its employee(s), member(s) or public.

Prepared by:


AR. ROY BENEDICT N. BAUTISTA
AO5, FMD

Checked & Reviewed by:


AR. NELSON JACQUINO
Architect IV, FMD

Noted by:



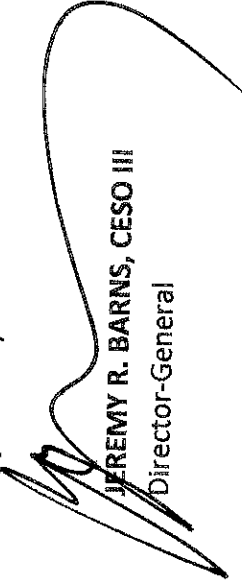
ENGR. JAINAB AIMEE T. ALTILLERO
Chief Administrative Officer, FMD

Recommending Approval:



Atty. MA. ROSENNE FLORES-AVILA
Deputy Director-General (Administration)

Approved by:



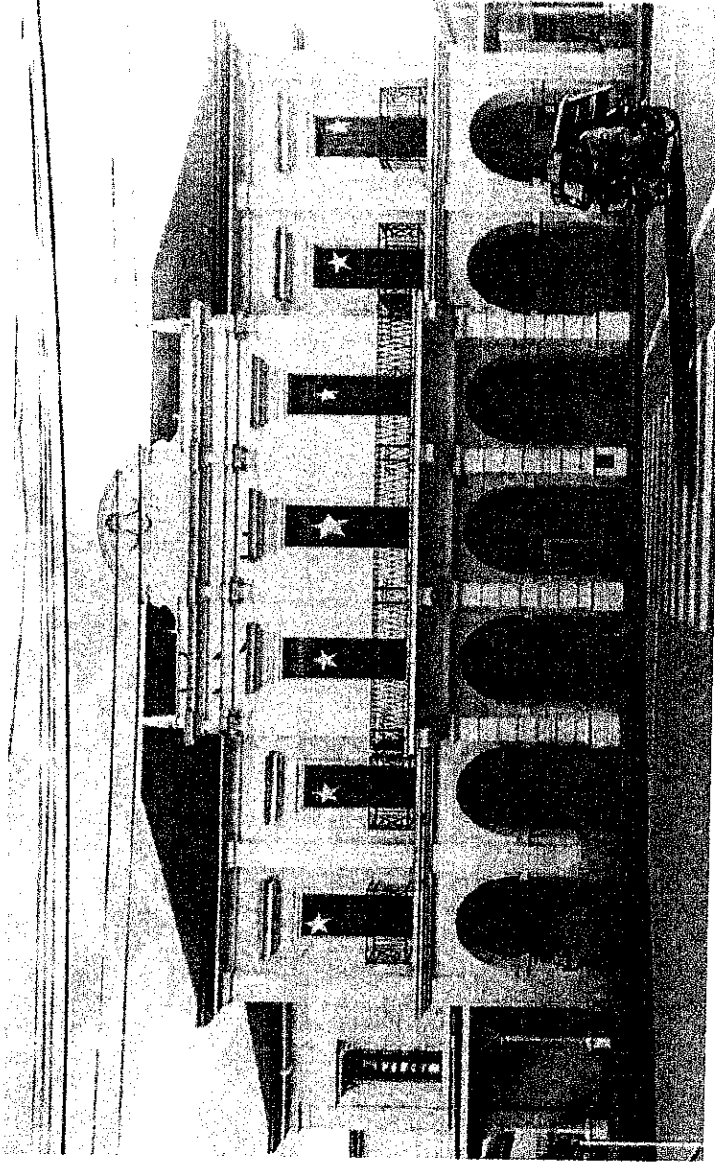
JEREMY R. BARNS, CESO III
Director-General

VI. SCOPE OF WORKS

PROJECT TITLE AND LOCATION

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (NM BOHOL)

Km. 0, Old Capitol Complex, CPG Ave. Tagbilaran City, Bohol



VI. SCOPE OF WORKS

This shall pertain to necessary works needed to complete the proposed project and shall include but is not limited to the supply, fabrication and installation of all materials, labour and equipment; provision for specialized activities, technical knowledge and skills; together with the liaison and coordination of applicable works such as applications of permits, licenses and notices to statutory authorities.

GENERAL WORKS:

1. The Contractor is expected to have conducted a site inspection prior to the actual mobilization, so as to acquaint and familiarize themselves with the location and condition of the project.
2. The Contractor shall obtain all official documents and payment of required fees and other costs incidental to the fulfillment of the requirements of the contract.
3. The Contractor shall safeguard the works and all building materials whether acquired or existing through proper warehousing and timely inventory. This shall include but is not limited to the installation of temporary facilities such as repository or warehouse, office and bunkhouse.
4. The Contractor is held responsible in ensuring the safety and protection of all persons engaged in the execution of the project. They shall also provide good general housekeeping practices.

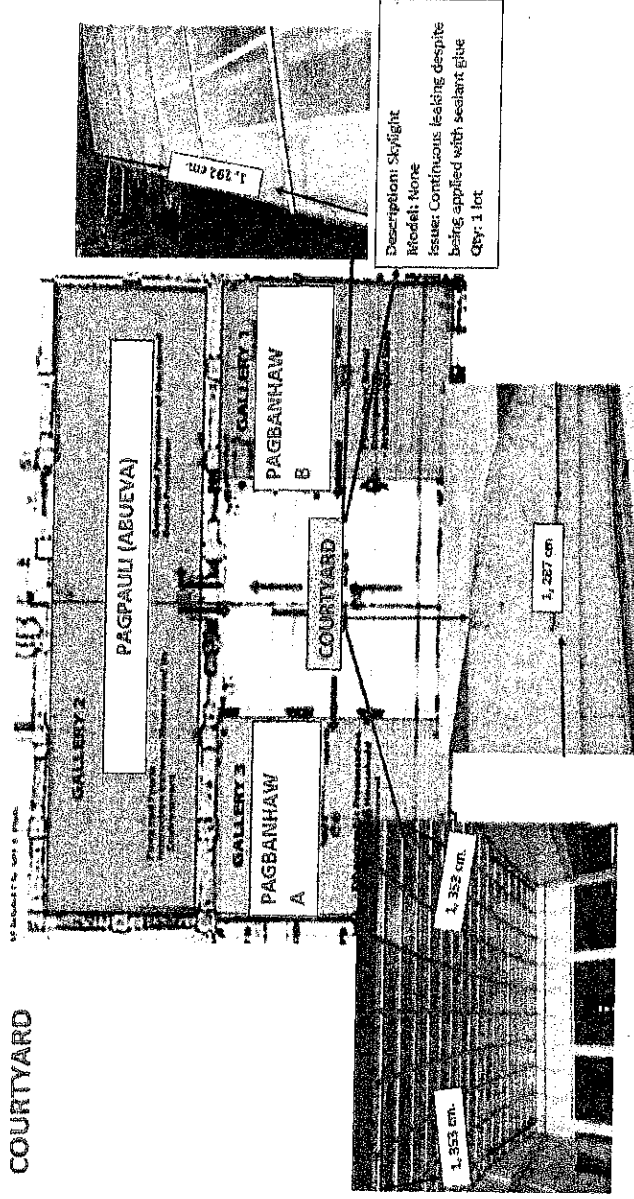
A. PRELIMINARIES / GENERAL REQUIREMENTS

1. Mobilization / Demolization
2. Project Identification Signage
3. Temporary Facilities (includes warehousing and utility consumption)
4. General Cleaning & Hauling of debris
5. Safety, Security and Housing
6. Covid-19 Safety Precautionary Measures

B. REPAIR AND MAINTENANCE WORKS

- B. 1. Repair of Courtyard Skylight with Installation of Heat Index Reduction (verify on-site based on detail drawings / plan)
1. Dismantling of Existing Polycarbonate

2. Supply & Installation of New Polycarbonate Roofing
3. Hole dismantling from existing wall for Exhaust Fan
4. Supply & Installation of Industrial Exhaust Fan (Specs: 1000mm min. blade diameter) w/ Shutting Louvers

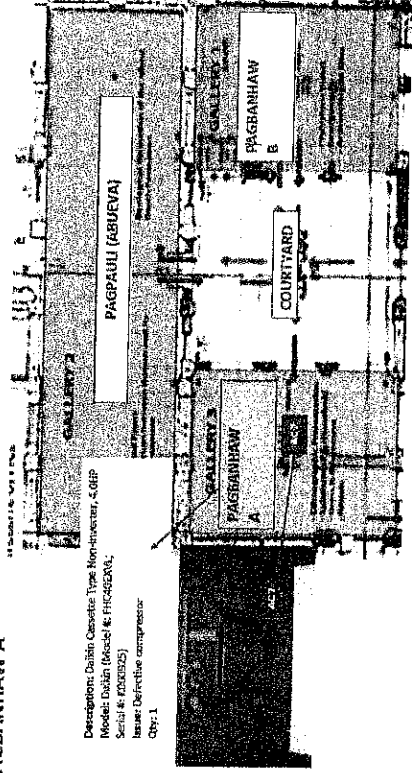


B.2 REPAIR OF AIR-CONDITIONING UNITS (5 UNITS)

Supply and Installation Cassette Type Non-Inverter AC Units w/ Complete Standard accessories supply of labor, materials and other works to complete the system

- a. GALLERY 3: PAGBANHAW A (GF)
 - Description: Daikin Cassette Type Non-Inverter, 4.0HP
 - Model: Daikin (Model #: FHC40EXVL; Serial #: K000925) – AC7
 - Issue: Defective Compressor
 - Qty: 1

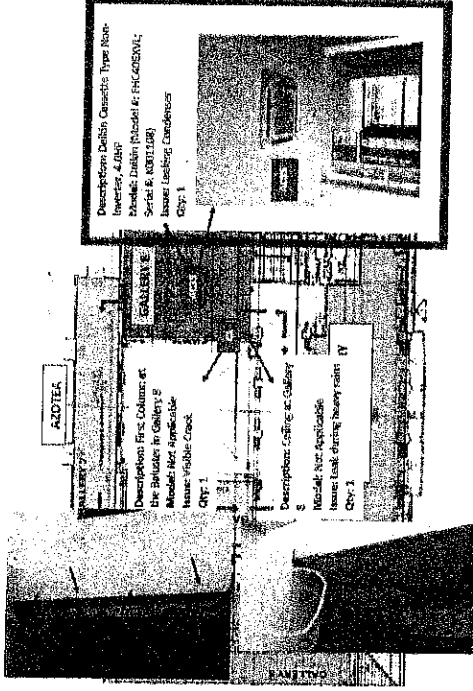
PAGBANHAW A



b. GALLERY 8 (2F)

- Description: Daikin Cassette Type Non-Inverter, 4.0HP
- Model: Daikin (Model #: FHC40EXVL; Serial #: K001108) – AC35
- Issue: Leaking Condenser
- Qty: 1

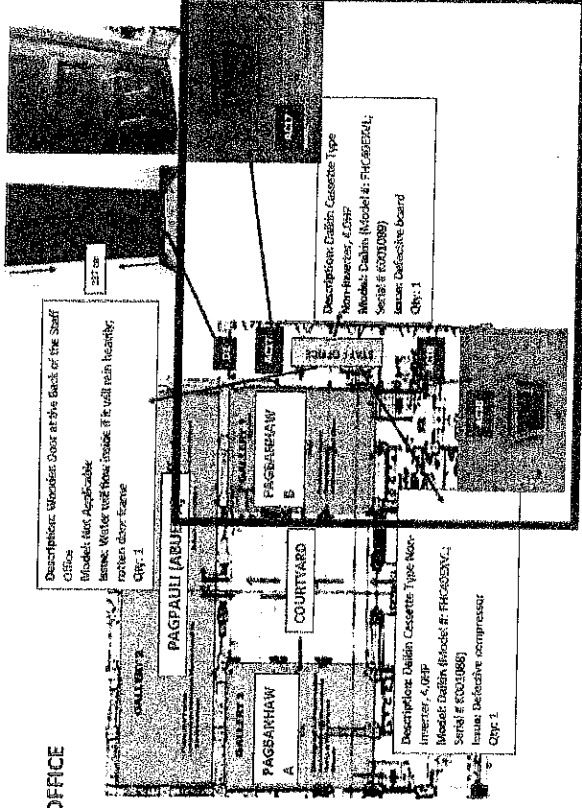
GALLERY 8



c. STAFF OFFICE (GF)

- Description: Daikin Cassette Type Non-Inverter, 4.0HP
- Model: Daikin (Model #: FHC40EXVL; Serial # K001088) – AC18
- Issue: Defective compressor
- Qty: 1

STAFF OFFICE

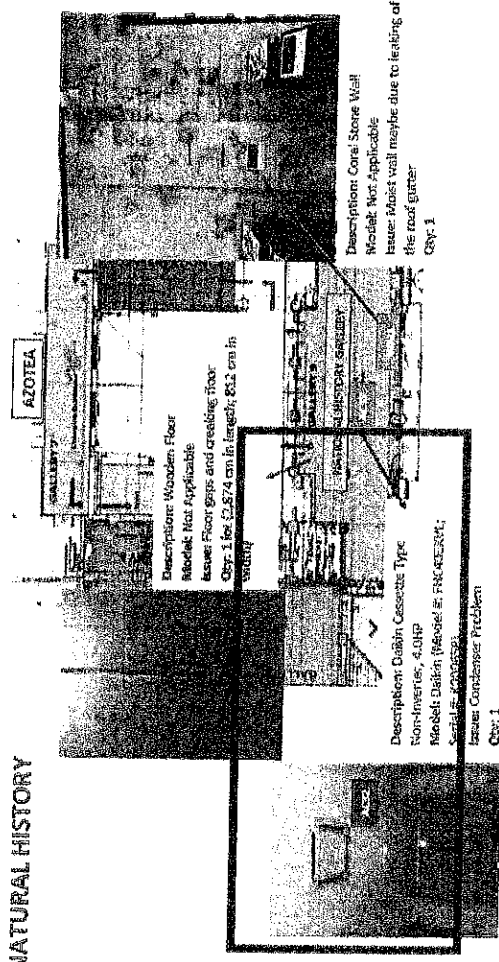


- Description: Daikin Cassette Type Non-Inverter, 4.0HP
- Model: Daikin (Model #: FHC40EXVL; Serial #: K001089) – AC17
- Issue: Defective Board
- Qty: 1

d. NATURAL HISTORY (2F)

- Description: Daikin Cassette Type Non-Inverter, 4.0HP
- Model: Daikin (Model #: FHC40EXVL; Serial #: K000658) – AC32
- Issue: Condenser Problem
- Qty: 1

NATURAL HISTORY

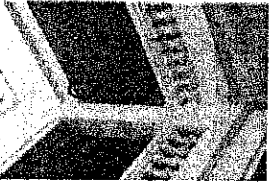


B.3 UPGRADING OF EXISTING CCTV SYSTEM

- Location: Ground Floor

- Qty: 9 Units & CCTV Mainframe

CCTV Location (9 Existing Areas only)



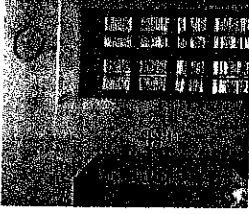
Courtyard (1)



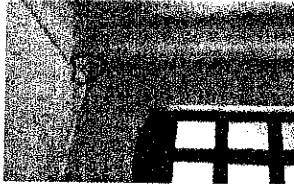
Hallway/Reception (2)



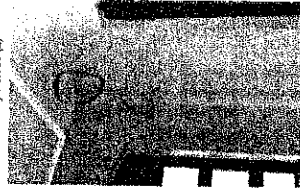
NMP Gallery A (5)



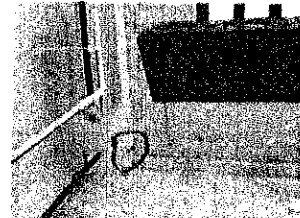
NMP Gallery B (6)



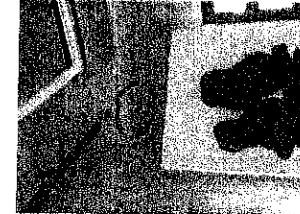
Gallery 2a (3)



Gallery 2b (4)



Ecological Gallery A (7)

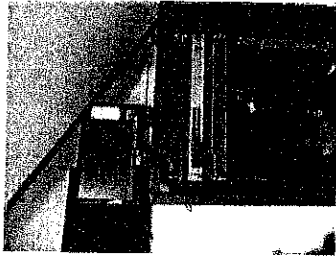


Ecological Gallery B (8)



Entry Area (9)

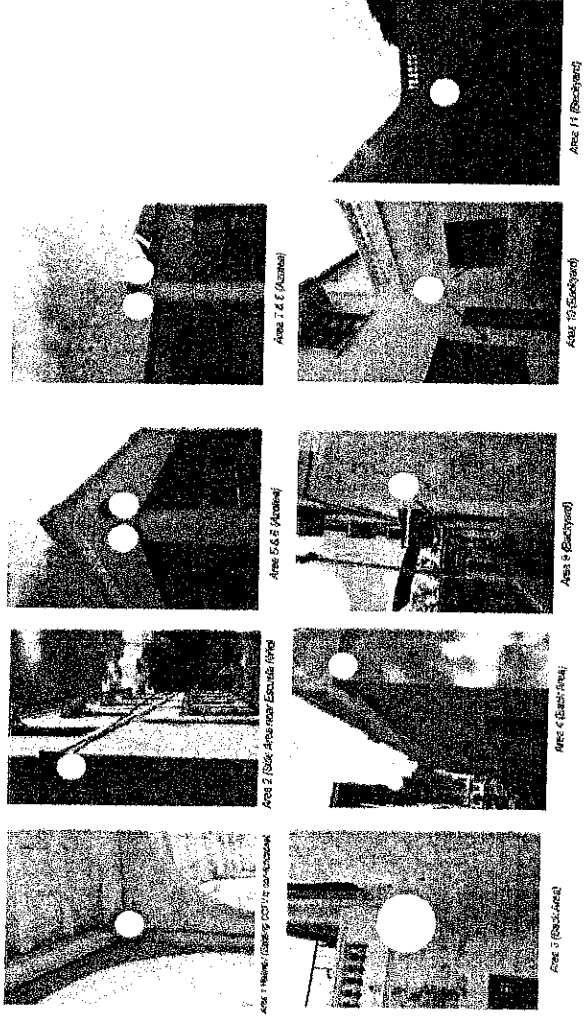
The CCTV monitor mainframe is in a "connecting mode" almost everyday. "Connecting mode" by lack of proper term, means black out from our monitoring system, no transmission of data from the camera to the stand-by monitor.



Seeing the limited locations of the CCTV cameras above, there are no cameras outside the perimeter of NMP-BOAMSO to record activities, untoward incidents and intrusion risks such as vandalism, criminal theft and worst terrorism. To secure our worries and anxieties and to keep safe the entire NMP BOAMSO building and its priceless collections, also in the absence of sufficient number of security personnel. It is advised to install additional 9 CCTV cameras in these proposed locations.

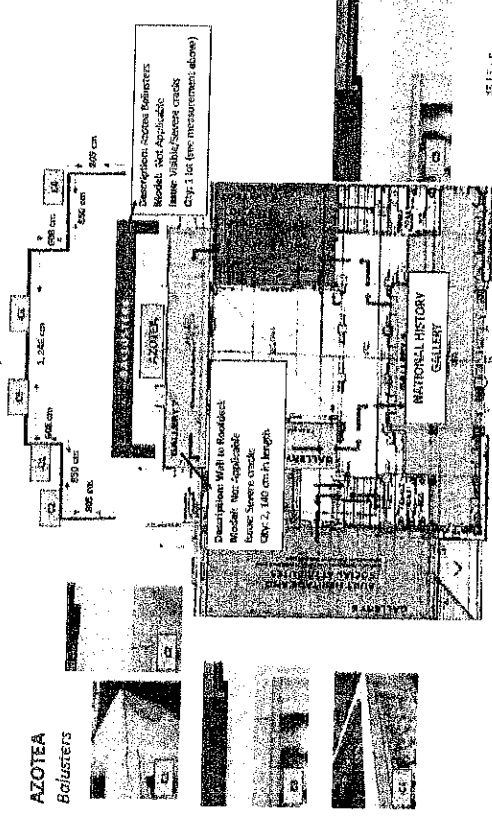
**REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM
AND SATELLITE OFFICE (Tagbilaran, Bohol)**
Location: Carlos P. Garcia, Tagbilaran City, Bohol

**Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS**



B. 4 REPAIR OF CONCRETE CRACKS (14.33 Ln. Mtr)

- Location: Azotea Balusters
- Issue: Visible/Severe cracks
- Qty: 5 Areas (see measurement above) – C1 to C5

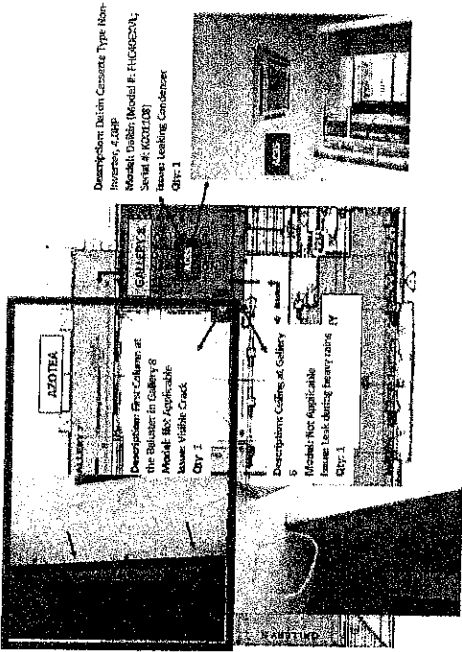


- Location: First Column at the Baluster in Gallery 8
- Issue: Visible Crack
- Qty: 3 In.m

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM
AND SATELLITE OFFICE (Tagbilaran, Bohol)
Location: Carlos P. Garcia, Tagbilaran City, Bohol

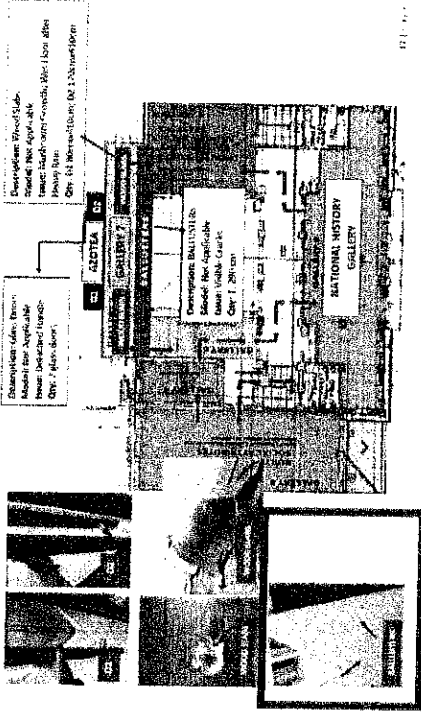
Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS

GALLERY 8



- Location: Ballusters at Gallery 7
- Issue: Visible Cracks
- Qty: 1, 290 In/m

GALLERY 7

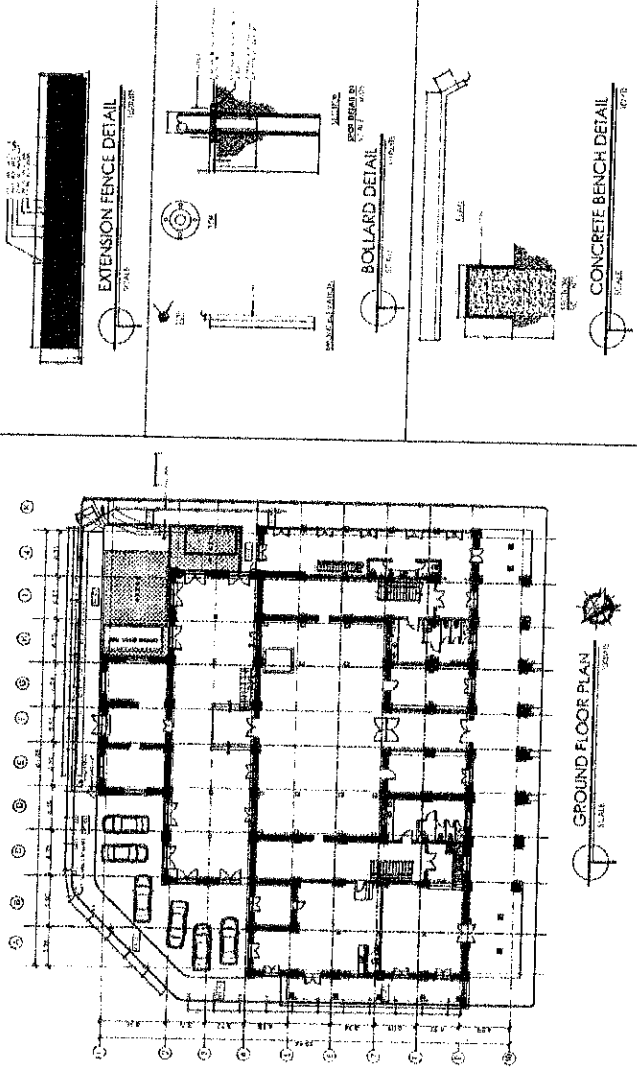


B.5 SUPPLY & INSTALLATION OF BOLLARDS (SOLAR POWERED LED, STEEL-GRADE, BLACK - VERIFY
LOCATION IN PLAN)

- Location: Ground Floor Rear Area
- Qty: 12 Units

**REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM
AND SATELLITE OFFICE (Tagbilaran, Bohol)**
Location: Carlos P. Garcia, Tagbilaran City, Bohol

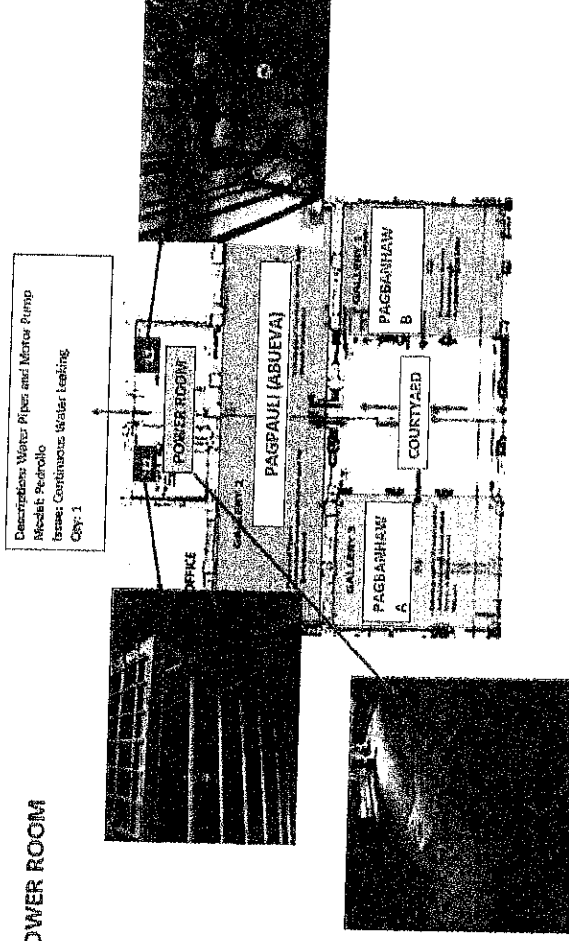
**Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS**



B.6 REPAIR OF WATER PIPE LEAK AT THE POWER ROOM

- Description: Water Pipes and Motor Pump
- Model: Pedrollo
- Issue: Continuous Water Leaking
- Qty: 1 Lot

POWER ROOM

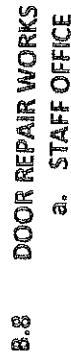


B.7 FLOOR WATERPROOFING & RE-TILING WORKS

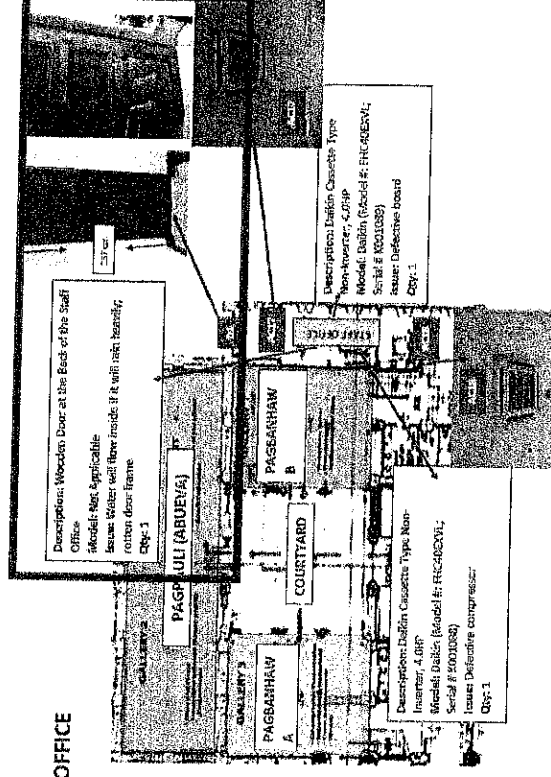
- Description: 2nd Floor Azotea Floor Waterproofing & Re-tiling

**Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS**

- AZOTEA**
Tiles

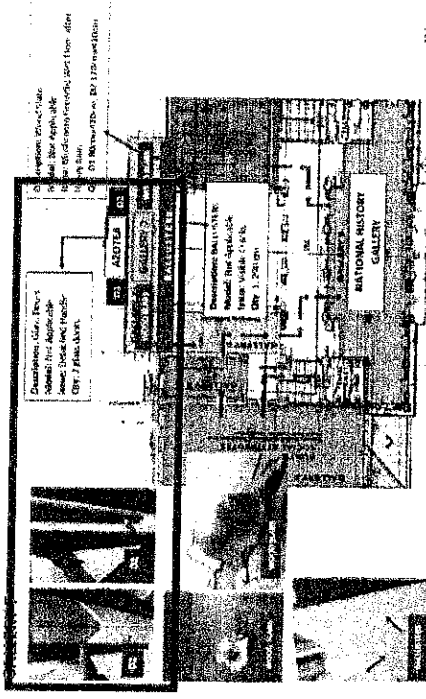


- STAFF OFFICE**



b. GALLERY 7

- **Description:** Glass Doors
- **Issue:** Detached Handle
- **Qty:** 2 Glass Door Handles



B.9 WINDOW REPAIR WORKS

a. PAGPAULI (ABUEVA) GALLERY

- **Location:** Wooden Windows at Pagpauli Gallery – W1, W2, W3
- **Issue 1:** Damage window jamb due to termite infestation
- **Issue 2:** Rain water flows inside the window due to the absence of canopy; window is on the same level with the parking area
- **Qty:** 3 windows, 6 panels (*Note:* All windows have the same sizes)

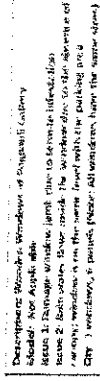
Window Jamb

(Length 143cm, Width 3cm x 13cm, Height 147cm)

Window Frame

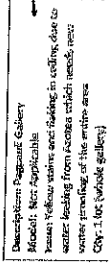
(Height 138cm, Width 66cm, Thickness 4.5cm)

Summary



- **Issue:** Yellow stains and flaking in ceiling due to water leaking from Azotea which needs new water proofing of the entire area
- **Qty:** 95 sqm

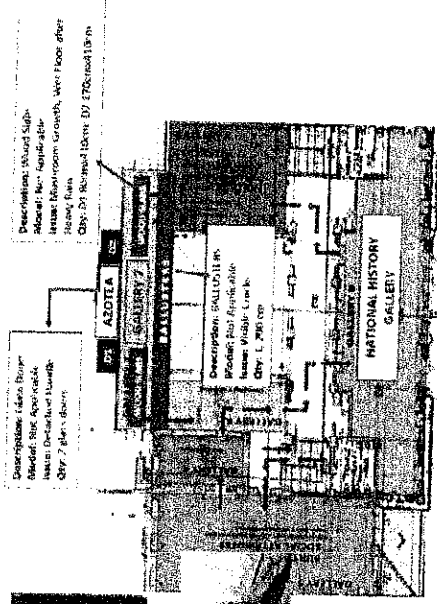
Ceiling



- **Location:** Wood Floor Slabs at Gallery 7
- **Issue:** removal of Biological Mushroom Growth sqm; Wet Floor after Heavy Rain
- **Qty (10 sqm)**
 - a. D1 80cmx410cm;
 - b. D2 170cmx410cm

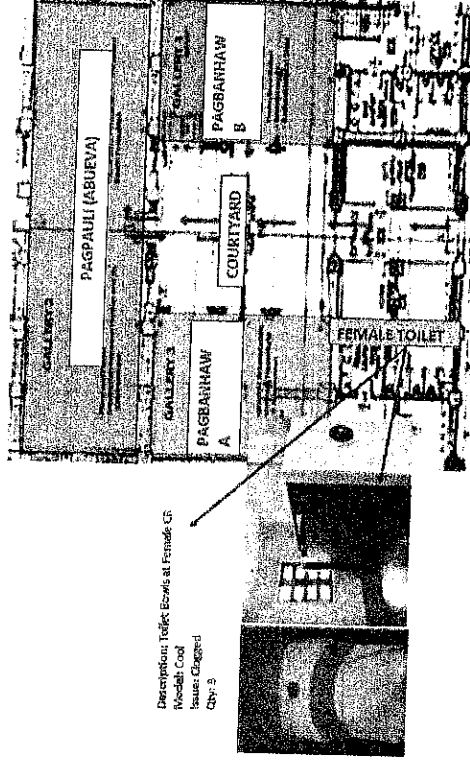
**Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS**

SCOPE OF WORKS



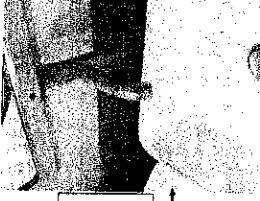
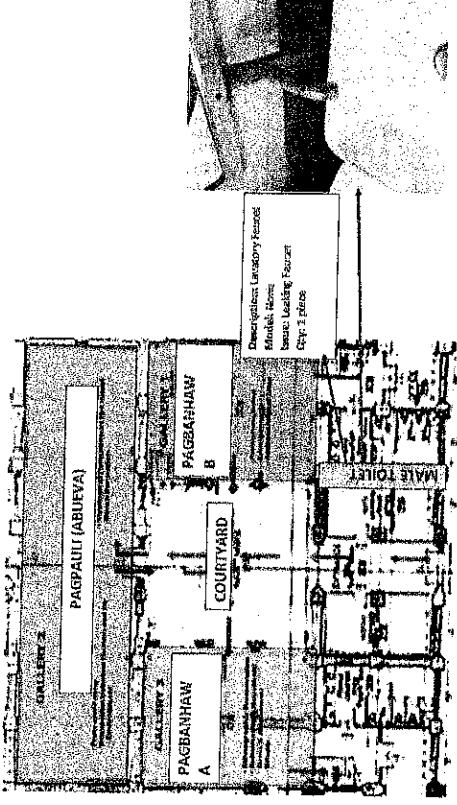
- **Location:** Toilet Bowls at Female Guest Toilet – 12 sqm

- ETIOPIAN SING



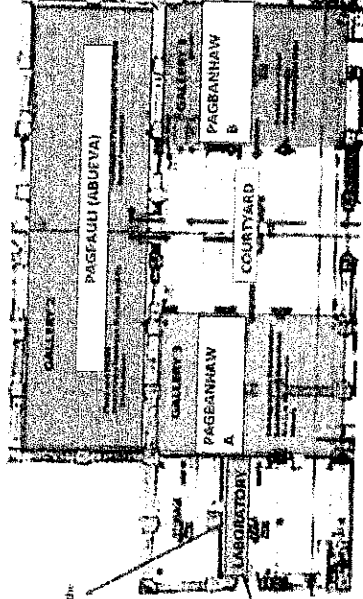
- 13

GUESTS' MALE TOILET



- **Location:** Floor Tiles at Laboratory Toilet
- **Model:** Ceramic Tiles
- **Issue:** Improper Tile sloping (water flows in the other direction)
- **Qty:** 1 Area (228cm length, 124cm width) – 4sqm

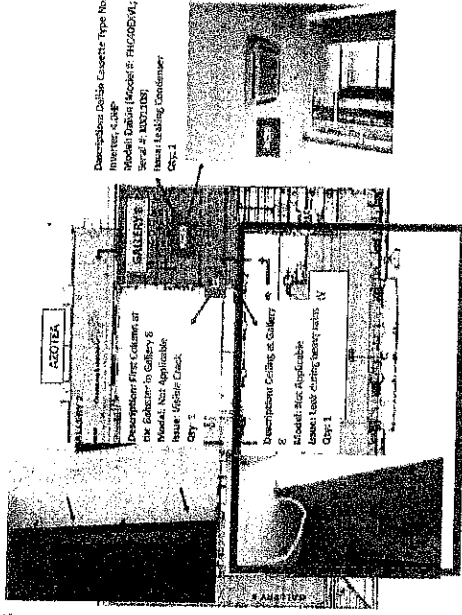
LABORATORY



Description: Tiles; Model: Ceramic; Serial: None; Qty: 1 Area (228cm length, 124cm width)



GALLERY 8



Description: Ceiling; Model: None; Serial: None; Qty: 1 Area (228cm length, 124cm width)



B.13 MISCELLANEOUS REPAIRS

A. Repair of Roof Gutter (Coral Stone Wall - National History Gallery) - verify on-site exact scope



B. Supply and Installation of Typical Roof Canopy for Doors (5 set) & Windows (13set) - verify exact location per set on floor plan



III.A NOTE

All works shall be read in conjunction with the working drawings, any discrepancy shall be timely coordinated with the National Museum of the Philippines- Facilities Management Division.

Prepared by:

Benedict Bautista
AR. ROY BENEDICT BAUTISTA
AO5, FMD

Checked & Reviewed by:

Nelson L. Aquino
AR. NELSON L. AQUINO
Architect IV, FMD

REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM
AND SATELLITE OFFICE (Tagbilaran, Bohol)
Location: Carlos P. Garcia, Tagbilaran City, Bohol

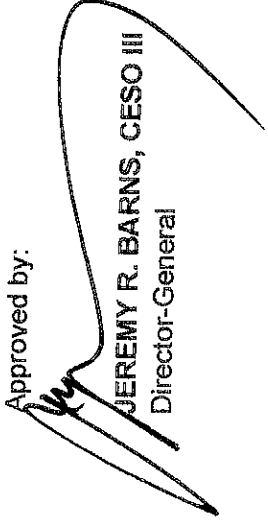
Facilities Management Division
National Museum of the Philippines
SCOPE OF WORKS

Noted by:



ENGR. JAIME T. ALTILLERO
Chief Administrative Officer, FMD

Approved by:



JEREMY R. BARNS, CESO III
Director-General

Recommending Approval:



Atty. MA. ROSENNE FLORES-AVILA
Deputy Director-General (Administration)

Section VII. Bill of Quantities

Insert Your Company Logo here

Project: REPAIR & MAINTENANCE OF BOHOL AREA MUSEUM & SATELLITE OFFICE (TAGBILARAN, BOHOL)
 Location: Km. 0, Old Capitol Complex, CPG Ave., Tagbilaran City, Bohol
 Duration: 90 Calendar Days
 amount (Php): 0.00

APPROVED BUDGET OF CONTRACT

Item No.	Description	Qty	Unit	Estimated Cost	MATERIAL	Unit	Total	LABOR	Unit	Total	TOTAL EDC	OCMP (25%)	Sub-Total	VAT	EDC + IC
A. PRELIMINARIES / GENERAL REQUIREMENTS															
1	Mobilization & Demobilization														
2	Project Identification Signage	1	lot					0.00		0.00	0.00	0.00	0.00	0.00	0.00
3	TEMPACIL	1	lot					0.00		0.00	0.00	0.00	0.00	0.00	0.00
	(includes warehousing and utility consumption)	32	sq.m					0.00		0.00	0.00	0.00	0.00	0.00	0.00
4	Safety, Security and Housing	90	C.D					0.00		0.00	0.00	0.00	0.00	0.00	0.00
	(including basic PPEs: hardhats, gloves, safety shoes, harness, first aid kit, etc for all personnel)														
5	General Cleaning & Hauling														
	General Cleaning	1	lot					0.00		0.00	0.00	0.00	0.00	0.00	0.00
	a. ordinary hardbroom	3	pcs					0.00		0.00	0.00				
	b. ordinary dustpan	3	pcs					0.00		0.00	0.00				
	c. ordinary bucket w/ dipper	3	pcs					0.00		0.00	0.00				
	d. garbage bag/ sacks	5	rolls					0.00		0.00	0.00				
	Hauling of debris														
	a. eff truck	6	trip					0.00		0.00	0.00				
6	Covid-19 Safety Precautionary Measures (1 Thermal Scanner, Face Masks & Face Shield for each worker, 2 Alcohol with Dispenser, Health reminder signages, 1 Disinfectant Mat w/ tray - Staff-use)	1	lot					0.00		0.00	0.00	0.00	0.00	0.00	0.00
SUB-TOTAL A. PRELIMINARIES / GENERAL REQUIREMENTS															
															0.00

Project No. :
 Date

APPROVED BUDGET OF CONTRACT

Item No.	Description	Qty	Unit	Estimated Direct Cost	LABOR	Total	Unit	Total	TOTAL EDC	OCMP (25%)	Sub-Total	VAT	EDC + IC	TOTAL COST
												5%		

B. REPAIR & MAINTENANCE WORKS

	Repair of Courtyard Skylight with Installation of Heat Index Reduction	161	sqm											
	1. Dismantling of Existing Polycarbonate Roofing	161	sqm											
	2. Supply & Installation of New Polycarbonate Roofing	161	sqm	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00
	1.20mx2.4m Twin-wall Polycarbonate Sheet	56.00	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	19mmx50mmx5.8mm Aluminum H-Clip	27.00	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	14mmx32mmx5.8mm Aluminum U-clip w/ neoprene set	27.00	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	1/4"x2" S.S Tex screw w/ neoprene washer(50pcs/pack)	17.00	pack	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	Polyurethane sealant 10.1 fl.oz. Cartridge,	20.00	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	Silver Window Film, Heat Insulation UV-Proof	161.00	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	-0.00				
	3. Hole dismantling from existing wall for Exhaust Fan	0.2	cum						0.00					
	4. Supply & Installation of Industrial Exhaust Fan (Specs: 1000mm min. blade diameter) w/ Shutting Louvers	2	set	-	-	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00
	Industrial fan(1.0mx1.0m)w/ Shutter Louver	2.00	set	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	plain GI sheet gauge 20 x8ft	4.00	pc	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Primer	1.00	liter	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Top coat	2.00	liter	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	2" Paint brush	2.00	pcs	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	3" Paint brush	2.00	pcs	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Scaffolding rental(4sets)	45.00	days	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Cement	1.00	bag	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Sand	0.50	cum	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

Item No.	Description	Qty	Unit	Estimated Cost		LABOR		TOTAL EDC	Indirect Cost (IC)				TOTAL COST
				Unit	Total	Unit	Total						
										Sub-Total	VAT	EDC + IC	
B.2	Repair of Airconditioning Units	5	unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	- Location: GALLERY 3: PAGBANHAW A (GF) - Description: Daikin Cassette Type Non-Inverter, 4.0HP - Model: Daikin (Model #: FHC40EXVL; Serial #: K000925) – AC7 - Issue: Defective Compressor (For replacement; compressor 4.0HP 4TR, Iteon R-22, Silver Rod)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00				
	- Location: GALLERY 8 (2F) - Description: Daikin Cassette Type Non-Inverter, 4.0HP - Model: Daikin (Model #: FHC40EXVL; Serial #: K001108) – AC35 - Issue: Leaking Condenser (For Repair: Freon R-22, Silver Rod...)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00				
	- Location: STAFF OFFICE (GF) - Description: Daikin Cassette Type Non-Inverter, 4.0HP - Model: Daikin (Model #: FHC40EXVL; Serial #: K001088) – AC18 - Issue: Defective compressor (For replacement; branded board circuits)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00				
	- STAFF OFFICE (GF) - Description: Daikin Cassette Type Non-Inverter, 4.0HP - Model: Daikin (Model #: FHC40EXVL; Serial # K001089) – AC17 - Issue: Defective Board (For replacement)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00				
	- Location: NATURAL HISTORY (2F) - Description: Daikin Cassette Type Non-Inverter, 4.0HP - Model: Daikin (Model #: FHC40EXVL; Serial #: K000658) – AC32 - Issue: Condenser Problem (Verify on-site)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00				

Item No.	Description	Qty	Unit	Estimated Direct Cost		LABOR	TOTAL EDC	Indirect Cost (IC)	TOTAL COST		
B.3	Upgrading of Existing Closed Circuit Television System (Verify on-site based on plan)	9	unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B.4	Repair of Concrete Cracks										
	A. Injection of structural epoxy along cracks of walls	14.33	ln.m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B. Repainting Works along Cracks (Putty & Paint)	1	lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B.5	Supply & Installation of Bollards (Solar powered LED, Steel-grade, black - verify location in plan)	12	unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B.6	Repair of Water Pipe Leak at the Power Room (Change pipe / Teflon tape)	1	lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B.7	Floor Waterproofing & Re-tilling Works	120	m²		0.00		0.00	0.00	0.00	0.00	0.00
	A. Chipping of Floor Tiles	120	m²			0.00	0.00	0.00			
	B. Application of Polyurethane Waterproofing and Sealing Membrane (3 coats) / Repair of cracks, epoxy grouting and epoxy injection	120	m²	0.00	0.00	0.00	0.00	0.00			
	C. Installation of New Tiles	120	m²	0.00							
	30 x 30 tiles - verify exact tile on-site	1400	pcs	0.00	0.00	0.00	0.00	0.00			
	5kg Tile Grout	60	bags	0.00	0.00	0.00	0.00	0.00			
	25 kg Tile Adhesive	24	bags	0.00	0.00	0.00	0.00	0.00			
B.8	Door Repair Works										
	A. Repair of Rotten Wooden Door (Staff Office)	1	set	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dismounting and re-mounting	1.00	set								
	Steel Brush	1.00	pcs	-		-	-	-			
	4L Natural Wood Paste Filler	1.00	cans	-		-	-	-			
	4L Oil-based Wood Stain	2.00	cans	-		-	-	-			
	4" Paint Brush	2.00	pcs	-		-	-	-			
	2" Paint Brush	2.00	pcs	-		-	-	-			
	3"x6"x12ft Good lumber	12.00	bdfn	-		-	-	-			
	Wood Glue (Stickwell)	1.00	quarts	-		-	-	-			
	Stopa Rags	1.00	kgs	-		-	-	-			
	Loose Pin Hinge 3 1/2" S.S	2.00	sets	-		-	-	-			
	Assorted CWN	1.00	kgs	-		-	-	-			

Item No.	Description	Qty	Unit	Estimated Cost		LABOR		TOTAL EDC	OCMP (25%)	Sub-Total	VAT	EDC + IC
B.9	B. Repair of Glass Door Handle (Gallery 7)	2.0	set	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Window Repair Works (Pagpauli Gallery)											
	A. Repair of Window Jamb & Frame - W1, W2, W3	3.0	set	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dismounting and re-mounting	3.00	set				#REF!	0.00	0.00	0.00	0.00	0.00
B.10	Steel Brush	1.00	pcs	-	-	-	#REF!	0.00	0.00			
	4L Natural Wood Paste Filler	1.00	cans	-	-	-	-	0.00	0.00			
	4L Oil-based Wood Stain	2.00	cans	-	-	-	-	0.00	0.00			
	4" Paint Brush	2.00	pcs	-	-	-	-	0.00	0.00			
	2" Paint Brush	2.00	pcs	-	-	-	-	0.00	0.00			
	3"x6"x12ft Good Lumber	12.00	bdf	-	-	-	-	0.00	0.00			
	Wood Glue (Stickwell)	1.00	quarts	-	-	-	-	0.00	0.00			
	Stopa Rags	1.00	kgs	-	-	-	-	0.00	0.00			
	Loose Pin Hinge 3 1/2" S.S	1.00	sets	-	-	-	-	0.00	0.00			
	Assorted CWN	2.00	sets	-	-	-	-	0.00	0.00			
	4L wood preservatives	1.00	kgs	-	-	-	-	0.00	0.00			
	Ceiling Repair Works (Pagpauli & Gallery 8)	140	m²	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	16L Primer Paint (1 coat)	4	cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	16L Paint Enamel (2 coats) - Verify Color	6	cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Roller brush, Refil, Extension pole and Tray set	10	sets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B.11	4" Paint Brush	5	pcs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" Paint Brush	5	pcs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5kg Putty	4	packs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wooden Floor Repair Works (Gallery 7)											
	A. Dismantling of Rotten Wooden Floor Slabs	15	sqm			0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B. Removal of Biological Mushroom Growth	15	sqm									
	C. Repair of Wooden Floor Slab	15	sqm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3"x6"x12ft Good Lumber	72.00	bdf	-	-	-	-	0.00	0.00	0.00	0.00	0.00
	4L Oil-based Wood Stain	2.00	cans	-	-	-	-	0.00	0.00	0.00	0.00	0.00
	Assorted CWN	2	kgs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1L Clear Wood Preservative	10	liters	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" Paint Brush	2	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Paint Brush	2	pcs.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Stopa Rags	2	kgs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL COST												

Item No.	Description	Qty	Unit	Estimated Direct Cost	MATERIAL Unit	LABOR Unit	TOTAL EDC	OOMP (25%)	Sub-Total	VAT 5%	TOTAL COST
B.12	D. Water sealing of Glass Door (Silicone Sealanty Against Rainwater)	1	lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	This includes the replacement of Door Handles										
	Repair of Toilets										
	A. Repair of Clogged Toilets Bowls (Model: Cool / Female Guest Toilet)	3	unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B. Repair of Lavatory Faucet (Male Guest Toilet)	1	unit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	This includes replacement of new faucet										
	C. Slope correction (The Dismantling, Correction of ponding surfaces with mortar and bonding agent - Laboratory Toilet)	4	sqm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Chipping of Existing Tiles	4	sqm					#REF!			
	300mm X 300mm Ceramic Tiles(verify on site)	44.00	pcs	0.00	0.00	0.00	0.00	-00			
	Tile Adhesive(25kg/bag)	1.00	bags	0.00	0.00	0.00	0.00	-00			
	Tile Grout(5kg/bag)	2.00	bags	0.00	0.00	0.00	0.00	-00			
	D. Installation of New Tiles (Laboratory Toilet)	4	m²		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	30 x 30 tiles - verify exact tile on-site	50	pcs	0.00	0.00	150.00	7,500.00	7,500.00			
	5kg Tile Grout	9	bags	0.00	0.00	50.75	456.75				
	25 kg Tile Adhesive	8	bags	0.00	0.00	92.75	742.00	742.00			
B. 13	Miscellaneous Repairs										
	A. Repair of Roof Gutter (Coral Stone Wall - National History Gallery - selected area)	1	lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	B. Supply and Installation of Typical Roof Canopy for Doors (5 set) & Windows (13set) - verify exact location per set on floor plan	18.00	set	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00

APPROVED BUDGET OF CONTRACT

Item No.	Description	Qty	Unit	Estimated Cost	LABOR	TOTAL EDC	OCMP (25%)	Sub-Total	VAT	EDC + IC	TOTAL COST
				Unit	Total	Unit	Total				
	Supply and Installation Canopy for Doors & Windows (Breakdown:	1	set	0.00	0.00	0.00	0.00				
	2"x2"x12ft local hardwood		bdt	16.00		0.00					
	2"x3" x12ft local hardwood		bdt			0.00					
	1/2"x6"x8ft Fascia Board		pcs	1.00		0.00					
	1/2 thk Marine Plywood		pcs	1.00		0.00					
	Plain GI sheet gauge 20 x8ft		pc	1.00		0.00					
	Roof Area		sqm	1.50		0.00					
	Primer		liter	0.50		0.00					
	Top coat		liter	1.00		0.00					
	Wood works paint		sqm	3.00		0.00					
	QDE(White)		liter	2.00		0.00					
	Paint thinner(350ml)		bot.	2.00		0.00					
	2" Paint brush		pcs	2.00		0.00					
	3" Paint brush		pcs	2.00		0.00					
	1/2" CWN		kg	0.25		0.00					
	3" CWN+135		kg	0.25		0.00					
	SUB-TOTAL B. Repair & Maintenance Works										
											0.00
	TOTAL PROJECT COST (Php)										
											0.00

*Section VIII. Checklist of Technical and
Financial Documents*

Components of Bid Proposal

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE (FIRST ENVELOPE)

Class "A" Documents

Legal Documents

- ☐ 1. Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
or
- ☐ Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;
and
- ☐ Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- ☐ Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- ☐ 2. Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**
- ☐ 3. Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; **and**
- ☐ 4. Philippine Contractors Accreditation Board (PCAB) License;
or
Special PCAB License in case of Joint Ventures;
and registration for the type and cost of the contract to be bid; **and**
- ☐ 5. Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**

Project Requirements, which shall include the following:

- ☐ 6. Organizational chart for the contract to be bid; **and**
- ☐ 7. List of contractor's key personnel (e.g., Project Manager, Project

Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data; and

- ☐ 8. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; and
- ☐ 12. Original duly signed Omnibus Sworn Statement (OSS); and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

- ☐ 13. Bid Bulletin, if any;
- ☐ 14. Official Receipt of the Bidding Documents;

Financial Documents

- ☐ 15. The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; and
- ☐ 16. The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

- ☐ 17. If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence; or duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT (SECOND ENVELOPE)

- ☐ 1. Original of duly signed and accomplished Financial Bid Form; and

Other documentary requirements under RA No. 9184

- ☐ 2. Original of duly signed Bid Prices in the Bill of Quantities; and
- ☐ 3. Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, labor rates, and equipment rentals used in coming up with the Bid; and
- ☐ 4. Cash Flow by Quarter.

Note: Please provide us a e-copy of all Eligibility, Technical and Financial Components of the Bid Proposal save in a compact disc.

Annex A Packaging and Labelling Instructions

PACKAGING AND LABELLING INSTRUCTIONS

1. Two Envelope System

The ORIGINAL - TECHNICAL COMPONENTS requirements stated below shall be enclosed into a folder, same as with the ORIGINAL - FINANCIAL COMPONENTS requirements which will also be done in a separate folder. These two (2) folders shall be placed into separate envelope forming the **Two-Envelope System**.

Envelope 1 : Technical Components (see attached listing)
Envelope 2 : Financial Components (see attached listing)

2. The First Envelope, ORIGINAL - TECHNICAL COMPONENTS and the Second Envelope, ORIGINAL - FINANCIAL COMPONENTS should be sealed in an outer envelope marked as ORIGINAL BID. Each copy of the first and second envelopes shall be similarly sealed duly marking the inner envelopes as "COPY NO. ____ - TECHNICAL COMPONENT" and "COPY NO. ____ - FINANCIAL COMPONENT" and the outer envelope as "COPY NO. ____", respectively. The First and Second envelope should be produced into three (3) copies marked as Copy No. 1, Copy No. 2 and Copy No. 3.

3. All four (4) envelopes, Original, Copy No. 1, Copy No. 2 and Copy No. 3, shall be enclosed in a single envelope referred to as the **Mother Envelope**.

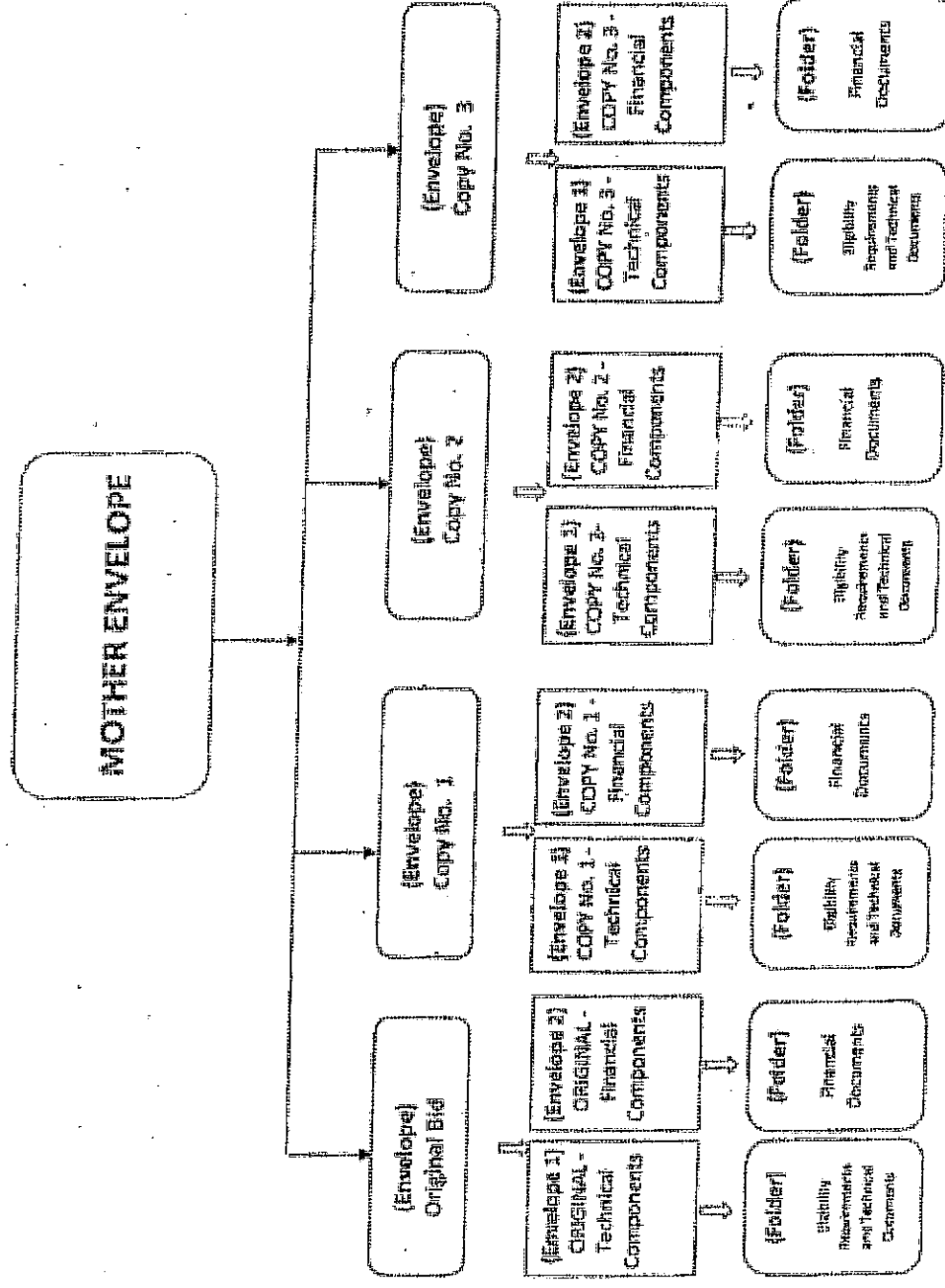
4. All documents must be marked with **Ear tabs**. There must be a Table of Contents indicating all the documents to be submitted per folder.

5. All envelopes should properly be **sealed, signed and labelled**. The folders should also be labelled properly.

6. All copies must be **Certified True Copy** and signed.

TO: ATTY. MA. ROSENNE M. FLORES-AVILA Chairperson Bids and Awards Committee National Museum of the Philippines Padre Burgos Avenue, ermita Manila	FROM: Name of Company Address & Telephone Number Reference No.
Project Title Location	
Do not Open Before: date and time of the Submission and Opening of Bids	

PACKAGING AND LABELING INSTRUCTIONS (DIAGRAM)



Annex B Bidding Form

Contract Agreement Form for the

Procurement of Infrastructure Projects (Revised)

[not required to be submitted with the Bid, but it shall be submitted within ten (10) days after receiving the Notice of Award]

CONTRACT AGREEMENT

THIS AGREEMENT, made this *[insert date]* day of *[insert month]*, *[insert year]* between *[name and address of PROCURING ENTITY]* (hereinafter called the “Entity”) and *[name and address of Contractor]* (hereinafter called the “Contractor”).

WHEREAS, the Entity is desirous that the Contractor execute *[name and identification number of contract]* (hereinafter called “the Works”) and the Entity has accepted the Bid for *[contract price in words and figures in specified currency]* by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents as required by the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184 shall be deemed to form and be read and construed as part of this Agreement, *viz.*:
 - a. Philippine Bidding Documents (PBDs);
 - i. Drawings/Plans;
 - ii. Specifications;
 - iii. Bill of Quantities;
 - iv. General and Special Conditions of Contract;
 - v. Supplemental or Bid Bulletins, if any;
 - b. Winning bidder’s bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents or statements submitted;

Bid form, including all the documents/statements contained in the Bidder’s bidding envelopes, as annexes, and all other documents submitted (*e.g.*, Bidder’s response to request for clarifications on the bid), including corrections to the bid, if any, resulting from the Procuring Entity’s bid evaluation;

- c. Performance Security;

- d. Notice of Award of Contract and the Bidder's conforme thereto; and
 - e. Other contract documents that may be required by existing laws and/or the Procuring Entity concerned in the PBDs. Winning bidder agrees that additional contract documents or information prescribed by the GPPB that are subsequently required for submission after the contract execution, such as the Notice to Proceed, Variation Orders, and Warranty Security, shall likewise form part of the Contract.
3. In consideration for the sum of *[total contract price in words and figures]* or such other sums as may be ascertained, *[Named of the bidder]* agrees to *[state the object of the contract]* in accordance with his/her/its Bid.
4. The *[Name of the procuring entity]* agrees to pay the above-mentioned sum in accordance with the terms of the Bidding.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

[Insert Name and Signature]

[Insert Name and Signature]

[Insert Signatory's Legal Capacity]

[Insert Signatory's Legal Capacity]

for:

for:

[Insert Procuring Entity]

[Insert Name of Supplier]

Acknowledgment

[Format shall be based on the latest Rules on Notarial Practice]

Omnibus Sworn Statement (Revised)

[shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)

CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

[If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

[If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

[If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)];

[If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on

Blacklisting:

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;
6. *[Select one, delete the rest:]*
[If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
[If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;
7. *[Name of Bidder]* complies with existing labor laws and standards; and
8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:
 - a. Carefully examining all of the Bidding Documents;
 - b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
 - c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
 - d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project]*.

9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriation or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

IN WITNESS WHEREOF, I have hereunto set my hand this ___ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]

[Insert signatory's legal capacity]

Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Performance Securing Declaration (Revised)

[if used as an alternative performance security but it is not required to be submitted with the Bid, as it shall be submitted within ten (10) days after receiving the Notice of Award]

REPUBLIC OF THE PHILIPPINES)

CITY OF _____) S.S.

PERFORMANCE SECURING DECLARATION

Invitation to Bid: [Insert Reference Number indicated in the Bidding Documents]

To: [Insert name and address of the Procuring Entity]

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, to guarantee the faithful performance by the supplier/distributor/manufacturer/contractor/consultant of its obligations under the Contract, I/we shall submit a Performance Securing Declaration within a maximum period of ten (10) calendar days from the receipt of the Notice of Award prior to the signing of the Contract.
2. I/We accept that: I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of one (1) year for the first offense, or two (2) years **for the second offense**, upon receipt of your Blacklisting Order if I/We have violated my/our obligations under the Contract;
3. I/We understand that this Performance Securing Declaration shall cease to be valid upon:
 - a. issuance by the Procuring Entity of the Certificate of Final Acceptance, subject to the following conditions:
 - i. Procuring Entity has no claims filed against the contract awardee;
 - ii. It has no claims for labor and materials filed against the contractor; and
 - iii. Other terms of the contract; or

- b. replacement by the winning bidder of the submitted PSD with a performance security in any of the prescribed forms under Section 39.2 of the 2016 revised IRR of RA No. 9184 as required by the end-user.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of [month] [year] at [place of execution].

*[Insert NAME OF BIDDER OR ITS
AUTHORIZED REPRESENTATIVE]*

[Insert signatory's legal capacity]

Affiant

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Bid Form for the Procurement of Infrastructure Projects

[shall be submitted with the Bid]

BID FORM

Date : _____

Project Identification No. : _____

To: *[name and address of Procuring Entity]*

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

- a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: *[insert name of contract]*;
- b. We offer to execute the Works for this Contract in accordance with the PBDs;
- c. The total price of our Bid in words and figures, excluding any discounts offered below is: *[insert information]*;
- d. The discounts offered and the methodology for their application are: *[insert information]*;
- e. The total bid price includes the cost of all taxes, such as, but not limited to: *[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized herein and reflected in the detailed estimates,
- f. Our Bid shall be valid within the a period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;
- g. If our Bid is accepted, we commit to obtain a Performance Security in the amount of *[insert percentage amount]* percent of the Contract Price for the due performance of the Contract, or a Performance Securing Declaration in lieu of the allowable forms of Performance Security, subject to the terms and conditions of

issued GPPB guidelines¹ for this purpose;

- h. We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;
- i. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and
- j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.
- k. We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the [Name of Project] of the [Name of the Procuring Entity]/.

- l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

¹ currently based on GPPB Resolution No. 09-2020