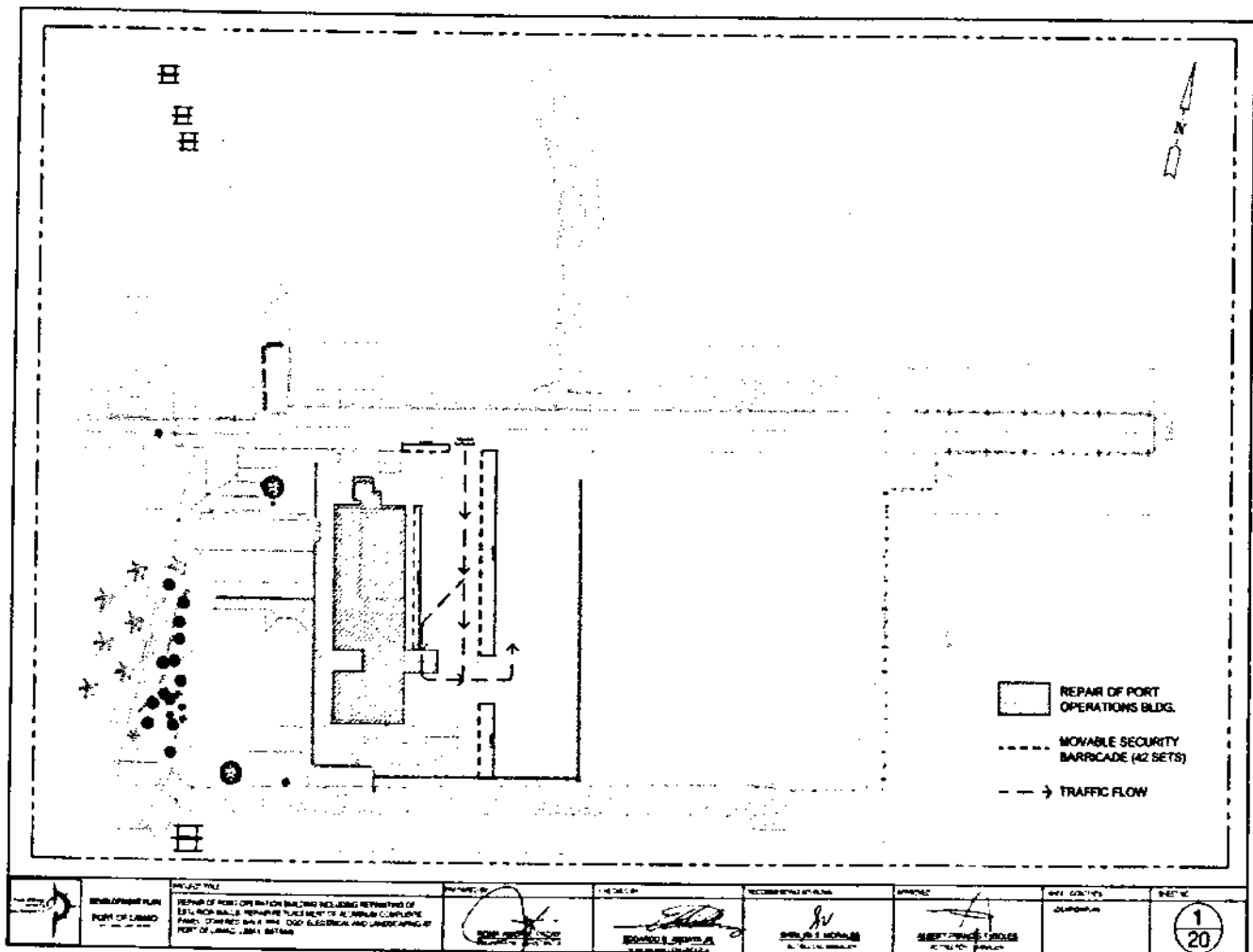




Improvement of Port Operation Building including Repainting of Exterior Walls, Repair/Replacement of Aluminum Composite Panel, Covered Walk, PPA Logo, Electrical and Landscaping at Port of Lamac, Limay, Bataan

(HO-INFRA-PPDD-23-0052)



BID DOCUMENTS
SEPTEMBER 2023

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***GLOSSARY OF TERMS,
ABBREVIATIONS, AND
ACRONYMS***

Glossary of Terms, Abbreviations, and Acronyms

ACP – Aluminum Composite Panel

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contractor – is a natural or juridical entity whose proposal was accepted by the Procuring Entity and to whom the Contract to execute the Work was awarded. Contractor as used in these Bidding Documents may likewise refer to a supplier, distributor, manufacturer, or consultant.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

Foreign-funded Procurement or Foreign-Assisted Project – Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses

or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term "related" or "analogous services" shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

SECTION I
INVITATION TO BID



PHILIPPINE
PORTS
AUTHORITY



INVITATION TO BID

FOR THE

IMPROVEMENT OF PORT OPERATION BUILDING INCLUDING REPAINTING OF EXTERIOR WALLS, REPAIR/REPLACEMENT OF ALUMINUM COMPOSITE PANEL, COVERED WALK, PPA LOGO, ELECTRICAL AND LANDSCAPING AT PORT OF LAMAO, LIMAY, BATAAN, PORT OF LAMAO, LIMAY, BATAAN

The Philippine Ports Authority, through the Corporate Budget of the Authority for CY 2023, intends to apply the sum of **P24,614,193.56** being the Approved Budget for the Contract (ABC) to payments under the contract for the **IMPROVEMENT OF PORT OPERATION BUILDING INCLUDING REPAINTING OF EXTERIOR WALLS, REPAIR/REPLACEMENT OF ALUMINUM COMPOSITE PANEL, COVERED WALK, PPA LOGO, ELECTRICAL AND LANDSCAPING AT PORT OF LAMAO, LIMAY, BATAAN, PORT OF LAMAO, LIMAY, BATAAN (HO-INFRA-PPDD-23-0052)**. Bids received in excess of the ABC shall be automatically rejected at bid opening.

The Philippine Ports Authority now invites bids for the above Procurement Project. Completion of the Works is required in **Three Hundred (300) calendar days** from the receipt by the successful bidder of the Notice to Proceed. Bidders should have completed a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (Instructions to Bidders).

Bidding will be conducted through open competitive bidding procedures using a non-discretionary "pass/fail" criterion as specified in the 2016 Revised Implementing Rules and Regulations (IRR) of Republic Act (RA) 9184.

Interested bidders may obtain further information from the Philippine Ports Authority Bids and Awards Committee (BAC) and inspect the Bidding Documents at the address given below from 8:00 a.m. to 5:00 p.m., Monday to Friday.

A complete set of Bidding Documents may be acquired by interested Bidders starting on **27 September 2023** from the given address and website(s) below and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of **TWENTY FIVE THOUSAND PESOS (P25,000.00)**. The Procuring Entity shall allow the bidder to present its proof of payment for the fees in person.

The Philippine Ports Authority's Bids and Awards Committee will hold a Pre-Bid Conference on **05 October 2023 at 2:00 p.m.** at the PPA Function Room, 7th Floor, PPA Bldg., Bonifacio Drive, South Harbor, Port Area, Manila, which shall be open to all prospective bidders.

Bids must be duly received by the BAC Secretariat through manual submission at the office address indicated below on or before **19 October 2023 at 8:00 a.m.** Late bids shall not be accepted.

All bids must be accompanied by a bid security in any of the acceptable forms and in amount stated in ITB Clause 16.

Bid opening shall be on **19 October 2023 at 11:00 a.m.** at the 7th Floor, PPA Building, A. Bonifacio Drive, South Harbor, Port Area, Manila. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

The Philippine Ports Authority 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 the 2016 revised Implementing Rules and Regulations of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

- Required PCAB Registration: SMALL B – General Building

For further information, please refer to:

BAC Secretariat, Philippine Ports Authority
5th Floor, PPA Bldg., A. Bonifacio Drive,
South Harbor, Port Area, Manila
Telephone Nos. 8 527-47-35
8 527-83-56 to 83 loc. 539
PPA Website: www.ppa.com.ph
PhilGEPS Website: www.philgeps.gov.ph



MARK JON S. PALOMAR
Chairperson, PPA Head Office Bids and Awards
Committee for Engineering Projects (HO-BAC-EP)

SECTION II
INSTRUCTIONS TO BIDDERS

1. Scope of Bid

The Procuring Entity, **Philippine Ports Authority** Invites Bids for the **Repair of Port Operation Building including Repainting of Exterior Walls, Repair/Replacement of Aluminum Composite Panel, Covered Walk, PPA Logo, Electrical and Landscaping at Port of Lamac, Limay, Bataan** with Project Identification Number **HO-INFRA-PPDD-23-0062**.

The **Repair of Port Operation Building including Repainting of Exterior Walls, Repair/Replacement of Aluminum Composite Panel, Covered Walk, PPA Logo, Electrical and Landscaping at Port of Lamac, Limay, Bataan** is for the construction of Works, as described in Section VI (Specifications).

2. Funding Information

2.1. The **Philippine Ports Authority** through the source of funding as indicated below for **CY2023** in the amount of **₱ 24,614,193.56**.

2.2. The source of funding is:

PPA Corporate Fund.

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 not allowed.

- 7.2. 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 and/or through videoconferencing/webcasting 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) days from the date set for Bid Opening**. 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 9 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 Works which shall be:		
	Description/Clarification	Unit of Measure	Quantity (at least)
	1. Construction of Building	sq.m	768
7.1	Portion of Works allowed to be subcontracted: Subcontracting is not allowed	Maximum Percentage allowed to be subcontracted: Subcontracting is not allowed	
10.3	Required PCAB Registration: Small B – General Building		
10.4	The key personnel must meet the required minimum years of experience set below:		
	Key Personnel	General Experience	Relevant Experience (Minimum)
	a. Project Manager b. Project Engineer c. Materials Engineer II d. Construction Safety and Health Officer e. Foreman		Five (5) years Three (3) years One (1) year One (1) year Five (5) years

10.5	<i>The minimum major equipment requirements are the following:</i>
	Please refer to Section 8, Annex 3 Minimum Major Equipment Requirements
12	<i>Value Engineering Clause:</i> Not Allowed
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 ₱ 492,283.87, 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 ₱ 1,230,709.68, if bid security is in Surety Bond.
16	Each bidder shall submit one (1) original and six (6) copies of the Technical and Financial Proposals, properly labelled, book-bound, with hard cover and corresponding index tabs. Failure to comply with the requirements is a ground for the automatic disqualification of the bidder.
19.2	Partial bids: Not Allowed
20	<i>Other appropriate licenses and permits required:</i> None
21	<i>Other contract documents are as follows:</i> Construction Schedule and S-Curve, Manpower Schedule, Construction Methods, Equipment Utilization Schedule, Construction Safety and Health Program approved by the Department of Labor and Employment and PERT/CPM or other acceptable tools of project scheduling.

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	<i>Sectional Completion:</i> None
3.1	The Procuring Entity shall give possession of all parts of the Site to the Contractor upon commencement of the project.
6	<i>Site Investigation Report:</i> None
7.2	<i>Permanent structures: Fifteen (15) years</i> Buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures
10	No dayworks are applicable to the contract.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within ____ days of delivery of the Notice of Award.
11.2	The amount to be withheld for late submission of an updated Program of Work is _____.
13	The provision on advance payments or mobilization fees in the terms and conditions of all contracts/ purchase orders/ job orders for goods, services and infrastructure projects that will be signed or executed shall henceforth be excluded.
14	No further instructions.
15.1	The date by which operating and maintenance manuals are required is _____. The date by which "as built" drawings are required is _____.
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 _____.

SECTION VI
TECHNICAL SPECIFICATIONS

ITEM 01 : DEMOLITION AND REMOVAL WORKS

DESCRIPTION

The work includes the furnishing of all labor, materials and equipment required to carry out the demolition, chipping-off, and removal of old/damaged structures, port accessories and obstructions, as required for the execution of the Contract.

The Contractor shall submit the proposed methodology or procedure of demolition/removal works with detailed drawings and calculations if necessary, to the Engineer for approval, before the execution of the Works.

The Contractor shall keep all pavements and landing areas to and from the site of the disposal area clean and free of mud, dirt and debris during and after the execution of disposal. Disposal of debris and materials shall be as directed by the Engineer.

GENERAL PROVISIONS

1. The Contractor shall be deemed to have satisfied himself of the site conditions, and to have included in his unit prices provision for all risks that may arise during or in connection with the work.
2. The demolition/chipping-off/removal shall be carried out by approved methods and equipment such as electric drill, concrete breakers, gas-cutters, hydraulic jacks, compressed air disintegrators, etc., however, no blasting shall be used unless approved in writing by the Engineer and after obtaining the written permission of the concerned authorities.
3. The Contractor shall provide suitable equipment, skilled labor and appropriate temporary works such as scaffoldings to ensure safety in his demolition works as well as in the adjacent area.
4. Materials coming from the demolition/removal/chipping-off works, shall remain the property of the Procuring Entity, the designated part of which shall be stored by the Contractor at places specified by the Engineer/ Accepting authority. Receiving copy of Turn-Over Report shall be provided.

INTERFERENCE WITH PORT OPERATIONS

During the execution of the work, the Contractor shall not interfere with the shipping, navigation and other traffic in the port.

The Contractor shall make arrangements with the operations people on the schedule of demolition/removal/chipping-off and related works to keep port operation activities undisturbed at all times.

Prior to commencement of the said works, the Contractor shall inform/announce to port users the schedule of disconnection of utilities, if applicable.

STORAGE AND DUMPING

Prior to the commencement of the demolition/chipping-off/removal work, the Engineer shall submit to the Contractor a list in which all the materials to be salvaged and overhauled, as property of PPA, and the description of the location of their storage. Materials embedded in concrete units shall not be salvaged.

The Contractor shall separate materials to be salvaged from debris. Salvaged materials shall be loaded, transported and unloaded by the Contractor at the specified locations.

The Contractor may dump debris or chipped-off concrete but out of the site, which areas shall be procured and prepared at his own expense. In this case, safety measures shall be undertaken in the transporting, unloading, covering and others as requested by the Engineer.

The approximate distance of the disposal site from the project site is about five (5) kms., as designated by the PMO thru the implementing office.

EXECUTION

1. Prior to commencement of demolition/removal/chipping works, the alignments of the new construction works to existing structure shall be checked.
2. The width and alignment of portion of existing structure to be removed/chipped off shall be marked by paint.
3. With these lines as guides, concrete shall be broken/chipped off.
4. Chip off concrete, remove panels, remove structures, and the likes as determined in the field for each project and as shown on the drawings or as directed by the Engineer.
5. Materials coming from the demolition/removal/chipping works shall be determined by the Engineer for disposal or for proper turnover.

SAFETY

During the course of survey and clearing, any obstacles which are recognized and seemed to be explosive or hazardous to workers shall be removed from the site by the proper Authority.

At the end of each day's work, the Contractor shall keep the workplace in safe condition and clean so that no part is in danger of falling or creating hazard to personnel or equipment.

ITEM 02 : EPOXY INJECTION

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, wherein or not referred to herein.

SCOPE OF WORK

The work shall consist of repairing cracks in concrete structures by pressurized injection of epoxy into the cracks in accordance with these Specifications and as indicated on the Plans.

MATERIAL REQUIREMENTS

1. Epoxy Resin Adhesives

Epoxy resin adhesives shall conform to the requirements of AASHTO M 235 as to type, grade, class and color.

2. Polymer Concrete and Mortar

Polymer binder and fine aggregate shall be in the proportions to meet a minimum compressive strength of 25MPa in 4 hours.

a. Epoxy Mortar

Epoxy mortar shall conform to the requirements of ACI 503.4.

b. Other Polymer Concrete or Mortar

Other polymer concrete or mortar shall conform to the requirements of ASTM C1438, Type II – For general use.

CONSTRUCTION REQUIREMENTS

1. Crack Preparation prior to repair

The Engineer shall be notified at least 10 days prior to crack preparation. The Engineer shall identify work areas and shall mark the cracks to be repaired.

The following shall be submitted for approval three (3) days before the work commences:

- a.) Personnel qualifications;
- b.) Description of the material to be used including the properties of each material and the specifications to which the material comply.

Dirt, laitance, and other debris from the exterior and interior of the crack shall be removed. Prior to the application of the epoxy material, cracks should therefore be thoroughly cleaned and dried by either high-pressure air blasting or hot air blasting using heated lance, when warranted, to eliminate the presence of contaminants (silt, water, oil, dirt, etc.) that would be detrimental to the strength of the bond. Use of acids and other corrosive agents should not be used in cleaning cracks. Surfaces adjacent to the cracks shall likewise be cleaned. A temporary surface seal material with sufficient strength and adhesion be applied to the face of the crack to confine the injected epoxy and to keep the epoxy from leaking out before it has gelled. After the injected epoxy has cured, the temporary seal material should be removed by grinding or other appropriate means.

Openings (entry ports) shall be provided in the surface seal along the crack. The distance between entry ports shall be at least the thickness of the concrete member being repaired.

2. Injection Procedure

Epoxy injection is used in horizontal, vertical and overhead cracks where conventional methods of repair cannot penetrate and deliver the specific repair product onto the crack. When structural repair is required, the cause/s of the cracks should be determined and corrected prior to proceeding with epoxy injection. Cracks caused by corroding reinforcing steel should not be repaired by epoxy injection since continuing corrosion will cause new cracks to appear.

The epoxy resin adhesive component mix ratio shall be maintained within five percent (5%) by volume or as prescribed by the Engineer. Solvents shall not be used to thin the epoxy.

Positive inline displacement type equipment shall be used to measure, mix, and inject the epoxy at pressures not to exceed 1,380 kPa. Epoxy injection shall begin at the lowest entry port. Injection at the first port shall be continued until epoxy flows from the next highest point. The first port shall then be plugged and then inject epoxy into the second port until epoxy flows from the next highest point. This sequence shall be continued until the entire crack is filled.

The following tests shall be performed for each injection unit at the beginning and at the end of each day the unit is used.

a. Ratio Check Test

Disconnect the mixing head of the injection equipment. Pump the two adhesive components through a ratio check device having two independent valved nozzles capable of controlling the flow rate and back pressure by opening or closing the valves. Use a pressure gauge capable of sensing back pressure behind each valve. Adjust the discharge pressure to 1,380 kPa for both epoxy components. Simultaneously discharge both epoxy components into separate calibrated containers. Compare the discharged quantities to determine the mix ratio.

After the test is completed at 1,380 kPa discharge pressure, repeat the procedures for 0 kPa discharge pressure.

b. Pressure Check Test

Disconnect the mixing head of the injection equipment. Attach the two adhesive component delivery lines to a pressure check device having two independent valved nozzles capable of controlling the flow rate and pressure by opening or closing the valves. Use a pressure gauge capable of sensing the pressure build-up behind each valve. Close the valves on the pressure-check device and operate the equipment until the gauge pressure on each line reads 1,380 kPa. Stop the pumps and check that the gauge pressure does not drop below 1,310 kPa within 3 minutes.

c. Records

Complete and accurate records of the ratio and pressure check tests shall be maintained and made available. Additional ratio and pressure check tests may be required.

3. Coring

One 50mm diameter test core shall be taken according to AASHTO T 24 for every 15m of repair crack at designated locations. Crack repair shall be acceptable when the epoxy bonding has penetrated at least ninety percent (90%) of the crack volume within the core sample.

When a test core is unacceptable, redo the 15m crack segment or the segment that the core represents and resample. This procedure shall be repeated until acceptable crack repair is achieved.

4. Finishing

The surface seal shall be removed and sample core holes shall be filled with polymer concrete and mortar. The face of the crack, the entry ports, and the core holes flush with the adjacent surface shall be finished to match the adjacent concrete, of which the surface shall also be finished.

5. Acceptance

Sampling, testing and acceptance of the epoxy resin adhesives shall conform to Table 5.

Material for structural concrete injection and crack repair shall be evaluated by visual inspection and certification from a manufacturer or an effective testing and inspection system. Structural concrete injection and crack repair works shall be evaluated by visual inspection and coring.

Table 5 – Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Characteristic	Test Method Specifications	Sampling Frequency	Point of Sampling	Reporting Time
Daily Start-Up and Shutdown Testing					
Epoxy resin adhesive	Ratio check	Construction Requirements 2.a.	Daily before starting work and after ending work	Injection unit	Construction Requirements 2.c.
Epoxy resin adhesive	Pressure check	Construction Requirements 2.b.	Daily before starting work and after ending work	Injection unit	Construction Requirements 2.c.
Production					
Epoxy resin adhesive	Penetration of material into crack	Construction Requirements 3 – Coring	1 core for every 15 meters of repaired crack length	In-place after epoxy resin injection completed	Upon completion of test

ITEM 03 : CONCRETE WATERPROOFING

GENERAL

General Requirements contain provisions and requirements essential to these specifications and apply to this Section, whether or not referred to herein.

SCOPE OF WORK

The work shall cover the waterproofing requirements for building as shown on the drawings.

The work shall consist of furnishing all labor, materials, equipment and other incidentals necessary for the integral waterproofing works where required as shown on the drawings and in accordance with the requirements of these specifications as directed by the Project-in-Charge.

SUBMITTAL

1. Material description and physical properties, application details, and recommendations regarding shelf life, application procedures, and precautions on flammability and toxicity.
2. Samples for each waterproofing type.

DELIVERY AND STORAGE

Deliver manufactured waterproofing materials in manufacturer's original, unopened containers, with labels intact and legible. Containers of materials covered by referenced specification number shall bear the specification number, type, and class of the contents. Store and protect materials in accordance with the manufacturer's instructions, and use within their indicated shelf life. Promptly remove from the site materials or incomplete work adversely affected by exposure to moisture. Use pallets and canvass tarpaulins to cover stored materials top to bottom.

PRODUCTS

I. CEMENT WATERPROOFING COMPOUND

Cement Waterproofing Compound is a water-repellent powder for adding to cement to overcome capillary absorption of moisture into cement mortar, cement plaster and concrete. This is used in preventing loss of water from water containing structures, reducing moisture movement, crazing, efflorescence and moisture penetration, and for reducing rising damp in brickwork when used in the mortar. Suitable for reducing permeability in concrete tanks, reservoirs, sewerage works, cellars, basement walls and floors, garage pits, walls and precast stone.

1. Cement-base waterproofing powder mix shall be cement-base, aggregate type, heavy duty, water-proof coating for reinforced concrete surface and masonry exposed to water. The aggregates are graded and sized so as to mesh perfectly and are selected for purity, hardness, strength and are non-metallic. When mixed with other ingredients, the mix shall be a free flowing, water-proof coatings that possesses strength durability and density.
2. Additive binders shall be of special formulation of acrylic polymers and modifiers in liquid form used as additive with cement-base powder mix that improves adhesion and mechanical properties.
3. Water shall be clean, clear and potable.
4. One (1) brand or type of waterproofing material shall be used on the project.
5. Waterproofing materials shall be stored in a weather-tight enclosure to avoid moisture damage and absorption

For application: Clean all surfaces in between joints of concrete area. Apply coat of waterproofing compound to the area. Leave the applied compound to dry.

II. CARBON FIBER REINFORCED POLYMERS

Carbon fiber reinforced polymers are extremely strong and light fiber-reinforced plastics that contain carbon fibers. CFRPs can be expensive to produce, but are commonly used wherever high strength-to-weight ratio and stiffness (rigidity) are required, such as aerospace, superstructures of ships, automotive, civil engineering, sports equipment, and an increasing number of consumer and technical applications.

The binding polymer is often a thermoset resin such as epoxy, but other thermoset or thermoplastic polymers, such as polyester, vinyl ester, or nylon, are sometimes used. The properties of the final CFRP product can be affected by the type of additives introduced to the binding matrix (resin). The most common additive is silica, but other additives such as rubber and carbon nanotubes can be used.

CFRPs have become a notable material in structural engineering applications. Studied in an academic context as to their potential benefits in construction, CFRPs have also proved themselves cost-effective in a number of field applications strengthening concrete, masonry, steel, cast iron, and timber structures. Their use in industry can be either for retrofitting to strengthen an existing structure or as an alternative reinforcing (or pre-stressing) material instead of steel from the outset of a project.

For application: Clean all surfaces of walls, slabs, beams, columns, and other structures to be retrofitted. Check for any uneven surfaces and cracks for the application of concrete epoxy sealant. Apply coating of epoxy resin at the area. CFRP is then laid and to be applied with another coat of epoxy resin. Cement mix is then applied after the epoxy resin is dried.

III. BITUMINOUS MEMBRANE WATERPROOFING

Primer shall be of asphalt cold applied, free from water and other foreign matters, and shall conform to the specifications requirement defined in ASTM D 41, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

Built-up membrane shall be made of smoothly woven fibers that are impervious to acid, heat, dampness, and totting. It should permit complete penetration of asphalt compound or bituminous coating in the woven glass fiber.

Built-up membrane shall conform to the requirements of ASTM C 981M, Standard Guide for Bituminous Membrane Waterproofing Systems for Building decks.

Preformed membrane shall be self-sealing flexible cold applied bituminous sheets bonded to 0.15 mm thick polyethylene film.

Application Procedure:

1. Prior to application of membrane concrete surfaces should be sound and cured without the use of curing compound. Apply a coat of concrete neutralizer to remove oil dirt and other contaminants.
2. Apply bituminous primer at the rate of 4 liters per 9 square meters evenly by spraying or by paint brush.
3. Application shall be done in one direction strip and by overlapping each other to assure uniform thickness.
4. Allow primer to dry until it is ready to receive the next coat or layer as specified in the manufacturing instructional manual.

5. As soon as primer coating is workable, lay a single layer of preformed or built-up membrane smoothly free from irregularities and folds.
6. Lay preformed or built-up membrane conforming to the size and shape of the surface area to be covered.
7. Carefully lay side and end laps in order to assure an even thickness throughout the whole surface area to be covered.
8. When the whole surface area is completely covered, apply a single coat of bituminous primer at the rate of 11 to 15 liters per 9 square meters.
9. Meshes of treated woven glass fibers shall not be completely closed or sealed by the primer coat, but shall sufficiently open to allow successive moppings of the ply material to seep through.
10. Cover ply not more than the minimum amount of surfacing necessary to prevent sticking on ply.
11. After application, the surface shall be uniformly smooth, free from irregularities folds and knots.
12. Where weather disturbance interrupt the work and exposing the membrane to moisture, remove the layer exposed to moisture and repeat procedure until completion of the process.

Methods of Application

Trowel

Application of the coating is done using the handheld trowel, by simply applying and spreading the coating using the trowel.

Spray

This method uses spraying equipment like the ones used in painting vehicles.

Brush

Use a typical brush similar to roll brushes that are used in painting houses. It also has a uniform finish and is faster to use compared to the trowel.

It is good to note that different surfaces will dictate the method of application.

ITEM 04 : STEEL AND METAL WORKS

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, wherein or not referred to herein.

SCOPE OF WORK

The work includes the furnishing of all labor, materials, equipment and other incidentals necessary for the fabrication and installation of structural steel and miscellaneous metal works as specified in relevant items of these specifications and as indicated on the drawings.

SUBMITTAL

1. Before placing orders for materials for the steel and metal works, the Contractor shall submit to the Engineer for approval shop drawings for all steelwork. All project shop drawings shall show the dimension of all parts, method of construction, bolts, welding sectional areas and other details.
2. The detail of connections shown on the shop drawings shall be such as to minimize the formation of pockets to hold condensation, water or dirt. A minimum gap between abutting angles and the like shall be provided wherever possible to eliminate any traps and facilitate maintenance painting.
3. No materials shall be ordered nor fabrication commenced until the shop drawings are approved by the Engineer.

STORAGE OF MATERIALS

Structural materials, either plain or fabricated, shall be stored above the ground upon platforms, skids, or other supports. Materials shall be kept free from dirt, grease, and other foreign matter and shall be protected from corrosion.

MATERIAL REQUIREMENTS

1. Unless specified herein, all steel structures and metals shall conform with the requirements of "Steel and Metal Works". Connections where the details are not specified or indicated herein, shall be designed in accordance with the American Institute of Steel Construction (AISC), Manual of Steel Construction, latest edition.
2. Structural steel works consisting of channels, gusset plates and other structural steel shape shall be as indicated on the drawings and shall be structural carbon steel conforming to ASTM A 36. Shapes shall be as given in AISC, Manual of Steel Construction.
3. High strength structural bolts, shall conform to ASTM A 325, Types 1 or 2. Nuts shall conform to ASTM A 560, Grade A, heavy hex style, except nuts 38mm (1-1/2 inch) may be provided in hex style. Washers shall conform to ANSI B 18.22.1, Type B.
4. Electrodes for arc welding shall be E70 series conforming to American Welding Society Specifications A5.1.
5. Tests are required under the ASTM Standards for steel to be used in the Works and shall be carried out in the presence of the Engineer and at least four (4) days notice must be given to him, of the dates proposed for such test. Four (4) calendar days notice on which fabricated steelwork will be ready for inspection in the Contractor's yard.
6. Standard bolt shall conform to ASTM A 307 Carbon Steel Externally Threaded Standard Fasteners.

EXECUTION

QUALIFICATION

Qualification of steel fabricators, erectors and welders shall comply with the requirements.

FABRICATION REQUIREMENTS

1. Worksmanship

Fabrication shall be performed within the permissible tolerance by the approved fabricator. All worksmanship shall be of the best quality with respect to internationally recognized standards of practice.

2. Cutting

Low-carbon structural steel may be cut by machine-guide torch instead by shears or saw. Harmful notches, burns, irregularities, etc., shall not be developed at the cut surface.

3. Contact Faces

Contact surfaces between bases or other elements bearing directly upon bearing plates shall be ground or milled as necessary for full effective bearing. Edges for welding shall likewise be properly prepared.

4. Bolt Holes

Bolt holes shall be according to engineering practice and as specified in these specifications. Gas burning of holes will not be permitted.

5. High Strength of Bolt Assembly Preparation

Surfaces of high strength bolted parts in contact with bolt heads and nuts shall not have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

Where the surface of a high strength bolted part has a slope of more than 1:20, a beveled washer shall be used to compensate for lack of parallelism.

High strength bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or any other interposed compressible materials.

When assembled, all joint surfaces including those adjacent to washers shall be free of scale except tight mill scale, and shall be free from dirt, loose scale, burrs, and other defects that would prevent solid seating of parts.

6. Welding

All welding shall be done only by welders certified as to their ability to perform in accordance with accepted testing requirement.

Welding of parts shall be in accordance with structural standards and the Standard Code for Arc and Gas Welding in Building Construction of AWS, and shall only be done where shown, specified, or permitted by the Engineer.

Damage to galvanized areas by welding shall be thoroughly cleaned with wire brushing and all traces of welding flux and loose or cracked zinc coating shall be removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight. As an alternative to the above, the Contractor may submit for approval the use of a galvanizing rod or galvanizing solder to repair damaged areas.

The welding machine shall be a stable welder, and have suitable functions for the dimension of materials to be welded. The auxiliary tools used for welding shall perform sufficiently and adequately.

The welding machine used for field welding shall be of readily adjustable for electric current.

7. Shop Assembly

Structural units furnished shall be assembled in the shop. An inspection shall be made to determine that the fabrication and the matching of the component parts are correct.

Jigs shall be used for the assembly of units as much as possible to maintain appropriate position of mutual materials.

Approval of the Engineer shall be required when drilling temporary bolt holes or welding temporary support to the assembled structure.

The tolerances shall not exceed those allowed by codes and each unit assembled shall be closely checked to insure that all necessary clearances have been provided and that binding does not occur in any moving part.

In order to maintain accurate finished dimensions and shape, appropriate reverse strain or restraint shall be provided as required. Assembly and disassembly work shall be performed in the presence of the Engineer, unless waived in writing by the Engineer any errors or defects disclosed shall be immediately remedied by the Contractor.

Before disassembly for shipment, component parts of the structures shall be match marked to facilitate erection in the field.

FABRICATION TOLERANCES

1. Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape at the time of inspection. Unevenness of plate work shall not exceed the limitation of the standard mill practice as specified in the American Institute of Steel Construction, "Manual of Steel Construction".

2. Camber

Reverse camber in any structural steel members in excess of 1/1000 of the span length shall cause rejection. The minimum dead load camber for any structural steel member shall be as allowed by Code, or otherwise specified.

INSPECTION AND TEST WELDING

1. Inspection of Welding

Inspection of welding shall be executed for the following work phases.

a. Before Welding

Scum, angle of bevel, root clearance, cleaning of surface to be welded, quality of end tab, drying of welding rod.

b. During Welding

Welding procedure, diameter of coil and wire, type of flux, welding current and voltage, welding speed, welding rod position, length of arc, melting, cleaning of slag of each level under surface chapping, supervision of welding rod.

c. After Execution of Welding

Assurance of bead surface, existence of harmful defects, treatment of crater, quality of slag removal, size of fillet, dimension of extra fill of butt welding, treatment of end tab.

2. Testing of Welding

Twenty percent (20%) of welds contributing in the overall strength of the structure and which will be inaccessible for the inspection in service shall be tested.

Welding shall be tested by ultrasonic test to the extent specified herein or as directed by the Engineer.

Where partial inspection is required, the ultrasonic test shall be located at random on the welds so as to indicate typical welding quality.

If ten percent (10%) of the random ultrasonic tested indicate unacceptable defect, the remaining eighty percent (80%) of the welding shall be tested. Repair welding required shall be ultrasonic tested after the repairs are made.

CORRECTIONS

In lieu of the rejection of an entire piece or member containing welding which is unsatisfactory or which indicates inferior workmanship, corrective measures may be permitted by the Engineer whose specific approval shall be obtained for making each correction. Defective or unsound welds or base steel shall be corrected either by removing and replacing the entire weld, or as follows.

1. Excessive convexity or overlap shall be reduced by grinding.
2. Undercuts, lack of weld shall be repaired with necessary reinforcement of weld after removal of any foreign materials such as slag, dust, oil, etc.
3. Any defects such as slag inclusions, incomplete fusion, or inadequate joint penetration, shall be completely removed, cleaned and re-welded.
4. Cracks in welds or base steel, shall be removed to sound steel throughout their length and 5cm beyond each end of the crack, followed by welding. The extent of the crack, depth and length, shall be ascertained by the use of acid etching, magnetic particle inspection or other equally positive means.

The removal of welded steel shall be done by chipping, grinding, oxygen cutting, oxygen gouging, or air carbon arc gouging and in such a manner that the remaining welded steel or base steel is not nicked or undercut. Defective portions of the welding shall be removed without substantial removal of the base steel.

INSTALLATION

1. Installation Program

a. Prerequisite Condition

Prior to executing steel fabrication and field installation, the Contractor shall prepare a comprehensive installation program including engineering supervision organization, fabrication procedures, field installation, procedures, material application, machinery applications, inspection procedure, scope and standard of quality judgment, and submit to the Engineer for approval.

b. Special Technical Engineering

Special technical engineering different from contract specifications can be applied upon receiving approval of the Engineer.

2. Installation Requirement

a. Setting of Anchor Bolt and Others

- a.1. Anchor bolts shall be set in accurate position by using templates.

- a.2. The setting method shall be proposed to the Engineer for his approval before setting starts.
- a.3. The threads of bolt shall be cured with an appropriate method against rust and/or any damage before tightening.
- a.4. Non-shrink mortar shall be placed under base plates, well cured to obtain the sufficient strength before bearing loads are applied to base plates.
- b. Temporary Bracing
 - b.1. Temporary bracing shall be installed as necessary to stay assemblies and assume loads against forces due to transport, erection operations or other work.
 - b.2. Temporary bracing shall be maintained in place until permanent work is properly connected and other construction installed as necessary for support, bracing or staying of permanent work.
 - b.3. Extent and quality of temporary bracing shall be as necessary against wind and other loads, including seismic loads not less than those for which the permanent structure is designed to resist.
- c. Adequacy of Temporary Connections

During erection, temporary connection work shall be securely made by bolting and/or welding for all dead load, wind and erection stresses.
- d. Alignment

No permanent bolting or welding shall be done until the alignment of all parts with respect to each other shall be true within the respective tolerances required.
- e. Field Welding
 - e.1. Any shop paint or surfaces adjacent to joints where field welding is to be executed shall be wire brushed to remove paint/primer.
 - e.2. Field welding shall conform to the requirements specified herein, except as approved by the Engineer.
- f. High Strength Bolts

Final tightening of high strength bolts shall be done by using manufacturer's power operated equipment without any overstresses to the threads.
- g. Correction of Errors
 - g.1. Corrections of minor misfits by use of drift pins, and reaming, chipping or cutting will be permitted and shall be provided as part of erection work.
 - g.2. Any errors to be corrected or adjusted, preventing proper assembly, shall be immediately reported to the Engineer, and such corrections or adjustments shall be made as necessary and approved by the Engineer.
 - g.3. Cutting or alterations other than as approved will not be permitted.
- h. Erection
 - h.1. Erection and installation shall be as per approved shop drawings.
 - h.2. Each structural unit shall be accurately aligned by the use of steel shims, or other approved methods so that no binding in any moving parts or distortion of any members occurs before it is finally fastened in place.

h.3. Operations, procedures of erection and bracing shall not cause any damage to works previously placed nor make overstress to any of the building parts or components. Damage caused by such operations shall be repaired as directed by the Engineer at no extra cost to the Employer.

GALVANIZING

PREPARATION

All mild steel parts exposed to weather shall be hot-dipped galvanized after fabrication in accordance with the requirements of ASTM A 153. Prior to galvanizing, the surfaces shall be cleaned of dirt, weld splatter, grease, slag, oil, paint or other deleterious matters. The steel surfaces shall be chemically descaled and cleaned with the same abrasive blast or other suitable method as approved by the Engineer.

ITEM 05 : ELECTRICAL WORKS

GENERAL

General Requirements contain provisions and requirements essential to these specifications and apply to this Section, whether or not referred to herein.

SCOPE OF WORK

The work shall consist of furnishing all labor, materials, equipment and other incidentals necessary for the supply and installation of electrical works as shown on the drawings and in accordance with the requirements of these specifications as directed by the Project-in-Charge.

All exposed metal surfaces, except metal surfaces embedded in concrete, shall be painted unless otherwise specified.

STANDARD

The following publications listed below, but referred to thereafter by basic designation only, forms a part of these Specifications to the extent indicated by the reference thereto:

MATERIAL REQUIREMENTS

WIRE AND POWER CABLE

1. General

Provide wire and cables with a minimum rating of 600 volts, except for wire used in 50 volts or below applications. For control or signal systems use 300 volt minimum or 600 volt where permitted to be incorporated with other wiring systems. All wires and cables shall be color coded or as required.

2. Conductors

Electrical grade, annealed copper, tinned if rubber insulated, and fabricated in accordance with ASTM standards.

3. Stranding and Number of Conductors

a. 3.5mm² and below shall be solid.

b. Cables larger than number 5.5mm² shall be stranded and in accordance with ASTM Class B stranding designations.

c. Control wires stranded in accordance with ASTM Class B stranding designations.

d. Cables, multi-conductor unless otherwise noted for low tensions systems.

4. Insulated Single Conductors

a. Type THWN - Thermoplastic insulation suitable for use in wet locations up to 75°C

b. Type THHN - Flame Retardant : Heat-resistant thermoplastic insulation, nylon jacket
rated for 90°C operation

5. Multi-Core or Single-Core Insulated Power Cable

a. Sizes as shown on Drawings

b. Suitable for direct burial, duct, open air or conduit installation

c. Temperature Rating: 90°C Dry / 75°C Wet

d. Three uninsulated ground wires for three conductor cables and two uninsulated ground wires for four conductor cables in cable interstices with conductivity of approximately one-half that of one phase conductor.

e. Cross-Linked Polyethylene Conductor Insulation: Insulation thickness satisfying requirements of ICEA Pub. No. S-66-524 (NEMA WC 7), Table 4-5

f. Shielding: shielding requirements must satisfy I.E.C. 60502 for each operating voltage

g. Overall polyvinyl chloride jacket satisfying requirements of ICEA Pub. No. S-66-524 (NEMA WC 7), Table 4-5.

6. Multi-Conductor Control and Supervisory Control Cables

a. Size AWG No. 16 (1.6mm²)

b. Suitable for direct burial, open air, duct or conduit installation

c. Temperature Rating: 75°C Wet or Dry

d. Uninsulated ground wire

e. PVC or cross-linked polyethylene conductor insulation; thickness satisfying requirements of ICEA Pub. No. S-66-524 (NEMA WC 7), Table 3-1, for cross-linked thermosetting polyethylene insulated conductors or ICEA Pub. S-61-402 (NEMA WC 5), for polyvinyl chloride insulated conductors.

f. Flame retardant overall polyvinyl jacket satisfying requirements of ICEA Pub. S-61-402 (NEMA WC 5), Table 7.4-2 or ICEA Pub. S-55-524 (NEMA WC 7), Table 4-5

g. Individual conductors bound together with overall binder tape prior to jacket application

h. Individual conductors rating of 300 volts (instead of 600 volts) for cables designated Supervisory Control Cable

- i. Factory color coded in accordance with Table 5-1, Part 5 of ICEA Pub. S-61-402 (NEMA WC 5)
- j. Fire rated cable shall have fire retardant insulation, halogen free and low smoke when exposed to fire. Fire resistance rating shall be three (3) hours.

CONNECTORS

1. 5.5mm²

a. Hand-Applied:

- 1) Coiled tapered, spring wound devices with a conducting corrosion-resistant coating over the spring steel and a plastic cover and skirt providing full insulation for splice and wired ends. Screw connector on by hand.

b. Tool-Applied:

- 1) Steel cap, with conduction and corrosion resistant metallic plating, open at both ends, fitted around the twisted ends of the wire and compressed or crimped by means of a special die designed for the purpose. Specifically fitted plastic or rubber insulating cover wrap over each connector.
- 2) Hydraulic tool of same manufacturer as lug which shall emboss on the connector the proper die number inspection.
- 3) Anti-oxide inhibitor for aluminum terminations.

ELECTRICAL TAPE

Specifically designed for use as insulating tape.

LIGHTING FIXTURES

A. Description

Provide Lighting Fixtures including accessories in accordance with the Contract Documents.

B. Work Included

- 1. Vertical Downlight Recessed Mounted Type Without Glass Cover 5" dia. Lamp Holder with LED Bulb 12Watts, warm white 220V
- 2. Vertical Downlight Recessed Mounted Type Without Glass Cover 5" dia. Lamp Holder with LED Bulb 12Watts, daylight 220V
- 3. Vertical Downlight Recessed Mounted Type Without Glass Cover (black color) 5" dia. Lamp Holder with LED Bulb 12Watts, warm white 220V

C. Submittals

1. Shop Drawings

- a. Submit complete shop drawings showing main devices showing the specifications and rating of the electrical components.

2. Product Data

- a. Submit manufacturer's catalog data for all circuit breakers.

D. Quality Assurance

- 1. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions.**

ITEM 06 a : FINISHES

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, wherein or not referred to herein.

SCOPE OF WORK

The work includes the furnishing of all labor, materials, equipment and other incidentals necessary for the finishes as specified in relevant items of these specifications and as indicated on the drawings.

MATERIAL REQUIREMENTS

1. Interior Ceiling

- a. C1 – 12mm thick fiber cement board, painted finish, on 0.40mm thick galvanized steel ceiling suspension system at 0.40 meter on center (furring), 0.60 meter on center (carrying channel), and 1.20 meters on center both ways (suspension rod) or approved equivalent.

a.1. VIP Rooms

Location is shown in the plan.

- b. C2 – 0.60mm x 0.60mm x 19mm thick mineral fibre acoustical lay-in panel with laminated marine plywood at the center for aesthetic purposes:

b.1. Conference Rooms

Location is shown in the plan.

- c. C3 – 600mm x 600mm x 0.70mm thick aluminum clipped-in perforated panels, bone white or approved equivalent.

2. Exterior Ceiling

- a. Ceiling Eaves – 0.60 mm thick ceiling eaves spandrel to be laid on 0.40mm thick galvanized steel ceiling suspension system at 0.40 meter on center (furring), 0.60 meter on center (carrying channel), and 1.20 meters on center both ways (suspension rod) or approved equivalent.

3. Interior Walls

- a. Partition – 12mm thick fiber cement board on at least Ga. 25 thick uncoated metal galvanized C-shaped studs framing.

Locations are shown in the plans and elevation.

Stud: 76mm (3 inches)

3.00 meter length

Track: 76mm (3 inches)

3.00 meter length

Board: 1.20 x 2.40 x 12 mm fiber cement

SUBMITTAL

1. Shop drawings for all finishing and painting works for the building shall be submitted in advance to allow twenty eight days for review and approval. Shop drawings shall indicate the materials and details of finishing works. The Contractor shall be responsible for all errors of detailing and fabrication, and for the correct finishing work items on the shop drawings.
2. The Contractor, before placing order for the finishing materials shall submit to the Engineer for approval representative samples of finishing materials. No placing of orders for material for finishing works shall be made without his approval.
3. Samples of all walls finishes, measuring not less than 1000mm x 1000mm shall be submitted to the Engineer for approval as to its finish texture and workmanship.
 - a. Shall be sound material with uniform and favorable working qualities and with very limited natural faults.
 - b. Color, veining, and quality shall be approved by Engineer.
 - c. Veining shall run vertically on all vertical surfaces and direction of veining shall continue in same directions over horizontal surfaces except as directed by the Engineer.
 - d. Sealer
 - d.1. Shall be a commercial penetrating type free from harmful alkali or acid content
 - d.2. Shall have a Ph factor between 7 and 9
 - d.3. Shall not discolor
 - d.4. Shall produce a slip resistant surface
 - d.5. Shall have a flash point not less than 35°C
 - e. Cleaning fluid
 - e.1. Shall be commercial neutral liquid type especially prepared for marble work
 - e.2. Shall have a Ph factor between 7 and 9
 - e.3. Shall be free from crystalizing salts or water soluble alkaline salts
 - e.4. Shall be biodegradable and phosphate free

INSTALLATION OF DOORS / GLASS PANELS

1. Surface preparation

Ensure surfaces to receive panels are structurally sound, even, smooth, clean, dry, and free from defects detrimental to work.

DOORS

D-1 – flushed panel door (0.80m x 2.10m)

INSTALLATION OF WINDOWS

1. Surface preparation

Ensure surfaces to receive panels are structurally sound, even, smooth, clean, dry, and free from defects detrimental to work.

WINDOWS

W-1 – 6mm thick reflected awning glass window with fixed glass in aluminum powder coated window framing

W-2 – 6mm thick reflected fixed glass in aluminum powder coated window framing

W-3 – sliding window in aluminum powder coated framing with 6mm thick reflective glass (1.60m x 2.10m)

Mirror Glass

Mirror glass shall be of high quality float glass free from imperfections and impurities, 6.3 mm (1/4 inch) thick. Silvering shall be performed by modern continuous operation under controlled conditions. The coating shall be of pure silver and of adequate thickness to provide reflectivity of 83% of incident light, and shall be without pinholes or other defects visible to the naked eye.

Refer to plans for locations, dimensions and details (pages 7 to 8).

ITEM 06 b : ALUMINUM COMPOSITE PANEL

I. INTRODUCTION

MATERIAL COMPOSITION

Aluminum Composite Panel (ACP) is a lightweight durable panel made of laminated aluminum and polyethylene core compound, coated with an advanced fluorocarbon pain Polyvinylidene Flouride (PVDF) to ensure the excellent durability of the surface finish. It is an excellent material for exterior and interior cladding of new building construction as well as retrofit applications. It also has a high degree of levelness top reserve the fine architectural design and can be roller bended to suit various design shapes. The laminated structure of ACP ensures exceptional strength of the panel.

THICKNESS: 3mm (Polyester) 4 to 6mm PVDF/+Nano

CHARACTERISTICS

1. Flatness – as the composite material is rigid, the flat surface can be preserved. This is considered a major advantage of ACP.
2. Fire Resistance – ACP are laminated at temperatures from 200° to 250° to bond aluminum sheets to the polyethylene core. The non-flammable aluminum cover sheets protect the plastic core.
3. Light Weight – as the weight is less than 1/2 to 1/3 of the weight of porcelain enamel, iron, copper, stainless and other metal panels, consequently it can reduce the weight of the building.
4. Durability – ACP is highly resistant to chemical corrosion due to the PVDF coating. The composite material is rigid, resistant to blows, breakage, and pressure and has high bending and breaking strength.

SPECIFICATION

- I. Aluminum Composite Panel (ACP) must be composed of density polyethylene core sandwiched between two sheets of aluminum,
- II. It must be strong, lightweight approximately 5.5kg/sqm. But must be exceptionally flat.
- III. The ACP composition
 - Two sheets of aluminum
 - Front side aluminum roll coated with polyvinylidene fluoride (PVDF) according to AAMA605.2 requirements.
- IV. PVDF coating finish adhere to the following standards:

Testing Item	Standard	Result
Finished coat thickness	ISO 2360 (CNS 8406)	27.6m
Gloss	ASTM D532-89	20 – 45 %
Pencil hardness	ASTM D3363-00	2H
Toughness	ASTM D4145-83	2T no rift
Adhesive force	ASTM 3359-97	4B

Impact resistance	ASTM D2794-93	>100 kg. cm.
Abrasion resistance	ASTM D968-93	64.6 L/mil
Mortar resistance	ASTM 605.2-90	24 Hrs. pat test exceed
Humidity resistance	ASTM D714-97	3000 hr no blister
	ASTM D2247-02	
Boiling water resistance	ASTM D3359-B	Passed
Salt spray resistance	ASTM D117-03	3000 hr no blister
Acid resistance	ASTM D1308-87	No effect
	AAMA 605.2-91, TEST #7, 7.31	
Alkali resistance	ASTM D1308-87	Passed
Solvent resistance	ASTM D2248-73	Passed
	ECCAT T5 & NCCA No. 11-18	
Color retention	ASTM D2244-93	$\Delta E = 0.34$
Chalk resistance	ASTM D4214-98	No chalking
Gloss retention	ASTM D2244-93	84.2%

- V. Total thickness must be 4.0mm minimum (standard)
- VI. Framing must also be made of aluminum to prevent corrosion of the panels.
- VII. Aluminum composite panel supplier must be the same company that will install the framing and will fabricate and install all panels. This is to insure optimum workmanship. All labor and installation must have a warranty of not less than one year.

II. SUBMITTALS

A. PRODUCT DATA

Manufacturer's printed product literature, specifications, and data sheets.

B. SHOP DRAWINGS

1. Indicate project layout and elevations; dimensions and thickness of panels; connections; details and locations of joints and sealant; methods of anchorage; number of anchors; supports; reinforcement; flashings; accessories; materials; and finishes.
2. Indicate proposed joint details providing watertight and structurally sound panel system that allows no uncontrolled water penetration on inside face of panel system as determined by ASTM E331.

C. SAMPLES

1. Sample of panel system materials for selection and verification of finishes, colors, and sealant colors.
2. Sample of panel assembly.

D. TEST REPORTS (as requested)

Certified test reports for ACP from approved independent testing laboratories indicating compliance with specifications for specified performance, characteristics, and physical properties.

III. QUALITY ASSURANCE

- A. Fabricator / installer to be accepted by the manufacturer.
- B. Fabricator / installer to have work similar in scope and size to this project.
- C. Take field measurements prior to completion of shop fabrication. Coordinate fabrication schedule with construction progress to avoid delay of work. Field fabrication should be

allowed to ensure proper fit and keep it to minimum with majority of fabrication being done under controlled shop conditions.

- D. Maximum deviation from vertical and horizontal alignment of erected panels should be made.
- E. Assume responsibility for components of exterior panel system including, but not limited to, attachment to sub-construction, panel-to-panel joinery, panel-to-dissimilar-material joinery, and joint seal associated with panel system.

IV. DELIVERY, STORAGE AND HANDLING

- A. Cover exposed surfaces with pressure-sensitive heavy protection paper or apply strippable plastic coating, before shipping to the job site.
- B. Leave protective covering in place until final cleaning of building.
- C. Deliver materials in (manufacturer's) original sealed packaging.
- D. Store panels and accessories in a dry, secure location and protect from weather.
- E. Protect finish and edges of panel.

V. LOADING AND UNLOADING

- A. Panels must be handled carefully to prevent damage
- B. Panels may buckle if they are not properly supported.
- C. A forklift may be used for panels up to 10 feet (3 meters long). However, some means of supporting the panel load over a longer distance from the forks may be used.

VI. PREPARATION

Ensure surfaces to receive panels are structurally sound, even, smooth, clean, dry, and free from defects detrimental to work. Notify consultant thru writing of conditions unfavorable to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

VII. SUBFRAMING INSTALLATION

Layout the location of the aluminum tube at every termination or as required in the approved shop drawing.

Drill the wall where the expansion bolt is to be placed and fix the angle bracket to the wall by securing it firmly with the expansion bolt.

Connect the aluminum tube to the expansion bolt by waferteks

VIII. FABRICATION AND INSTALLATION

Layout the dimension of the panel as per approved termination based on actual measurements and as per approval of the Engineer.

Cut the panel sizes using cutting machine.

Finally, install the produced panel to the aluminum tube by waferteks.

IX. SEALANT APPLICATION

After the panel is put into place, peel off the protective film at the edges of the panel.

Fill in the gap with the backer rod. Wipe the edges of the panel by rags. Cover the edges of the panel with masking tape. Apply the sealant of approved color.

As soon as the application of sealant is finished, carefully remove the masking tape and wipe off excess sealant on the panel.

X. ACCESSORIES

- A. Extrusions, formed members, sheet, and plate are in accordance with ASTM B209 and recommendations of Manufacturers.
- B. Panel stiffeners are structurally fastened or restrained at ends and secured to rear face of ACP with double-sided tape of sufficient size and strength to maintain panel flatness.
- C. Sealant within panel system to conform with Manufacturer's standards to meet performance requirements.
- D. Fasteners are not exposed except where unavoidable.

Aluminum Composite Panel Color / Thickness / Location

Parapet Wall	-	Metallic Light Blue; 4mm thick ACP (As shown on Plans)
Exit stairs	-	Metallic Light Gray; 4mm thick ACP (As shown on Plans)

Details are shown on the plans.

ITEM 06 c : POLYCARBONATE

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, whether or not referred to herein.

DESCRIPTION

This item shall consist of furnishing all polycarbonate materials, tools and equipment, plant including labor required in undertaking the proper installation, complete as shown on the Plans and in accordance with this Specification.

Polycarbonate sheets/panels can be used for stage backdrops, wall partitions, skylight roofing, canopies, car garage, and walkways.

MATERIAL REQUIREMENTS

A. Exit Stairs Canopy

1. **Polycarbonate sheets** – 4.5 mm thick solid polycarbonate sheet that is uniform in color

Solid panels shall consist of a polycarbonate resin with a permanent co-formulated ultraviolet (UV) protective additive. Polycarbonate sheet/panel thickness shall correspond to the relative span available locally and shall be subjected to the approval of the Architect/Engineer.

2. **Framing** – 37mm diameter stainless steel pipe framing

All sections shall be formed true to detail and free from defects impairing appearance, strength or durability.

3. **Fasteners** – for angular bars: expansion bolts; for wall: galvanized expansion shield anchor bolt

When exposed, fasteners shall be stainless steel, 300 Series, with stainless steel backed neoprene washers. Concealed fasteners may be stainless or zinc-plated steel in accordance with ASTM Specifications A165-55 or A164-55.

Fastening hardware shall be of screws that are compatible with polycarbonate sheeting. Bolts, anchors and other fastening devices shall be as required for the strength of the connections and shall be suitable for conditions encountered. Washers shall be of the same metals as fasteners.

4. **Flashing** – minimum 0.040 thick aluminum [painted finish: 3105-H14] [anodized finish: 5005-H34]

Use the appropriate flashings. Ideally, a metal flashing should be used since these do not interfere with the thermal movement of the sheet. The finish on this metal shall match as closely as possible that which is on the framing members.

5. **Sealant** – Silicone Sealant

6. **Attachment**

- a. System shall be fastened to substrate with fasteners that are designed and installed by the installer.
- b. Any shims or appurtenances required to facilitate system mounting and isolation shall be provided and installed by the installer.

B. Covered Walk Canopy

1. **Polycarbonate sheets** – 6 mm thick solid polycarbonate sheet that is uniform in color

Solid panels shall consist of a polycarbonate resin with a permanent co-formulated ultraviolet (UV) protective additive. Polycarbonate sheet/panel thickness shall correspond to the relative span available locally and shall be subjected to the approval of the Architect/Engineer.

2. Framing – 2" x 4" rectangular hollow section

All sections shall be formed true to detail and free from defects impairing appearance, strength or durability.

3. Fasteners – for angular bars fastened to wall: expansion bolts; for support: turn buckle with 16mm tension rod support

When exposed, fasteners shall be stainless steel, 300 Series, with stainless steel backed neoprene washers. Concealed fasteners may be stainless or zinc-plated steel in accordance with ASTM Specifications A165-55 or A164-55.

Fastening hardware shall be of screws that are compatible with polycarbonate sheeting. Bolts, anchors and other fastening devices shall be as required for the strength of the connections and shall be suitable for conditions encountered. Washers shall be of the same metals as fasteners.

4. Flashing – aluminum PCS profile cap (see Page 13 of Plans)

Use the appropriate flashings. Ideally, a metal flashing should be used since these do not interfere with the thermal movement of the sheet.

5. Sealant – Rubber Sealant

6. Attachment

- a. System shall be fastened to substrate with fasteners that are designed and installed by the installer.
- b. Any shims or appurtenances required to facilitate system mounting and isolation shall be provided and installed by the installer.

FABRICATION AND WORKMANSHIP

Carefully and accurately design, fabricate and assemble work with proper provision for thermal contraction and expansion. Work shall conform to profiles and sections noted on the shop drawings. Work shall be assembled with joints in a neat and finished manner.

EXECUTION

A. EXAMINATION

- a. All submitted opening sizes, dimensions and tolerances are to be field verified by the installer unless otherwise stipulated.
- b. Installer to examine site conditions to verify readiness. Notify general contractor or owner about any defects requiring correction, including but not limited to improperly sloping sill substrates and uneven planar substrates. Do not work until conditions are satisfactory.

B. INSTALLATION

- a. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners and hardware for material attachments as specified.
- b. Use methods of attachment to structure which include provisions for thermal movement.

- c. Polycarbonate sheets shall be installed in accordance with panel and system manufacturer's guidelines.
- d. Remove all protective coverings on polycarbonate panels during or immediately after installation.
- e. Protect contact points between unprotected dissimilar metals (except stainless steel) using continuous separators of FRP, PVC tape (or approved equal)

C. CLEANING AND PROTECTION

- a. During installation, protect exposed surfaces against accumulation of paint, caulking, disfiguration and damage.
- b. Follow panel manufacturer instructions when cleaning exposed panel surfaces. Clean polycarbonate and frame at time of installation.
- c. Follow panel manufacturer's guidelines when removing foreign substances from panel surfaces. Use only solvents that are deemed acceptable for use.
- d. Before final acceptance, repair and/or replace any defective materials or work.

ITEM 06 d : SUPPLY AND INSTALLATION OF PHOTOLUMINESCENT SIGNS AND MARKINGS

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, wherein or not referred to herein.

SCOPE OF WORK

The work includes the furnishing of all labor, materials and equipment necessary to undertake, complete supply and installation of photoluminescent signs and markers for the buildings as indicated on the drawings and as specified herein.

PHOTOLUMINESCENT SIGNS AND PATH MARKERS

Signs and markers are designed to be used in and about buildings to identify and ensure visibility escape routes for compliance with the performance based on Codes (Building & Fire Codes). The signs will be clearly visible and readily understandable under all conditions of foreseeable use, including emergency conditions.

SUBMITTAL

1. Shop drawings shall be submitted in advance to allow twenty eight days for review and approval. Shop drawings shall indicate materials and details of finishing works. The Contractor shall be responsible for all errors of detailing and fabrication, and for the correct finishing work items shown on the shop drawings.
2. The Contractor, before placing order for the finishing materials shall submit to the Project-in-Charge for approval representative samples of finishing materials. No placing of orders for material for finishing works shall be made without approval.

MATERIALS

Running Man Double Arrow/Arrow Up/Left/Right Pictogram (392mm x 223mm)
Fire Extinguisher Sign
Directional Arrow Straight/Diagonal
Guidance Strip
Exit Signage
Emergency Exit Signage

EXECUTION

INSTALLATION

For versatility the signs and markers can be installed using fixers (screws) or adhesive tape.

The installation method used should be determined by the condition of installation. Surface screws should be used if there is any doubt about adhesion.

ITEM 06 e : SIGNAGES AND LOGO

GENERAL

General Requirements contain provisions and requirements essential to these Specifications; and apply to this section, wherein or not referred to herein.

SCOPE OF WORK

Furnish materials and perform labor to include miscellaneous works required for the installation of room identification for the toilets and port office.

SAMPLE AND SHOP DRAWINGS

The Contractor shall submit samples for approval by the Architect. Notify the Architect for any changes, clarifications, and discrepancies.

For the room I.D. full size lettering layout and installation method shall be submitted to Architect for approval before start of work.

MATERIAL REQUIREMENTS

1. PPA LOGO

- 12.5mm thk. Colored Acrylic Plastic Sheet with Built-up LED Lighting for PPA Logo (2 units)

2. PORT OF LAMAO AND PORT OPERATIONS BUILDING SIGNAGE

- 12.5mm thk. Colored Acrylic Plastic Sheet with Built-up LED Lighting for "PORT OF LAMAO" signage (2 units)
- 12.5mm thk. Colored Acrylic Plastic Sheet with Built-up LED Lighting for "PORT OPERATIONS BUILDING" signage (1 unit)

EXECUTION

WORKMANSHIP

Workmanship shall be executed in high quality comparable with artworks.

MOUNTING

For all mounted assemblies, appropriate mounting hardware and connectors which are concealed shall be sufficiently used.

Assemblies shall be mounted plumb, straight, level, and at prescribed heights.

INSTALLATION

Installation shall be done in a secure and permanent manner at prescribed heights and/or layout. The backwall shall not be mutilated. After the dowels are positioned, fill with expanding frou, or other approved fillers, and retouch, flashed to the backwall surface.

ITEM 07 : MASONRY WORKS

GENERAL

General Requirements contain provisions and requirements essential to these specifications and apply to this Section, whether or not referred to herein.

SCOPE OF WORK

This Section includes furnishing all labor, materials, equipment and other incidentals necessary as shown on the drawings and in accordance with the requirements of these specifications as directed by the Project-in-Charge. The works shall include but not necessarily be limited to the following:

1. Supply and installation of concrete hollow block (CHB) for walls, concrete tables, chairs, and other related masonry product with reinforcement
2. Plastering
3. Installing temporary works like scaffolding, platforms, steps, etc.

GENERAL PROVISIONS

The following publications of the issues below, but referred to thereafter by basic designation only, forms a part of these Specifications to the extent indicated by the reference thereto:

American Society for Testing and Materials (ASTM) Publications:

A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 33	Concrete Aggregates
C 129	Specification for Non-Load Bearing Concrete Masonry Units C
144	Specification for Aggregate for Masonry Mortar
C 270	Mortar for Unit Masonry

MATERIAL REQUIREMENTS

Materials shall conform to the respective specifications and other requirements specified below.

CONCRETE HOLLOW BLOCKS (CHB)

CHB shall be of standard manufacture, machine vibrated with fine and even texture and well-defined edges and conforming with the requirements of ASTM C 129. Unless otherwise specified on the Drawings, it shall have a minimum compressive strength of 4.14 MPa (600 psi). CHB shall be non-load bearing uniform and essentially smooth as normally achieves by standard molding methods and shall be free from any cracks, flaws or other defects.

BEDDING MORTAR

Mortar shall be composed of 1 part of Portland cement, 3 parts of sand and ½ part of lime. It shall have a compressive strength of [14 MPa (2000 psi)] at 28 days and shall comply with property specifications for type N mortar set forth in ASTM Specification C 270 and as modified herein, proportioned and tested in an approved laboratory at the expense of the Contractor. When tested for water retention, the mortar shall have a flow after suction, of 74 percent or more when mixed to an initial flow of 125 to 140

percent. When tested for compressive strength, mortar shall be mixed to a flow of 100 to 115 percent. Aggregate for mortar shall conform to ASTM C 144.

PLASTER

Plaster shall comply with the same specification as those for bedding mortar and will include the use of synthetic fibrous reinforcement of type and dosage recommended by the manufacturer.

REINFORCING STEEL BARS AND RODS

Minimum yield strength of reinforcement shall conform with the specifications in Section of Reinforced Concrete.

SAMPLES AND TESTING

1. The following shall be submitted for approval and in addition, representative samples shall be taken periodically from on-the-site stockpiles as required for testing or checking during the progress of the work.

Anchors and ties	:	Two of each type proposed for use
Concrete Hollow Blocks	:	Shapes, sizes and kinds in sufficient numbers to show full range of quality and texture.
2. Sampling and testing, unless otherwise specified, shall be performed by an approved independent commercial testing laboratory at the expense of the Contractor. Certified copies of laboratory test reports, including all test data, shall be submitted at least 10 days before delivery of the units or mortar materials represented by the tests to the project site.
3. Mortar shall be laboratory-proportioned and tested. Certified copies of approved laboratory-established proportions shall be submitted with the required test reports and test data. Approved laboratory-established proportions shall not be changed and materials with different physical or chemical characteristics shall not be used in mortar for the work unless additional evidence is furnished that the mortar meets the specified requirements.

EXECUTION

1. GENERAL

No unit having a film of water on its surface shall be laid. Masonry shall be laid plumb, true to line, with level courses accurately spaced. Bond pattern shall be kept plumb throughout. Corners and reveals shall be plumb and true. Vertical joints shall be shoved tight. Each unit shall be adjusted to final position while mortar is still soft and plastic. Any unit that is disturbed after mortar has stiffened shall be removed and relaid with fresh mortar. Courses shall be so spaced that backing masonry will level off, flush with the face work at all joints where ties occur. Chases and rake-out joints shall be kept free from mortar or other debris.

2. Anchorage to concrete. Anchorage to abutting columns shall be provided only where indicated. Details shall be as indicated including anchorage to underside of beams and slabs.
3. Cutting and fitting, including that required to accommodate the work of others shall be done by masonry mechanics. Wherever possible, full units of the proper size shall be used in lieu of cut units. Cut edges shall be clean, true and sharp. Openings shall be carefully cut, formed or otherwise neatly made for recessed items and for electrical, plumbing, or other mechanical installations so that wall plates, cover plates, or escutcheons required by the installation will completely conceal the openings and will have bottoms in alignment with lower edge of masonry joints. Webs of hollow masonry units shall be cut to the minimum required for the installation. Reinforced masonry lintels shall be provided as indicated above openings over 300mm wide, for pipes, ducts and cable trays, unless steel sleeves are used.

4. Embedded Items

Spaces around built-in items shall be filled with mortar. Openings around flush-mounted electrical outlet boxes in wet locations shall be pointed flush with mortar including flush joints above the boxes. Anchors, ties, accessories, flashing, pipe sleeves and other items required to be built-in shall be built-in as the masonry work progresses. Anchors, ties, and joint reinforcement shall be fully embedded in mortar.

5. Unfinished work shall be stepped back for jointing with new work. Toothing may be resorted to only when specifically approved. Before laying new work, loose mortar shall be removed and exposed joint shall be thoroughly cleaned.

6. Protection

Surfaces of masonry not being worked on shall be properly protected at all times. At the end of each workday period and when rain is imminent, the top of exposed masonry shall be covered with a strong non-staining waterproof membrane well secured in place and in a manner that will prevent moisture. Adequate provisions shall be made during construction to prevent damages by wind.

7. Mortar

Materials shall be accurately measured in laboratory-established proportions and mixed with as much water as may be necessary to produce the wettest workable consistency possible. Mortar shall be placed in final position within one hour after mixing. Mortar not used or that has started to set within this time interval shall be discarded.

8. Jointing

Joints in exposed-to-view except control joints, joints to be pointed or caulked or sealed, and openings around flush-mounted electrical outlet boxes in wet locations shall be tooled slightly concave with the mortar thoroughly compacted and pressed against the edges of the units. Tooling shall be done when the mortar has been thumbprint hard. The tooled joint shall be finished to uniformly straight and true lines and surfaces, smooth and free of tool marks.

9. Placing Reinforcing Steel

Prior to placing grout, all reinforcement shall be cleaned of loose, flaky rust, scale, grease, mortar, grout or other coating which might destroy or reduce its bond with grout. Details of reinforcement shall be as indicated in the drawings. Reinforcing shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on the drawings shall not be used. Placement of reinforcement shall be inspected and approved prior to placing grout. One piece vertical bars extending from floor to roof above shall be provided. Vertical bars shall be spliced only where indicated.

a. Positioning Bars

Vertical bars shall be positioned accurately at the centerline of the wall. A minimum clearance between the bars and masonry units of 12mm and between parallel bars of one diameter of the reinforcement shall be maintained. Vertical reinforcing shall be held in place using metal supports, centering clips, spacers, ties or caging devices located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement.

b. Splices

Splices shall be located only as indicated. Splices shall be staggered in adjacent bars at least 600mm. Bars shall be lapped a minimum of 40 diameters of the reinforcement.

PAINTING AND CLEANING

Mortar daubs or splashing, before setting or hardening, shall be completely removed from masonry unit surfaces that will be exposed or painted. Before completion of the work, all defects in joints or masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Masonry surfaces shall not be cleaned, other than removing excess surface mortar until

mortar in joints has hardened. Masonry hardened surfaces shall be left clean, free of mortar daubs, dirt, stain and discoloration, including scum from cleaning operations and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

ITEM 08 : PAINTING WORKS

GENERAL

General Requirements contain provisions and requirements essential to these specifications and apply to this Section, whether or not referred to herein.

SCOPE OF WORK

This Section covers the surface preparation, coating materials and application of coating systems required for the Works.

The work shall consist of furnishing all labor, materials, equipment and other incidentals necessary for the supply of painting materials and the complete painting of surfaces as shown on the drawings and in accordance with the requirements of these specifications as directed by the Project-in-Charge.

All exposed metal surfaces, except metal surfaces embedded in concrete, shall be painted unless otherwise specified.

STANDARD

The following publications listed below, but referred to thereafter by basic designation only, forms a part of these Specifications to the extent indicated by the reference thereto:

Steel Structures Painting Council (SSPC) U.S. Specification JIS K 5628 Red-lead Zinc Chromate Anti-Corrosive Paint

SUBMITTAL

1. The Contractor shall submit work method statements with lists of materials to the Project-in-Charge for approval twenty eight (28) days before the starting of works. This statement shall include the following items:
 - a. Type of paint and manufacturer
 - b. Manufacturer's specifications
 - c. Storage and delivery of materials
 - d. Surface preparation
 - e. Finish painting and drying
 - f. Touch-up painting, if any
 - g. Equipment
2. The Contractor, before placing order for the painting materials, shall submit to the Project-in-Charge for approval samples of materials. No placing of orders for material shall be made without his approval.

STORAGE AND DELIVERY

1. The Contractor shall deliver all material to the site in the original labeled sealed cans and containers, with labels intact and seal unbroken.
 - a. Seals shall remain unbroken until after inspection and acceptance of material by the Project-in-Charge.
 - b. The Contractor shall deliver materials in ample quantities sufficiently in advance of the need to avoid any delay or interruptions in the works.
2. Paint in thinner shall be stored in accordance with the approved manufacturer's instructions.

- a. All regulations required for storage of paint shall be observed and all necessary safety signs required by governing codes shall be posted.
- b. Any damage caused by failure to exercise proper precautions in paint storage shall be repaired.

MATERIAL REQUIREMENTS

PAINT

Paint for the protective coating system shall be the product of a manufacturer approved by the Project-in-Charge.

Paints for exterior finish must be with tile like durability and elegance, fast drying, solvent based acrylic, highly suitable for coastal or polluted areas with excellent anti-fungal properties and alkali resistance.

100% Acrylic, water based, quick-drying, easy to clean-up and environmentally friendly, resist dirt, stains, alkali, water, humidity, algae. Mold, and mildew growth and highly durable paint for interior finish.

An all-purpose synthetic quick dry paint for all types of wood and metal surfaces. It has high gloss, good color retention and outstanding durability.

For pipes, valves and equipment, galvanized and ungalvanized ferrous metal, use a 100% acrylic gloss paint, has excellent resistance to ultraviolet rays and resists chalking, cracking and color fading, dries fast and environmentally friendly.

SCHEDULE OF PAINTING

Architectural Items	
a. Exterior Finishes	
1. On concrete walls	
Three coats, concrete masonry paint	Elastomeric paint or approved equal
2. Unprimed Ferrous Metal	
First coat	Red Oxide Primer, #310 or approved equal
Second and Third Coat	Quick Dry Enamel or approved equal
3. On Concrete Block Wall	
Masonry Neutralizer	Masonry Neutralizer #44 or approved equal
Three Coats Concrete Masonry Paint	Elastomeric Paint or approved equal
4. On wood	
First Coat Exterior Wood Primer	Flatwall Enamel or approved equal
Second & Third Coat Exterior enamel	Quick Dry Enamel or approved equal
b. Interior Finishes	
Location of various finishes are listed in the Finish Schedule on the drawings or else will be confirmed by PPA	
1. On primer and coated metal two coats of interior semi-gloss enamel or as indicated in the Schedule finish	Red Oxide Primer #310, Quick Dry Enamel or approved equal
2. On Plaster	
First Coat	Masonry Neutralizer #44 or approved equal
Three Coats	Elastomeric Paint or approved equal
3. On wood	

First Coat Enamel undercoater	Flatwall Enamel or approved equal
Second & Third Coat Exterior enamel	Quick Dry Enamel or approved equal
4. Wood Stain Finish	
First Coat Second & Third Coat Fourth & Fifth Coat	Oil Wood Stain, Lacquer Sanding Sealer #1254 Clear Gloss Lacquer #1250 or approved equal
c. Non – Architectural Items (Piping, valves, equipment, etc.)	
1. Piping, valves, equipment, etc. in rooms are to be painted	
2. Galvanized pipes and ducts	
Primer – one coat Finish – one coat	Red Oxide Primer #310, or approved equal Quick Dry Enamel or approved equal
3. Black steel pipes	
Primer – one coat Finish – one coat	Red Oxide Primer #310, or approved equal Quick Dry Enamel or approved equal
4. Mechanical Items	
a. Ungalvanized ferrous metal Primer – one coat Finish – one coat	Red Oxide Primer #310, or approved equal Quick Dry Enamel or approved equal
b. Galvanized ferrous metal Primer – one coat Finish – one coat	Red Oxide Primer #310, or approved equal Quick Dry Enamel or approved equal
c. Submerged galvanized ferrous metal Primer – one coat	Red Oxide Primer #310, or approved equal
d. Buried miscellaneous ferrous surface valves, & flanged joints (excl. pipe) Primer – one coat	Red Oxide Primer #310, or approved equal

EXECUTION

SURFACE PREPARATION OF STEEL

1. Steel surfaces shall be cleaned as follows:
 - a. All round welds, burrs and sharp surface projections shall be ground smooth and all weld splatter shall be removed prior to blast cleaning.
 - b. Sand abrasives, if used, shall be clean, and free from salt and extraneous matter. The sand shall pass through a 2.0mm test sieve, and be substantially retained on a 0.18mm test sieve, with at least 25 percent retained on a 0.355mm test sieve.
 - c. Metallic abrasive, if used, shall be sharp, hard, and free from dust, and shall pass through a 1.8mm test sieve.
 - d. Blast cleaning operations shall not be conducted on surfaces that will be wet after blasting and before coating, or when the surfaces are less than 10°C above degree points, or when the relative humidity of the air is greater than 95 percent.