PHILIPPINE BIDDING DOCUMENTS

(As Harmonized with Development Partners)

Procurement for the Construction of Fish Processing Facility for the NFPC

(Re-bidding)

Department of Agriculture

PHILIPPINE FISHERIES DEVELOPMENT AUTHORITY

Navotas Fish Port Complex

Sixth Edition
July 2020

Preface

These Philippine Bidding Documents (PBDs) for the procurement of Infrastructure Projects (hereinafter referred to also as the "Works") through Competitive Bidding have been prepared by the Government of the Philippines for use by all branches, agencies, departments, bureaus, offices, or instrumentalities of the government, including government-owned and/or -controlled corporations, government financial institutions, state universities and colleges, local government units, and autonomous regional government. The procedures and practices presented in this document have been developed through broad experience, and are for mandatory use in projects that are financed in whole or in part by the Government of the Philippines or any foreign government/foreign or international financing institution in accordance with the provisions of the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

The PBDs are intended as a model for admeasurements (unit prices or unit rates in a bill of quantities) types of contract, which are the most common in Works contracting.

The Bidding Documents shall clearly and adequately define, among others: (i) the objectives, scope, and expected outputs and/or results of the proposed contract; (ii) the eligibility requirements of Bidders; (iii) the expected contract duration; and (iv) the obligations, duties, and/or functions of the winning Bidder.

Care should be taken to check the relevance of the provisions of the PBDs against the requirements of the specific Works to be procured. If duplication of a subject is inevitable in other sections of the document prepared by the Procuring Entity, care must be exercised to avoid contradictions between clauses dealing with the same matter.

Moreover, each section is prepared with notes intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They shall not be included in the final documents. The following general directions should be observed when using the documents:

a. All the documents listed in the Table of Contents are normally required for the procurement of Infrastructure Projects. However, they should be adapted as necessary to the circumstances of the particular Project.

b. Specific details, such as the "*name of the Procuring Entity*" and "*address for bid submission*," should be furnished in the Instructions to Bidders, Bid Data Sheet, and Special Conditions of Contract. The final documents should contain neither blank spaces nor options.

c. This Preface and the footnotes or notes in italics included in the Invitation to Bid, BDS, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, and Bill of Quantities are not part of the text of the final document, although they contain instructions that the Procuring Entity should strictly follow.

d. The cover should be modified as required to identify the Bidding Documents as to the names of the Project, Contract, and Procuring Entity, in addition to date of issue.

e. Modifications for specific Procurement Project details should be provided in the Special Conditions of Contract as amendments to the Conditions of Contract. For easy completion, whenever reference has to be made to specific clauses in the Bid Data Sheet or Special Conditions of Contract, these terms shall be printed in bold typeface on Sections I (Instructions to Bidders) and III (General Conditions of Contract), respectively.

f. For guidelines on the use of Bidding Forms and the procurement of Foreign-Assisted Projects, these will be covered by a separate issuance of the Government Procurement Policy Board.

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Glossary of Terms, Abbreviations, and Acronyms

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

INVITATION TO BID FOR THE
CONSTRUCTION OF FISH PROCESSING FACILITY FOR THE NFPC
(NFPC INFRA2022-001)

1. The Philippine Fisheries Development Authority - Navotas Fish Port Complex through CY 2022 Corporate Budget intends to apply the sum of Two Million Eight Hundred Twenty Nine Three Hundred Ninety One Pesos & 03/100 (₱2,829,391.03) being the Approved Budget of the Contract (ABC) to payments under the contract for the Construction of Fish Processing Facility for the NFPC. Bids received in excess of the ABC shall be automatically rejected at bid opening.

2. The Philippine Fisheries Development Authority - Navotas Fish Port Complex now invites bids for the above Procurement Project. Bidders should have completed, within five (5) years from the date of submission and receipt of bids, 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).

3. 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) No. 9184.

   In addition, bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA No. 5183.

4. Prospective Bidders may obtain further information from PFDA-Navotas Fish Port Complex and inspect the Bidding Documents at the address given below during office hours, from 8:00 a.m. to 5:00 p.m.., Monday to Friday.

5. A complete set of Bidding Documents may be acquired by interested Bidders on November 14, 2022 from the NPFC Regional Bids and Awards Committee (RBAC) Secretariat at Ground Floor, PFDA Administration Office, Navotas Fish Port Complex, North Bay Boulevard, Navotas City and upon payment of applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB in the amount of Five Thousand Pesos (₱5,000.00) tax exclusive.

   It may also be downloaded free of charge from the website of the Philippine Government Electronic Procurement System (PhilGEPS) and the website of the

Procuring Entity, provided that Bidders shall pay the applicable fee for the Bidding Documents not later than the submission of their bids.

6. The PFDA - NFPC will hold a Pre-Bid Conference[1] on November 22, 2022, 2:00 p.m. at the Ground Floor, PFDA GAD Building, Navotas Fish Port Complex, North Bay Boulevard, Navotas City and/or through video conferencing or webcasting (Google Meet) which shall be open to prospective bidders. .

7. Bids must be duly received by the NFPC RBAC Secretariat at the Ground Floor, PFDA GAD Building, Navotas Fish Port Complex, North Bay Boulevard, Navotas City on or before 12:00 noon, December 7, 2022. Late bids shall not be accepted.

8. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 14.

9. Bid opening shall be on December 7, 2022, 2:00 p.m. at the Ground Floor, PFDA GAD Bldg., Navotas Fish Port Complex, North Bay Boulevard, Navotas City. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The PFDA - Navotas Fish Port Complex 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 IRR of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

Ms. Maris Stella C. Cruz
NFPC RBAC Secretariat
Ground Floor, PFDA Admin Bldg.
Navotas Fish Port Complex
North Bay Boulevard, Navotas City
Tel. No. (02) 8359-1604
Email: rbac_nfpc@pfda.gov.ph

November 14, 2022

ARFILO C. CATIPAY
Chairperson - NFPC RBAC

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, Philippine Fisheries Development Authority – Navotas Fish Port Complex invites Bids for the Construction of Fish Processing Facility for the Navotas Fish Port Complex with Project Identification Number NFPCINFRA2022-01.

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

2. Funding Information

2.1. The GOP through the source of funding as indicated below for CY 2022 Corporate Budget the amount of ₱ 2,829,391.03.

2.2. The source of funding is GOCC and GFIs, the Corporate Operating Budget.

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 –

Subcontracting is not allowed.

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 Ground Floor, PFDA GAD Building Navotas Fish Port Complex, North Bay Boulevard, Navotas City 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. In joint ventures, a special PCAB License, and registration for the type and cost of the contract for this Project, shall be required. 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 April 6, 2023. 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 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

<table>
<tr><th>ITB Clause</th><th></th></tr>
<tr><td>5.2</td><td>For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be:
Similar to the construction of processing facility.</td></tr>
<tr><td>7.1</td><td>Not Applicable</td></tr>
<tr><td>10.3</td><td>Applicable permits from the City Government of Navotas.</td></tr>
<tr><td>10.4</td><td>The key personnel must meet the required minimum years of experience set below:
<table>
<tr><th>Key Personnel</th><th>No.</th><th>Minimum Total Work Experience (years)</th><th>Type of Experience</th></tr>
<tr><td>Project Manager</td><td>1</td><td>2</td><td>Licensed Civil Engineer with experience in civil works and must have manage or supervised at least P3M above project of similar nature.</td></tr>
<tr><td>Electrical Engineer</td><td>1</td><td>2</td><td>Licensed Electrical Engineer with 2 years experience in electrical works</td></tr>
<tr><td>Safety Engineer</td><td>1</td><td>2</td><td>With 40 hours relevant training</td></tr>
<tr><td>Construction Foreman</td><td>1</td><td>5</td><td>With 5 years’ experience in civil and electrical works</td></tr>
</table></td></tr>
<tr><td>10.5</td><td>The minimum major equipment requirements are the following:
<table>
<tr><th colspan="2">Number of Units</th><th>Equipment (Capacity)</th></tr>
<tr><td>1</td><td>unit</td><td>Roller Compactor, 10T</td></tr>
<tr><td>1</td><td>unit</td><td>Backhoe, 1 cu.m. cap</td></tr>
<tr><td>1</td><td>unit</td><td>Grade, 140 HP</td></tr>
<tr><td>1</td><td>unit</td><td>Truck Mounted Crane, 41-45 MT Cap.</td></tr>
<tr><td>1</td><td>unit</td><td>Vibro Hammer, 272 HP</td></tr>
<tr><td>1</td><td>unit</td><td>Plate Compactor</td></tr>
<tr><td>1</td><td>unit</td><td>Generator Set (700W)</td></tr>
</table></td></tr>
</table>

	<table><tr><td>1</td><td>unit</td><td>Transit Mixer, 5 cu.m.</td></tr><tr><td>1</td><td>unit</td><td>Jackhammer</td></tr><tr><td>1</td><td>unit</td><td>Concrete Screeder</td></tr><tr><td>1</td><td>unit</td><td>Concrete Cutter</td></tr></table>
12	Alternative Bid is 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 ₱ 56,587.82, 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 ₱ 141,469.55 if bid security is in Surety Bond.
19.2	Partial bids are not allowed.
20	Only tax returns filed and taxes paid through the BIR Electronic Filing and Payments System (EFPS) shall be accepted. NOTE: ***The latest income and business tax returns are those within the last six months preceding the date of bid submission.*** Applicable government permits and licenses of City Government of Navotas.
21	Additional contract documents relevant to the Project that may be required by existing laws and/or the Procuring Entity, such as construction schedule and S-curve, manpower schedule, construction methods, equipment utilization schedule, construction safety and health program approved by the DOLE, and 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

4.1. 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.

4.2. 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	The Intended Completion Date is sixty (60) calendar days.
4.1	The **Procuring Entity** shall give possession of all parts of the Site to the Contractor beginning on the date of effectivity of contract until the date of its termination and/or project completion.
6	The site investigation reports are: None
7.2	In case of permanent structures, such as 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: Fifteen (15) years. In case of semi-permanent structures, such as buildings of types 1, 2, and 3 as classified under the National Building Code of the Philippines, concrete/asphalt roads, concrete river control, drainage, irrigation lined canals, river landing, deep wells, rock causeway, pedestrian overpass, and other similar semi-permanent structures: Five (5) years. In case of other structures, such as bailey and wooden bridges, shallow wells, spring developments, and other similar structures: Two (2) years.
10	Dayworks are applicable at the rate shown in the Contractor's original Bid.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within seven (7) calendar 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 5% of contract price.
13	The amount of the advance payment is 15% of the total contract price.
14	No further instruction.
15.1	The date by which "as-built drawings" (one original in Mylar, two blue print copies and electronic file in USB) are required to be submitted is before the release of final payment. The date by which the "Operations and Maintenance Manuals" are required is before the release of final payment.
15.2	No final payment shall be made by the Procuring Entity unless the Contractor prepares and submits the required as-built plans.

Additional Clause	
	NEGATIVE SLIPPAGE The Procuring Entity shall ensure the timely implementation of infrastructure projects by monitoring the performance of the contractors. When the contractor incurs negative slippage during the contract duration, the Procuring Entity shall implement the calibrated measures provided under GPPB Circular No. 03-2019 dated 8 March 2019, entitled "Guidance on Contract Termination Due to Fifteen Percent (15%) Negative Slippage by the Contractor in Infrastructure Projects." See attached Annex "A" of SCC.

Republic of the Philippines
gppb
Government Procurement Policy Board

ANNEX "A"

CIRCULAR 03-2019
8 March2019

TO: Heads of Departments, Bureaus, Offices and Agencies of the National Government including State Universities and Colleges, Government Owned and/or Controlled Corporations, Government Financial Institutions, and Local Government Units

SUBJECT: Guidance on Contract Termination Due to Fifteen Percent (15%) Negative Slippage By the Contractor in Infrastructure Projects

1.0 PURPOSE

This Circular is issued to furtherguide procuring entities on the actions to be undertaken when contractors incurred negative slippage in the implementation of infrastructure projects.

2.0 SCOPE

All Departments, Bureaus, Offices and Agencies of the National Government including State Universities and Colleges, Government-Owned and/or Controlled Corporations, Government Financial Institutions and Local Government Units.

3.0 CONTRACT TERMINATION DUE TO DEFAULT BY CONTRACTORS IN INFRASTRUCTURE PROJECTS

3.1 The provisions for the grounds contract termination of on-going infrastructure project under GPPB Resolution No. 018-2004 remain effective and continue to be the basis by which both the procuring entities and contractors should be guided, thus:

"2. In contracts for Infrastructure Projects:

The Procuring Entity shall terminatea contract for default when any of the following conditions attend its implementation:

a) Due to the Contractor's fault and while the project is on-going, it has incurred negative slippage of fifteen percent (15%) or more in accordance with Presidential Decree 1870;[1]

[1]Authorizing the Government's Take Over by Administration of Delayed Infrastructure Projects or Awarding of the Contract to other Qualified Contractors, issued on 12 July 1983.

4.0 GUIDELINES

4.1 The provisions of the Guidelines on Termination of Contracts as embodied in GPPB Resolution No. 018-2004 remain to be the basis for contract termination in infrastructure projects.

4.2 To ensure the timely implementation of infrastructure projects and effective management of the performance of contractors, the following calibrated actions in response to delays in the implementation of infrastructure projects are hereby adopted:

4.2.1 Negative slippage of five percent (5%) –

The contractor shall be given a warning and be required to:

4.2.1.1 Submit a detailed "catch-up" program every two weeks in order to eliminate the slippage and to restore the project to its original schedule;

4.2.1.2 Accelerate work and identify specific physical targets to be accomplished over adefinite period of time; and

4.2.1.3 Provide additional input resources such as the following: money, manpower, materials, equipment, and management, which shall be mobilized for this action.

The Implementing Unit shall exercise closer supervision and meet the contractor every other week to evaluate the progress of work and resolve any problems and bottlenecks.

4.2.2 Negative slippage of ten percent (10%)–

The contractor shall be issued a final warning and be required to come-up with a revised detailed "catch-up" program with weekly physical targets together with the required additional input resources.

The implementing unit shall intensify on-site supervision and evaluation of the project performance to at least once a weekand prepare contingency plans for a possible termination of the contract or take-over of the work by administration or contract.

4.2.3 Negative slippage of fifteen percent (15%) –

The implementing unit shall initiate termination of the contract or take-over of the work by administration or contract in accordance with Section 53.3 of the 2016 revised IRR of RA No. 9184 and the Revised Guidelines for the Implementation of Infrastructure Projects by Administration.

It shall likewise take proper transitory measures to minimize work disruptions, e.g., take-over by administration while negotiation or rebidding is on-going.

5.0 All procuring entities are enjoined to apply this Guidelines on all government infrastructure projects.

6.0 This Circular shall take effect fifteen (15) days after publication.

7.0 For guidance and compliance.

SGD

LAURA B. PASCUA
Alternate Chairperson

Section VI. Specifications

TECHNICAL SPECIFICATIONS

Part I - CONSTRUCTION SAFETY

A. SCOPE OF WORK

A.01 The Contractor shall provide construction safety materials to be used by construction personnel for the entire duration of the project. These include personal protective equipment (PPE) such as safety shoes, helmets (hard hats), rubber boots, raincoats, and safety dust masks, among others. The Contractor shall also provide safety/warning signs, signals and barricades; proper storage/containers for chemicals, waste materials/rubbish and related materials; an adequate means for protection against dust and wind-blown debris; regular construction debris collection and hauling; and, other necessary procedures to ensure safety, orderliness and cleanliness in the project site.

The Contractor shall hire one (1) Safety Officer and one (1) First Aider for the whole duration of the project.

A.02 Construction safety shall be treated as a separate item. The pertinent costs shall be computed based on the cost of construction safety materials and the corresponding wage rates of the Safety Officer and the First Aider to be hired by the contractor for the project.

PART II – SITE DEVELOPMENT

A. SURVEY AND LAYOUT WORKS

Scope of Work

This section covers topography including layout and installation of markers.

A.01 Topographic Survey

Reference: All survey works shall be carried out in reference to benchmarks or monuments designated by the Engineer.

Surveyor: Licensed Surveyor shall carry out all survey works specified in this section. The Contractor shall submit in advance for the Owner's approval, the true copy of license and qualifications of the surveyor to be employed for the works.

Prior to commencement of the work, the Contractor shall carry out the pre-construction topographic survey of the project by means of traversing, sounding and leveling, and shall prepare a topographic plan on tracing paper in a convenient scale approved by the Engineer. The salient features of the area with respect to their position and shall have contour lines of 250mm vertical intervals. This survey shall form the basis for future quantity measurements.

All stations shall be established by closed traversing with an error of closure of not more than 1:3000.

The Contractor shall submit to the Owner the original and two (2) copies of the plan signed by the Surveyor and the Owner's Representative.

A.02 Layout and Installation of Markers

The Contractors shall lay out the works and shall be solely responsible for the accuracy of such layout. The Contractor shall provide, fix and maintain all survey stakes/markers or the like which are necessary for the accurate laying out of the works and shall take all necessary precautions to prevent their removal or disturbances, all as approved by the Owner. The Contractor shall provide suitable range in the water to indicate the boundary lines.

Laying out of works shall include the verification of position of all markers, supply and installation of any and all other markers which the Contractor may require for the proper execution and completion of the work, and shall also include the repositioning of the Owner's marker if such repositioning is deemed necessary by the Contractor and approved by the Owner.

A.03 Construction Survey Work Shall Provide:

1. Lines and reference points for the existing structures, road and other major site improvements included under this contract.

2. Reference points, lines and levels necessary for layout of building, roadway and other construction related to the control of surface and storm water.

A.04 Field Notes

Field Notes, calculations sheets and other documents shall be prepared in a manner acceptable to the Owner. The Contractor shall submit such notes and other documents on completion of the respective works or, if required, during the progress of works for the Engineer's inspection thereof.

B. EXCAVATION FOR EMBANKMENT

B.01 Description

This item shall consist of removal and disposal of unsuitable material that may be required for the construction of the bulkheads and reclamation works. It shall include all necessary clearing and maintenance of the excavation prior to backfilling. It shall also include removal of obstruction or parts thereof, as required. Materials such as weed, fine silt, mud and other superfluous material are considered unsuitable materials.

B.02 Construction Requirements

Excavation will include removal of unsuitable material along the line of pile. All unsuitable material shall be disposed of as directed by the PFDA Engineer. Materials encountered in the excavation and determined by the Engineer as suitable for slope protection or other purposes shall be conserved & utilized as directed by the Engineer.

Before proceeding with the work under this item, the Contractor shall submit his proposed method of excavation including drawings and other details left open to his choice when not fully shown on the Plans. The Owner shall approve such method, drawings and details before actual work is started under this item.

C. PORTLAND CEMENT CONCRETE PAVEMENT

C.01 Description

This item shall consist of a pavement of Portland Cement Concrete with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with the lines, grades, thickness and typical cross section shown on the Plans.

C.02 Surface Preparation

Laying/spreading and compaction of Aggregate Base Coarse (Item 201) and Aggregate Sub-Base Coarse (Item200).

Base coarse materials shall conform to the grading requirement of Table 201.1 of the DPWH Standard Specifications 2012 and shall be free from vegetable matter and lumps or balls of clay, and shall be such nature that it can be compacted readily to form a firm, stable base.

Sub-base coarse materials shall conform to the grading requirements of Tale 200.1 of the DPWH Standard Specifications 2012 and shall consist of hard, durable particles or fragments of crushed stone, crushed slag or crushed natural gravel and filter of natural crushed sand or other finely divided mineral matter.

Aggregate base coarse & sub-base coarse shall be laid in accordance with Plan & DPWH Standard Specification 2012, Volume II.

Compactions of materials shall conform to *Part I.B.04*

Filling, Grading and Compaction of fill materials.

Except when provided herein, all applicable provisions of the 1995 DPWH Standard Specifications for Item 201 – AGGREGATE BASE COARSE & Item 200 – AGGREGATE SUB-BASE COARSE shall be followed.

Prior to the delivery of materials, the Contractor shall submit samples to the Engineer for approval.

C.03 Concrete Pavement

The material shall be Field Mix Concrete and shall have flexural strength of 3,500 psi (24.1 MPa) when tested at twenty-eight (28) days in accordance with the AASHTO T 97, or 22 respectively.

Concrete pavement shall have thickness of 200mm and shall conform to DPWH Standard Specification 2012, Item 311- Portland Cement Pavement and the Plan.

Construction joints shall be provided with 16 mm. diameter X 0.60 m. dowel spaced at 0.60 m. on center.

Joint filler shall be mixed asphalt and mineral or rubber filler. It shall be punched to admit the dowels where called for in the Plans.

The filler for each joint shall be furnished in a single place for the full depth and width required for the joint.

C.04 Sidewalk, Curbs and Gutters

Bed coarse material shall consist of cinders, sand, slag, crushed stone or other porous materials of such grading that all particles will pass through 12.5 mm (1/2 inch) sieve and shall be placed and compacted to form a bed of the required thickness as shown on the plans.

All sidewalks, curbs and gutter shall have a minimum compressive strength of 20.70 Mpa at 28 days and shall conform to the requirements of ***Part II.C – PORTLAND CEMENT CONCRETE PAVEMENT .***

Excavation shall be made to the required depth and the base upon which the curb and/or gutter are to be set shall be compacted to a firm and even surface.

C.05 Concrete Curbs

C.05.1 Description

This item shall consist of placing markings on the curbs and barrier electrical post. The work shall include the furnishing of reflective pavement marking paint, whichever is called for in the contract, sampling and packing, preparing the surface, and applying the paint to the surface, all in accordance with this Specification.

The paint shall be applied to the size, shape and location of the markings shown on the Plans or as required by the Engineer.

C.05.2 Material requirements

Paint shall be mixed at the factory, ready for application without the necessity of using thinners and shall be of a smooth uniform quality. It shall conform to the composition of given in Table 606.1, Item 606 – Pavement Markings of DPWH Standard Specifications 2012.

C.05.3 Construction Requirements

The painting of lane markers and traffic strips shall include the cleaning of the surface and the application, protection and drying of the paint coatings.

The paint shall not be applied during rain or wet weather or when the air is misty, or when in the opinion of the Engineer conditions are unfavorable for the work.

The paint shall be so applied as to produce a uniform, even coating in close contact with the surface being painted.

D. DRAINAGE AND SEWERAGE SYSTEM

D.01 Scope of Work

The Contractor shall furnish all works, equipment, materials, labor and supervision required to complete this item in full compliance with the terms and conditions of contract.

Work Included

a. Excavation and Backfilling

All excavation shall conform to the requirements of ***Part III-B- EXCAVATION AND BACKFILLING FOR BUILDING.***

b. Construction of Drainage Canals, Storm Drain Manholes, R.C Pipes

Drainage canal shall be constructed in accordance with the plans and shall conform to the requirement of ***Part III-E CEMENT AND MANSONRY.***

c. All pipes shall conform to the requirement of ***Part II.E – OUTSIDE WATER DISTRIBUTION SYSTEM***

D.02 Material Requirements

Materials for storm drainage system shall meet the requirement specified in the following standard specifications.

Portland Cement	ASTM C - 150
Fine and Coarse Aggregates	ASTM C - 33
Reinforcing Steel	ASTM A - 615
Non- reinforced Concrete Pipes	ASTM C - 14
Reinforced Concrete Pipes	ASTM C - 76
Polyvinyl Chloride Pipes (for conductors and downspouts)	ASTM D - 2729

Materials for sewerage system shall meet the requirements specified in the following standard specifications.

PVC Pipes and Fittings (where called in the Plans)	ASTM D - 1784
Solvent Cement (for securing PVC joints)	ASTM D – 2564

D.03 Construction Requirements

D.03.1 Work Included

a. Excavation and Backfilling

All excavation shall conform to the requirements of ***Part III-B – EXCAVATION AND BACKFILLING FOR BUILDINGS.***

b. Construction of Drainage Gutter Type Canals shall be constructed in accordance with the plans and shall conform to the requirements of ***Part III-E – CEMENT AND MASONRY.***

c. Provide sewage holding tank as shown in the plan. Concrete shall be 20.70 MPa at 28 days and conform to the requirements of ***Part II.C- CONCRETE WORKS.***

d. All pipes shall conform to the requirements of ***Part II.E – OUTSIDE WATER DISTRIBUTION SYSTEM***

E. OUTSIDE WATER DISTRIBUTION SYSTEM

E.01 Scope of Work

The Contractor shall furnish all works, equipment, materials, labor, testing and supervision required to complete the entire water supply system, in strict compliance with the Drawing and these Specifications.

E.02 Work Included

a. Outside Water Distribution line from local source to water distribution system.

b. Furnishing and installation of gate valves, check valve and valve manholes.

c. Supply and installation of all pipes and fittings as indicated in the Plan and Specification.

d. Hydrostatic pressure testing of pipelines.

e. All works guarantee.

f. Expenses for water connection from the existing Local Water Cooperative shall be to the account of end user / Philippine Fisheries Development Authority (PFDA).

Specifications for inside water distribution system are as per the provision of ***Part II.E – OUTSIDE WATER DISTRIBUTION SYSTEM***.

E.03 Trench Excavation/Backfilling

All excavations shall be protected from damage due to water. The Contractor, at his own expense, shall provide pumps, enclosure and temporary drainage whenever necessary to keep the excavation free of water.

Whenever it is necessary to excavate deeper to bring the pipe below the hydraulic gradient or for the purpose of protecting the pipeline, the Contractor shall do all the excavation work and backfill at his own expense.

After pipes have been laid, tested and approved, backfilling shall be done with approved materials free from large clods, stones and organic matters.

Excavated materials may be used for backfilling as approved by the Engineer.

In all cases, backfill materials shall be moistened, if dry, and tampered to 95% compaction.

E.04 Pipe Laying and Anchorage

Pipes shall not be laid in water, or when trench or weather conditions are unsuitable for the work. Water shall be kept out of the trench until the connection is complete.

All dirt shall be removed from the inside of the pipe before laying. Changes in direction of pipes and other fittings that may be unsettled by pressure shall be properly anchored by concrete thrust blocks. Likewise, all exposed pipes shall also be supported and anchored whenever necessary.

The design of these supports shall be approved by the Engineer and all extra costs shall be at the expense of the Contractor.

E.05 Sand Bedding and Backfilling

Each layer of sand bed and backfill shall be moistened, if dry, and tampered to 95% compaction. Water settling shall not be permitted in clayey soils.

No backfilling shall commence without proper installation of trust blocks and pressure testing.

E.06 High Density Polyethylene (HDPE) Pipe and Fittings

HDPE pipe shall conform with the standard specifications of PNS 55-SDR 13.5.

Fittings shall be injection molded compression-type fittings. Installation shall be as per manufacturer's specification.

E.07 Galvanized/Black Iron Pipes and Fittings

Galvanized/Black steel pipe shall conform to the requirements of "ASTM A – 120" and shall be Schedule 40. Fittings for galvanized pipe shall be of galvanized malleable iron.

E.08 uPVC Pipes and Fittings

Pipes shall conform to the requirement of uPVC Portable Water Pipes stated in *Part II.E* – ***OUTSIDE WATER DISTRIBUTION SYSTEM*** of this specification.

E.09 Water Meter

Water meter must be "ARAD" or "Asahi" brand, or approved equivalent, screw-type brand with operating pressure containing and standard specification of MWSS and LWUA.

E.10 Valves

Gate valves to be used shall be screw-type KITZ brand or equivalent.

E.11 Pumps and Control for Fresh Water Systems

Pump shall be jet booster pump, stainless steel construction, capable of sucking water from the underground water reservoir, directly coupled to a TEFC electric motor, 220V, 3600 RPM, 60HZ, single phase with built in motor protector complete with liquid level control with electrode for elevated tank and underground reservoir.

Electrical control shall be direct on line circuit breaker with manual switch and automatic switch in a single enclosure.

E.12 Anti-Corrosion Painting

All exposed metal surface such as G.I. Pipes, pipe clamps, steel ladder, water tank steel base, metal box covers etc. must be applied with two (2) coats of anti-corrosion paint.

For galvanized metals - apply one coat zinc-chromate primer and one (1) coat silver chrome finish

For other metal surfaces - apply one (1) coat of red lead primer and one (1) coat silver chrome finish

E.13 Testing Requirements

Pressure testing of the piping system shall be performed as work progresses to detect leaks especially at the pipe joints. Testing shall be done prior to backfilling.

Testing shall be made only after all the pipes are properly anchored. Test pressures and procedures as approved by the Engineer.

Pump test shall also be performed to check its performance under actual operating condition. This is done after the installation works so that the whole system including its controls shall be subjected to demonstration test to prove that they operate and function satisfactorily.

All pipes, fittings, valves, joints and coupling found to be defective or cracked during the test shall be removed and replaced by the Contractor at his own expense.

E.14 Water Supply Pits, Drains Box and Valve Manholes

Concrete to be used shall develop 20.70MPa strength after 28 days. Dimension and other data are indicated in the Plans. Concrete covers shall conform to MWSS/LWUA Standard.

E.15 General Requirements for Mechanical Works

1.0 Supervision of Mechanical Works (Water Supply)

a. General Work - Furnish full-time services of one or more experienced supervisors (master plumber) well qualified in directing, overseeing all phases of works of this nature.

b. Equipment Installation Work - Furnish services of manufacturer's representative to supervise equipment installation when regular full-time supervisors are not otherwise qualified.

2.0 Review of the Water Supply System

a. Before procurement of the pumps and controls, the contractor shall review and evaluate the systems provided herein. In case the Contractor has no expertise in such works, it shall avail the services of the manufacturer's authorized representative.

b. In case of any discrepancy which needs necessary corrections, the matter shall be brought to the Owner's attention for proper action.

3.0 Approval of Materials and Equipment

All materials and equipment shall be new. Before procurement and delivery to project site, the contractor shall submit to the Owner the technical data indicating the rated capacities and performance curve related to the equipment and materials for evaluation and approval.

For pumps and controls, a performance test is required at the supplier's shop to prove that they operate and function satisfactorily based on the technical data submitted before procurement.

4.0 Maintenance Services, Warranty and Reliability Trial Testing

a. The Contractor shall assume the responsibility to provide warranty to all equipment, machinery and systems so as to function not only as a part but also as a whole intended and installed under the Contract as assurance against any defects due.

b. The material, manufacturing, fabrication and installation that may occur during normal operation with appropriate maintenance for a period of twelve (12) months reckoned from the date of issuance of Certificate of Acceptance.

c. The Contractor shall provide reliability, trial test for a period of two (2) weeks from the date of project completion at no additional cost to the Owner. During this test period, the Contractor shall provide at least one (1) qualified technician to oversee the testing.

d. Emergency services shall be available when called for at no additional cost to the Owner where it is attributable to the Contractor and/or Manufacturer.

F. OUTSIDE ELECTRICAL LIGHTING AND POWER SYSTEM

All works shall conform to the applicable provision of ***Part V – ELECTRICAL WORKS.***

G. WELDING AND METAL WORKS

G.01 Scope of Work

This section covers the furnishing of all work, equipment, materials, labor and supervision required to complete the items in full compliance with the Drawing and these Specifications.

All metal works shall be done in accordance with all related publications of the American Institute of Steel Construction (AISC), American Society of Testing Materials (ASTM), and American Welding Society (AWS).

G.02 Material Provisions

All welding shall conform to the "AWS CODE FOR ARC AND GAS WELDING IN BUILDING" and as herein specified or any other welding standards approved by the Owner's Engineer's.

Use only welding equipment, electrodes welding wire and fluxes capable of producing satisfactory output when used in a qualified welding procedure.

The Contractor shall be responsible for all errors of detailing for correct fitting of the structural members.

G.03 Storage of Materials

The materials shall be stored out of contact with the ground and in a manner and location that will minimize contamination and deterioration.

G.04 Materials

All materials shall be new stock, free from surface imperfections and shall conform to the applicable ASTM Specifications and equivalent standards.

G.05 Shop Connections

As detailed in the drawing or as approved by the Owner's Engineer.

G.06 Field Connections

Provide welded connections as shown in the drawing or as approved by the Owner's Engineer's.

H. METAL PAINTING

H.01 Scope of Work

The work under this section shall include labor, materials, equipment, plant and other facilities for the satisfactory performance of all work necessary to complete all field painting as specified herein.

The Contractor shall responsible for cleaning and removal of corrosive surface on newly installed steel members. No painting shall be allowed unless the newly installed steel members are free from corrosive and surface imperfections.

All members shall meet the requirements of the Standard Specification of the Standard Committee on supplies and shall be in accordance with the latest classification "A" of the Institute of Science in Manila, Philippines and shall be delivered on the work in the original containers with the labels intact and seals unbroken.

Davies epoxy paint or its approved equivalent shall be used on all surfaces to be painted. A certificate of original quality shall be submitted to the Owner for inspection and approved before using any of the paint.

All materials to be used in the work shall be stored in a single place and be kept near and clean at all times. Any damages on its surrounding shall be rectified. All precautions to avoid danger of fire must be observed by removing oily rags and waste materials at the end of daily works.

All exposed works shall be protected while the steel members are being painted. Any dirt, smear, etc. shall be removed by the Contractor to the satisfaction of the Owner.

The work under this section shall include labor, materials, equipment, plant and other facilities for the satisfactory performance of all work necessary to complete all field painting as specified herein.

H.02 Inspection and Preparation of Surfaces

The Contractor shall inspect all surfaces to paint and all defects shall be remedied before starting the work.

No work shall be started unless Contractor shall has made certain as to the dryness of surface. The test shall be made in the presence of the Owner's Engineer to verify dryness of surface to be painted.

Before painting is started, all spaces shall be cleaned of all dust, dirt, plaster, grease and other extraneous matter which would affect the finish shall be removed.

H.03 Workmanship

All painting shall be done in the workmanlike manner by skilled painters only.

All materials shall be evenly applied on, as to form a firm, uniform thickness, free from sags, runs, crawl or other defects. The use of heavy brushes is required, and such paintbrushes and shall be cleaned and in good condition. Paint shall be thoroughly stirred so as to keep the pigment evenly in suspension while paint is being applied.

In general, and unless otherwise satisfied, and/or instructed by the Owner's Engineer or due to actual conditions on the job, not less than one-day time shall elapse between application of succeeding coats. Each coat of paint shall be allowed to dry thoroughly and inspected for the approval of the Owner's Engineer before succeeding coat is applied. No work shall be done under conditions that are unsuitable for the production of good results. No painting shall be done while welding is in process or is drying.

Before any painting is started, the Contractor shall furnish the Owner with the paint manufacturer's detailed painting recommendations as to surface preparations and application, including relevant information regarding the use of the paint.

H.04 Painting

Prime with EPOXY PRIMER for Steel and allow to dry for 24 hours. Apply by brush two (2) coats of EPOXY PAINT and finish with silver Quick Dry Enamel Paint (Boysen, Davies or approved equivalent). Allow overnight drying in between coats. The color to be applied is the same color of the existing paint applied in the structure.

I. MISCELLANEOUS

I.01 Scope of Work

This section covers the furnishing of all work, equipment, materials, labor and supervision required to complete the items in full compliance with the Drawing and this Specifications.

I.02 FACILITY/BUILDING SIGNAGE

Text made of computer cut engineering grade reflective sheeting on a Ga. 22 Aluminum Sheet substrate panel. Hi-intensity Prismatic Grade Background bearing the name of the port owner, location, logo of DA/PFDA as indicated in the plan.

I.03 PROJECT SIGNAGE

The Contractor shall provide a project signboard (1.20m x 2.40m) at the construction site bearing the name of the project, location, project cost, starting date and completion date, name of implementing agency, the name of the Contractor, and the other information that shall be required by the PFDA.

The signboard shall be made of tarpaulin in wood framing. It shall be erected with necessary wooden support and bracing. The signboard shall be erected by the Contractor within two (2) weeks after the project has commenced.

PART III – BUILDING FACILITIES

A. SURVEY AND LAYOUT WORK

General: Under **PART I.A** Site Development and Utilities work shall also be applied to these terms with the additional provisions.

A.01 Construction Survey Requirements

The Contractor shall establish the following:

a. Column/grid reference system of the building
b. Boundary or primary perimeter lines of the building
c. Entrance points of all utilities in the project area
d. Reference mark to control the floor elevation and other finish grades

A.02 Interior Layout Work

As the work progresses, the Contractor shall provide the reference points throughout each interior area, which are necessary to facilitate detailed layout of partitions, doors, windows, equipment foundation, ceilings and other structures.

All layouts, locations and dimensions shall be rechecked and verified in the plans by the Contractor before starting any work items of the project.

B. EXCAVATION AND BACKFILLING FOR BUILDINGS

B.01 Scope of Work

The Contractor shall furnish all labor, materials, equipment, plant and other facilities and perform all work necessary to complete the preparation of site, excavation, filling and grading in strict compliance with the applicable drawings and as specified herein.

B.02 Stakes and Batter Boards

The Contractor shall stake out the buildings accurately and establish grades, after which the approval of the Owner shall be secured before any excavation work is started.

Basic batter boards and reference marks shall be erected at the expense of the Contractor, at such places where they will not be disturbed during construction. Materials shall be stored, and work shall be conducted in such manner as to preserve all reference marks set.

The Contractor shall construct two (2) permanent benchmarks of previously known elevations near or within the site of construction for determining any settlement that may occur during the progress of construction.

Elevation reading shall be taken on at least four (4) points in the buildings and other related structures. A permanent record of the weekly reading shall be kept at the construction site and a monthly report thereof shall be submitted to the Owner, unless some unusual reading is observed in which case a report shall be made immediately.

B.03 Excavation

Excavation work shall commerce after the fill has thoroughly compacted and attained the required elevation.

The Contractor shall make all necessary excavation for foundations to grade indicated on the Drawings. All trenches shall be excavated at a neat size, leveled to a line at the bottom, which is ready to receive the foundation. The Contractor shall not excavate to a depth below elevations shown on the Drawings. Work that is excavated to a greater depth than required by the drawings and this specification shall be filled with lean concrete (fc' = 13.8 Mpa) at the expense of the Contractor.

No footings shall rest on fill. If the excavations for foundation reveal that footing will rest on fill, excavations shall be carried until the desired stratum is reached for safe bearing. All excavations shall be made with proper allowance made for floor slabs and forms. Bottom of footing and foundations shall be approximately level, clean and clear of loose materials with the lower section true to size.

All excavation for drainage, sewer and water services, and other underground utilities which are within the property line or scope of work indicated on the Plans, are included.

Sheathing shall be driven below the bottom of excavation deep enough. Where walls or footings are to be poured without forms, trench sides shall be sharp and true.

The Contractor shall, at all times, protect the excavation and trenches from damage due to water. He shall provide pumps and equipment; build enclosures; construct and maintain temporary drainage; and, do all pumping necessary to keep the excavation free of water. Sheet piling, if needed, shall be provided and tightly driven, shored and braced to maintain its position until removed.

B.04 Utilities

When encountered in work or as indicated, protect the existing active sewer, water, gas, electric, other utility services, and structures; when required for proper execution of work, relocate them as directed. If encountered, requiring protection or relocation, request in writing for decision of the Owner. Do not proceed until written instructions are obtained.

B.05 Backfilling, Grading and Compaction

After forms have been removed from footings, beams, foundations, walls, etc., and when the concrete work has attained full designed strength, backfill shall be placed free from waste and objectionable matters. After the backfill has settled, the Contractor shall fill all shallow places to bring the backfill area to grade.

The Contractor shall grade the site within the area indicated in the scope of work.

All filling materials shall be placed in layers not exceeding 150 mm in thickness, each layer being thoroughly wetted and compacted by rolling or tamping. All fills shall have 95% compaction.

The types of filling materials for buildings shall be selected earth fill and the source shall be approved by the Engineer.

C. CONCRETE WORKS

C.01 Scope of Work

The work shall include all labor, materials, equipment, plant and other facilities for the satisfactory performance of all work necessary to complete all concrete and reinforced concrete work shown on the Drawing and specified herein.

C.02 Concrete and Reinforced Concrete

All concrete and reinforced concrete work shall be done in accordance with the *DPWH Standard Specifications for Highways and Bridges revised 2012 and the current American Concrete Institute "BUILDING CODE REQUIREMENTS FOR THE REINFORCED CONCRETE (ACI 318 – 76)".*

C.03 Concrete Materials

Portland Cement shall be Type I and shall conform to "Specification for Portland cement (ASTM – C – 150-76a)".

Concrete aggregates shall be well-graded particles of gravel or crushed rock conforming to the *"Specification for Concrete Aggregates (ASTM C33 – 74a)".*

The maximum size of the aggregates shall not be larger than 1/5 of the narrowest dimension between forms nor larger than 3/4 of the minimum clear spacing between reinforcing bars nor larger than 25 mm in diameter.

Larger diameters of aggregates may be allowed in massive concreting with written permissions from the Owner.

Water used in mixing concrete shall be clean and free from injurious amount of oil, acid, alkali, salt, organic matter or other deleterious substances.

All reinforcing bars used shall be deformed and shall be free from rust, oil, defects, grease or kinks.

All reinforcing steel bars shall conform to the *PHILIPPINE STANDARD GRADE DSB 275*.

C.04 Storage of Materials

Cement shall be stored immediately upon arrival at the site in substantial, weatherproof bodegas, with a floor raised from the ground sufficiently high to be free from dampness.

Aggregates shall be stored in such a manner as to avoid the inclusion of other/foreign materials.

Reinforcing bars shall be placed in racks raised above the ground and protected from moisture and vegetation.

C.05 Samples and Testing

Testing except as otherwise specified herein shall be performed by an approved testing agency as proposed by the Contractor and approved by the Owner at no additional cost to the Owner.

Cement: Sampled either at the mill or at the site of the work and tested by an approved independent commercial or national testing laboratory at no additional cost to the Owner. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data results and certificates that the sampling and testing cement shall be used until notice has been given by the Owner that the test results are satisfactory. Cement that has been stored, other than in bins at the mills, for more than four (4) months after delivery to the site shall be retest before use. Cement delivered at the site and later found under the test to be unsuitable shall not be incorporated into the permanent works.

Aggregates: Tested as prescribed in ASTM C 33.

Reinforcement: Certified copies of mill certificates of tests shall accompany deliveries of steel bar reinforcement. If requested by the Owner, additional testing of the materials shall be made at the Contractor expense.

Concrete Test: Provide for test purposes three sets of test specimens taken under the instructions of the Owner from each 50 cu. m. or a fraction thereof of each class of concrete placed. At least one set of test specimens shall be provided for each Class of concrete placed in each 8-hour shift. Each shall consist of two specimens and shall be made from separate batch. *Samples shall be secured in conformity with ASTM C 172. Test specimens shall be made, cured and packed for shipment in accordance with ASTM C 31.* Cylinders will be tested by and at the expense of the Contractor in accordance with the ASTM C 39. Test specimens will be evaluated separately by the Owner for meeting strength level requirements for each cylinder with CONCRETE QUALITY of ACI 318. The standard age of test shall be 28 days; however, seven (7) days tests may be allowed, with the permission of the Owner provided that the relation between the 7-day and the 28-day strengths on the concrete is established by tests for the materials and proportions used. When samples fail to conform to the requirements for strength, the Owner shall have the right to order a change in the proportions of the concrete mix for the remaining portions of the work at no additional cost to the Owner.

C.06 Proportioning of Concrete Work

Trial design batches and testing to meet requirements of the classes of concrete specified shall be the responsibility of the Contractor. The design mix shall be of consistencies specified herein after in ***PART III.C – CONCRETE WORKS***/Test for slump, unit weight, and air content shall be performed in the field under the presence of the Owner.

Concrete Proportioning: Samples of approved aggregate shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixes shall have proportions, consistencies, and air content suitable for the work. Trial mix shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For concrete in each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 39. From these test results, a curve shall be plotted showing the relationship between water-cement.

C.07 Strength Requirement

All concrete, unless otherwise indicated, shall develop a maximum 28-day cylinder strength of 20.70 MPa.

The Contractor shall submit mix design obtained from at least three standard cylinder samples made in accordance with Section 5.4 of the NSCB, 1991, for the strength required stating the proposed slump and the proportional weights of cement, aggregates, and water. The mixes shall be approved by preliminary tests fourteen (14) days before concreting and shall show the required strength. No substitutions shall be made in the materials or mix without additional tests to show that the quality for concrete is satisfactory.

Slump: Tests shall be made in conformity with ASTM C 143, and unless otherwise specified by the Owner slump shall be within the following limits:

Structural Element	*Slump of Vibrated Concrete*	
	Minimum	*Maximum*
Concrete	50 mm	70 mm
Wall, Column and girder, beam, 25 cm maximum thickness	50 mm	70 mm
All other concrete	50 mm	100 mm

C.08 Joints

No reinforcement, corner protection angles or other fixed metal items shall be run continuous through joints containing expansion-joint filler, through crack-control joints in slabs on grade and vertical surfaces.

Pre – molded Expansion Joint Filler

Joints with Joint Sealant: At expansion joints in concrete slabs to be exposed, and at the other joints indicated to receive joint sealant, pre-molded expansion joint filler strips shall be installed at the proper level below the elevation with a slightly tapered, dressed and wood strip temporarily secured to the top thereof to form a groove, when surface dry, shall be cleaned of foreign matter, loosed particles, and concrete protrusions, there filled approximately flush with joint sealant so as to be slightly concave after drying.

Finish of Concrete at Joints: Edges of exposed concrete slabs along expansion joints shall be nearly finished with slightly rounded edging tools.

Construction Joints: Unless otherwise specified herein, all construction joints shall be subject for approval of the Owner. Concrete shall be placed continuously to form a monolithic construction. Fresh concrete may be placed against adjoining

units, provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located in a manner not to impair strength and appearance of the structure.

Placement of concrete shall be at such rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Lifts shall terminate at such levels as indicated or as to conform to structural requirements as directed. If horizontal construction joints are required, a strip of 25 mm square – edge lumber, leveled to facilitate removal shall be taken to the inside the forms at the construction joint. Concrete shall be placed to a point 25 mm above the underside of the strip. The strip shall be removed (1) one hour after the concrete has been placed, any irregularities in the joint lines shall be leveled off with a wood float, and all laitance removed. Prior to placing additional concrete, horizontal constructed joints shall be prepared as specified in *BONDING*.

Crack control joints in slabs on grade are specified in ***Part III.C – CONCRETE WORKS***

C.09 Placing Concrete

Concrete shall be transported from mixer to the place of final deposit in a continuous manner, as rapidly as practicable without segregation or loss of ingredient until the approved unit of work is completed. Placing will not be permitted when the sun, heat, wind or limitations of facilities furnished by the Contractor, prevent proper finishing and curing of the concrete.

Concrete shall be placed in the forms, as closed as possible in the final position, in uniform approximately horizontal layers not over 300 mm deep. Forms splashed with concrete of form coating shall be cleaned in advance of placing subsequent lifts. Concrete shall not be allowed to drop freely more than 10 m in unexposed work, not more than 1.0 m in exposed work; where greater drops are required, tremie or other approved means shall be employed.

The discharge of the tremies shall be controlled so that the concrete may be effectively compacted into horizontal layers no more than 300 mm thick, and spacing of the tremies shall be such that segregation does not occur. Concrete to receive other construction shall be screeded to the proper level to avoid excessive skimming or grouting. Conduits and pipes shall not be embedded in concrete unless specifically indicated or as directed by the Owner.

Time Interval between Mixing and Placing: Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed in the forms within 45 minutes from the time ingredients are charged into the mixing drum. Concrete transported in truck mixers or truck agitator shall be delivered to the site of work, discharged in the forms within 45 minutes from the time that the ingredients are

discharged into the mixing drum. Concrete shall be placed in the forms within 45 minutes after discharge from the mixer at the jobsite.

Earth – foundation Placement: Leveling concrete for concrete foundations, exterior slabs and exterior foundations receiving equipment or machinery shall be placed upon undisturbed surfaces conforming to ***Part III.B – EXCAVATION AND BACKFILLING FOR BUILDINGS***. The surfaces shall be clean, free from mud and water. The concrete foundations may be placed over the leveling concrete surfaces.

Conveying Concrete by Chute, Conveyor or Pump: Concrete may be conveyed by chute, conveyor, or pump if approved in writing. In requesting approval, the Contractor shall submit his entire plan of operation for time of discharge of concrete from the mixer to final placement in the forms, and the steps to be taken to prevent the formation of cold joints, in case the transporting of concrete by chute, conveyor or pump is disrupted. Conveyor and pump shall be capable of expeditiously placing concrete at the rate most advantageous to good workmanship. Approval will not be given for chutes or conveyors requiring changes in the concrete materials or design mix for efficient operation.

a) ***Chutes and Conveyors:*** Chutes shall be of steel or steel line wood, rounded in cross section rigid in construction, and protected from overflow. Conveyors shall be designed and operated, and chute section shall be set, to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients, loss of mortar, or change in slump. The discharge portion of each chute or conveyor shall be provided with a device to prevent segregation. The chute and conveyor shall be thoroughly cleaned before and after each run. Waste material and flushing water shall be discharged outside the forms. When using tilted chutes, the inclination should not be flatter than one (1) vertical and two (2) horizontal. From the outlet/mouth of the chute to the concrete surface, the maximum allowable height shall be 1.50 m.

b) Pumps shall be operated and maintained so that a continuous stream of concrete is delivered into the forms without air pocket, segregation of change in slump. When pumping is completed, concrete remaining in the pipeline shall be ejected, wasted without contamination of concrete already.

c) After each operation, equipment shall be thoroughly cleaned and the flushing water shall be splashed outside the forms.

d) ***Placing Concrete Reinforcement:*** Where congestion of the steel or other conditions will make placing or compaction of concrete difficult, a layer of mortar shall be first deposited in forms to a depth of approximately 25 cm. Mortar proportions shall be the same as the concrete minus the coarse aggregate.

C.10 Compaction

Immediately after placing, each layer of concrete shall be compacted by internal concrete vibrators supplemented by hand-spading, rodding, and tamping. Tapping or other external vibration of forms will not be permitted unless specifically approved by the Owner. Vibrators shall not be used to transport concrete inside forms. Internals vibrators submerged in concrete shall maintain a speed of not less than 7,000 impulses per minute. The vibrating equipment at all times shall be adequate in number of units and power to properly consolidate all concrete.

Spare units shall be on hand as necessary to ensure such adequacy. Duration of vibrating equipment shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrators shall not be inserted into lower courses that have begun to set.

Vibrators shall be applied at uniformly spaced points not farther apart that would affect the visible effectiveness of the machine.

C.11 Bonding

Bonding/depositing new concrete on or against concrete that has set: The surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be retightened. The cleaned surfaces shall be moistened but shall be without free flowing water when concrete is placed.

C.12 Slabs on Grade

Capillary water barrier to avoid surge shall conform to ***PART II.C – PORTLAND CEMENT CONCRETE PAVEMENT & III.C – CONCRETE WORKS***

Concrete shall be compacted, screeded to grade, and prepared for the specified finish. Concrete shall be placed continuously so that each unit of operation will be monolithic in construction. Concrete shall be placed in alternate check board pattern terminating at crack-control joints or construction joints or may be placed in alternative paving lanes as limited by expansion, and contraction joints. Crack-control joints shall be expansion, contraction, or construction joints. Joints not shown shall be lifted at column centerlines and at intermediate intervals so that such panel shall not be more than 55 sq.m. Panels shall be approximately square with dimensioning of one side not more than 7.5 m. Forms shall remain in place for at least twelve (12) hours after complete placement.

Construction joints may be formed by the insertion of hard-pressed fiberboard strips inserted in the plastic concrete or may be cut with an approved concrete

sawing machine, after the concrete has set. Unless otherwise indicated or directed the joints shall be 3 mm wide and depth equal to approximately 1/4 of the slab thickness of the maximum size of the coarse aggregate whichever is greater.

C.13 Finishes of Concrete

Within twelve (12) hours after forms are removed, surface defects shall be remedied as specified herein. Fine and loose material shall be removed. Honeycomb, aggregate pockets, voids over 13 mm in diameter, and holes left by the rods or bolts shall be cut out to solid concrete, reamed, thoroughly wetted, brush-coated with neat cement rout, and filled with mortar. Mortar shall be a stiff mix of 1 part Portland cement to not more than 2 parts fine aggregates passing the no. 16 mesh sieve, and minimum amount of water. The color of the mortar shall match the adjoining concrete color. Mortar shall be thoroughly compacted in place.

Holes passing through walls shall be completely filled from the inside face by forcing mortar through to the outside face. Holes, which do not pass entirely through wall, shall be packed full.

Patchwork shall be finished to match adjoining surfaces in texture and color. Patchworks shall be damping cured for 72 hours. Ambient temperature shall not be less than 10 degrees C. Dusting of finish surfaces with dry material or adding water to concrete surfaces will not be permitted.

C.14 Concrete Finished for Slabs

Slabs Receiving Concrete Paving: After concrete is placed and consolidated, slab shall be screed or struck off and no further finish is required.

Smooth Finish: Required only when specified; screed concrete and floats to required level with no coarse aggregate visible. After surface moisture has disappeared and laitance has been removed, the surface shall be finished by float and steel trowel.

Broom Finish: Required for paving, stairs and landings, the concrete shall be creed and floated to required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance has been removed, surface shall be float-finished to an even, smooth finish. The floated surfaces shall be broomed with a fiber bristle brush in a direction transverse to the direction of the main traffic.

Tolerance: Smooth and broom-finished surfaces shall be true to plane with no deviation in excess of 3 mm in any direction when tested with a 3.0 m. straight edge.

C.15 Finishes of Concrete other than Floor Slabs

Within twelve (12) hours after forms are removed, surface defects shall be remedied as specified herein. Honeycomb, aggregate, pockets, voids over 12 mm in diameter, and holes left by the rods or bolts shall be cut out to, reamed, and thoroughly wetted, brush-coated with next cement grout and filed with mortar. Mortar shall be a stiff mix of 1 part Portland cement and not more than 2 parts fine aggregates passing the no. 16 mesh sieve. Minimum amount of water using white Portland cement for all or part of the cement so that when dry, the color of the mortar shall be thoroughly compacted in place. Holes passing entirely through walls shall be completely filled from the inside face by forcing mortar through the wall shall be packed full. Patchwork shall be damp cured for 72 hours protruding portions of bar supports shall be ground flush with concrete surfaces that will be exposed, painted, or plastered directly.

Smooth Finish: After the above operations have been completed, smooth finish shall be given to interior and exterior concrete surfaces that are to be painted or exposed to view. Smooth finish shall consist of thoroughly wetting and then brush-coating the surfaces with cement grout composed by volume of 1 part fine aggregate passing the no. 30 mesh sieve and mix with water to the consistency of thick mixes, so that the final color of grout, when dry, will be approximately the same as the color of the surrounding concrete. Grout shall be cork or wood-floated to fill all pits and air bubbles; visible grout film. The grout shall be kept damp by means of fog spray during the setting period. The finish of any area shall be completed in the same day and the limits of a finished area shall be made at natural breaks in the finished surface.

Rough Slab Finish: Slabs to receive full and mortar setting beds shall be screeded with straightedges to bring the surface to the required finish plane with no aggregate visible.

Broom Finish shall be given to exterior surfaces except concrete stairs treads, entrances, and landings for buildings. The concrete shall be screeded and floated to the required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance has been removed, surfaces shall be still troweled to an even, smooth finish. The trawled surfaces shall be broomed with a fiber bristle brush in a direction transverse to that of the main traffic.

C.16 Curing

Concrete shall be protected against moisture loss, rapid temperature change, mechanical injury from rain or flowing water, for a minimum period of seven (7) days.

Concrete shall be maintained in a moist condition at temperature above 10 degrees C throughout the specified curing period and until remedied work started under

Part III.C – CONCRETE WORKS. Curing activities shall be started as soon as free water has disappeared from the surface of the concrete after placing and finishing. Form under surfaces shall be moist cured with formworks in place for the full curing period. All formworks shall not be removed prior to the end of the curing period by approved means. Curing shall be accomplished by any of the following methods or combination thereof, as approved.

Water: Water used in curing shall be reasonably cleaned and free of oil, salt, acid, alkali, or other substances injurious to the concrete. Drinking water may be used for curing test.

Moist Curing: Uniformed surfaces shall be covered with burlap or mats, wetted before placing and over-lap at least 150 mm. Burlap or mats shall be kept continually wet and in intimate contract with the surface. If the forms are removed before the end of the curing period, curing shall be continued on uniformed surfaces, using suitable materials.

D. CONCRETE WATER PROOFING

D.01 Scope of Work

This item shall consist of furnishing all water proofing materials, labor, tools, equipment and other facilities and undertaking the proper work required as shown on the plan and in accordance with this specification and as directed by the Engineer.

D.02 Material Requirements

Liquid water-proofing materials shall be Multi-high Quality Water Proofing Film (Castle Brand or equivalent materials) applied in liquid form and shall be approved by the Engineer.

Integral water proofing shall be in accordance with the approved manufacturer's recommended amount/ratio of admixture for cement.

D.03 Construction Requirements

D.03.1 Submittals

The Contractor shall submit for approval of the Engineer the manufacture's recommended method of waterproof installation/construction.

D.03.2 Delivery, Storage, and Product Handling

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Materials shall be delivered to the job site in their original unopened packages, clearly marked with the manufacturer's name, brand name, description of contents, and shelf life of containerized materials.

Materials shall be stored in clean, dry areas, away from excessive heat, sparks, and open flame. Storage area shall be ventilated to prevent build-up of flammable gases. Maintain temperatures in the storage area below the materials' flash point and within limits recommended by the manufacturer's printed instructions.

Handle materials and containers during application work safely and in accordance with manufacturer recommendations. Store liquids in airtight containers and keep containers closed except when removing materials. Do not use equipment or containers containing remains of dissimilar materials. Do not expose foam component containers to direct sunlight for periods of time sufficient to cause contents to exceed 26 degrees C. Mark and remove from job site materials which have been exposed to moisture or that exceed shelf-life limits. Not more than half the shelf-life shall have expired when materials are applied.

D.03.3 Surface Preparation

Concrete surface to be applied with water proofing shall be structurally sound, clean, and free of dirt, loose mortar particles, paints, films oil, protective coats, etc.

All defects shall be properly corrected and carefully formed to provide a smooth surface that is free of marks and properly cured prior to application works.

Inside corners where vertical and horizontal structure meet shall be provided with cants measuring 50 mm. or rounded at corners a minimum of 50 mm. radius.

Concrete slabs shall be properly graded to drain rainwater. Provide a minimum pitch of 1 on 100 to satisfactorily drain rainwater freely into the drainage lines, gutters, and downspout.

Drainage connections and weep holes shall be set permit the free flow of water.

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

Provide reglets of about 40 mm. deep by 40 mm. wide and 250 mm. above floor along walls or parapets for the termination of the membrane.

Prepared surface shall be cured and kept wet by sprinkling with water at regular intervals for a period of at least three days and allow surface to actually set within seven (7) days.

Ensure that the prepared surface has completely set, and all defects repaired.

D.03.4 Application Procedure

Prior to application of Multi-High Quality Water Proofing Film, concrete surfaces should be sound and cured without the use of curing compound. Apply a coat neutralized to removed oil, dirt and other contaminants.

Apply a primer coat of Cement and Mortar Intensifier (Castle Brand, PME 901) or equivalent (coating of the manufacturer at the rate of 25 square meter per gallon over the surface area to be applied by brush or roller brush (Make a mix of PME 901 and 150% of water perfectly).

The prime coat shall be allowed to dry in 40 to 60 minutes before applying the main water proofing materials.

Apply three (3) coats of Multi-High Quality Water Proofing Film (Castle Brand, PME 202) or equivalent by using brush or roller at the rate of three (3) to four (4) square meters per gallon for three (3) coats at a film dry thickness of 1.0 mm. to 1.2 mm.

Integral water proofing with anti-crack fiber application/procedure shall conform to manufacturer's specification.

D.03.5 Environmental Conditions

Do not apply roof system materials during inclement weather; when surface moisture, or visible dampness is present on the surface to be covered; or when precipitation is imminent. Use moisture-measuring methods and equipment as required to verify that the moisture conditions of substrate surfaces are in accordance with roof system materials per manufacturer requirement prior to application of foam and coating materials. Substrate temperature shall be within limits recommended by the manufacturer's printed instructions, unless specified otherwise.

D.03.6 Special Safety Provisions

During application, the following shall be required unless in conflict with the manufacturer's recommendations or requirements of a recognized legal authority, in which case, the manufacturer's recommendations or the legal authority's requirements take precedence.

a) Special Equipment

    1) Air Masks

Wear fresh air supply masks when applying foam or when handling hazardous liquid materials. Respiratory protective devices shall be as recommended by AIHA Z88.6. Instruct personnel required to use respiratory protective devices in the use of the devices. Maintain such equipment and inspect regularly.

2) Eye and Face Masks

Use eye and face protection during materials applications. Eye and face protective equipment shall meet the requirements of ANSI/ISEA Z87.1.

3) Clothing and Gloves

Wear protective clothing and gloves during materials applications. Skin areas not covered by clothing shall be protected by protective creams.

b) Handling Precautions

1) Venting of Material Containers

Partially unscrew material container and drum caps to gradually vent the containers prior to opening. Do not inhale vapors. Decontaminate empty component containers by filling with water and allowing to stand for 48 hours with bung caps removed. Under no circumstances seal, stop, or close the containers which have been emptied of the foam component.

D.03.7 Alternative

No substitution of materials shall be made unless authorized in writing by the Engineer prior to starting the work of waterproofing.

D.03.8 Minimum Guarantee Period

a) The Contractor shall guarantee the work for a minimum guarantee period of five (5) years. The Contractor shall make a sub-contract agreement with an approved manufacturer in which following conditions shall be included:

b) Minimum guarantee of five (5) years after the issuance of Certificate of Completion.

c) The Contractor shall transfer all the rights to the Employer, free of charge after the issuance of Certificate of Completion.

D.03.9 Flood Testing

Flood test for duration of 24 hours shall be undertaken upon completion of water proofing installation to determine any leakage or defect on the materials and/or workmanship.

E. CEMENT AND MASONRY

E.01 Scope of Work

The work under this section shall include all labor, materials, equipment, plant and other facilities and the satisfactory performance of all work necessary to complete all cement and masonry work shown on the Drawings and as specified herein.

Unless otherwise indicated on the Drawings or specified herein, all materials or work under this section shall be subject to provision under ***Part III.C – CONCRETE WORKS***.

E.02 Mortar

Cement mortar shall be one (1) part Portland cement and three (3) parts of sand by volume.

Re-tampering is not permitted. No mortar that has stood for more than one (1) hour shall be used. Works shall not be permitted on mortar that has reached its initial set.

E.03 Concrete Hollow Blocks

Concrete hollow blocks shall have a minimum compressive strength of 350 psi computed from the average of five (5) units based on the average gross area and a minimum of 300 psi for individual unit. Samples shall be taken at random for every batch/delivery of at least 2,000 pieces and upon the discretion of the Engineer.

E.04 Laying of Concrete Hollow Blocks

Do not wet blocks before using. Blocks must be dry when laid.

The first row of blocks must be thoroughly anchored to concrete walls, columns or slabs. Courses shall be laid straight and uniform with regular running bond and vertical faces truly vertical and set true to line. Each block shall be adjusted to its position in the wall while the mortar is still soft and plastic enough to ensure good bond. The position of the block shall never be shifted after the mortar has stiffened. No re-alignment of a block shall be attempted after a higher or following course has been laid.

All horizontal and vertical reinforcing bars shall be anchored 20 diameters into the concrete walls, columns and slabs.

Dowel bars properly spaced are placed into walls, columns or slabs during pouring and hooked to the vertical bar, leaving bar diameter exposed to splice with the reinforcing bars of the hollow block walls during construction.

All units shall be laid with mortar composed of one (1) part Portland cement and three (3) parts of sand. Unless otherwise specified or detailed on the drawings, horizontal and vertical joints shall be 10 mm thick with full mortar coverage on the face shells and on the web surrounding the cells to be filled.

Reinforcing bars shall have a lap of 40 bar diameters. All horizontal reinforcement must be tied to the vertical reinforcement at their intersection.

After each day's work, uncompleted walls shall be covered with waterproof materials to keep the inside of the blocks dry in case of rain.

E.05 Plain Cement Plaster Finish

All concrete columns, beams, roof beams, exposed concrete hollow block walls and floor surfaces to be applied with plain cement finish shall be clean and evenly wet, slushed with a wash or neat cement and followed by cement mortar 5mm thick which shall be applied with a wooden float to leave the surface straight, true, smooth, plumb and even, and all corner angles and all intersections shall be straight, true and rounded slighted. The use of an approved bond fluid is suggested.

F. STEEL AND METAL WORKS

F.01 GENERAL

Division 1, "General Requirements" contain provisions and requirements essential to these specifications, and apply to this Section, whether or not referred to herein.

F.01.1 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.

F.01.2 Submittal

Before placing orders for the materials for the steel and metal works, the Contractor shall submit to the Engineer for approval shop drawings for all steelworks. All project shop drawings shall show the dimensions of all parts, method of construction, bolts, welding sectional areas and other details.

The details of connections shown on the shop drawings shall be such as to minimize 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.

No materials shall be ordered, nor fabrication commenced, until the shop drawings are approved by the Engineer.

Prepare samples of each type of metal handrails and railings stainless steel hairline finish and automotive paint finish as required on GIP metal. Where finish involves normal color and texture variations, include sample sets composed of two or more units showing limits of such variations expected in completed works.

1. Include 6" long samples of each distinctly different railing member including handrails, top rails, and posts. Include samples of fittings and brackets if requested by Architect.

2. Include sample of typical welded connection.

F.01.3 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.

F.02 MATERIAL REQUIREMENTS

Unless specified herein all steel structures and metals shall conform to the requirements of Section 3.8, "Steel and Metal Works". Connections where details are not specified or indicated herein shall be designed in accordance with the latest edition of American Institute of Steel Construction (AISC), Manual of Construction.

Structural steel works consisting of I-beams, Wide Flanges, base plates, channels, gusset plates and other structural steel shape shall be indicated on the drawings and shall be structural carbon steel conforming to ASTM A 36. However, structural steel works for mechanical machine room at existing refrigeration building as well as new refrigeration building shall conform to ASTM A992, Standard Specification for Structural Steel Shapes. Shapes shall be as given in AISC, Manual of Steel Construction.

Purlins shall be light gage steel conforming to ASTM A500.

Structural steel tubing shall conform to ASTM A500. Grade A.

All anchor bolts shall conform to ASTM A325.

All bolts and threaded fasteners shall conform to ASTM A307 Carbon Steel Externally Threaded Standard Fasteners.

Tubular stainless-steel handrail, rail, and post shall either be conformed to ASTM A554, Type 316 with diameter and galvanized iron pipe. Refer to the drawings for the type of handrail/railing.

Ladders shall be 38 mm diameter galvanized iron pipe support with 6 mm steel plate, 10 mm x 160 bolt with epoxy anchor.

Electrodes for arc welding shall be in accordance with the American Welding Society Code AWS D1.1 unless indicated otherwise. Welding electrodes shall be E70xx.

Fastenings: Commercial types, except where special types are shown or required. Fastenings for all exterior work shall be non-ferrous, unless otherwise shown. Fastenings for steel and aluminium and for all other interior work, where exposed, shall match the fastened metal.

Miscellaneous: Miscellaneous materials or accessories not listed above shall be provided as specified hereinafter the various items of work and/or indicated on the drawings, or in accordance with the manufacturer's specifications.

Contractor shall furnish all plates, cup angles, connectors, etc. required for completion of the structure even if every such item is not shown on the drawings.

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 tests. Four (4) calendar days' notice on which fabricated steelwork will be ready for inspection in the Contractor's yard.

The 50mm diameter handrail shall be made of stainless-steel pipe or square tube Sch. 40, Grade 416.

F.03 EXECUTION

F.03.1 Qualification

Qualification of steel fabricators, erectors, and welders shall comply with requirements of sub-section 3.9.3.1

F.03.2 Fabrication Requirements

a) Workmanship

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

b) Cutting

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

c) 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.

d) Bolt Holes

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

e) High Strength 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 bevelled 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-scale except tight mill scale, and shall be free from dirt, loose scale, burrs, and other defects that would prevent solid seating of parts.

Contact surfaces of friction-type joints shall be free from oil, paint, lacquer, or galvanizing.

f) Welding

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

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.

g) 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 ensure that all necessary clearances have been provided and that binding does not occur in any moving part.

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 matchmarked to facilitate erection in the field.

F.03.3 Fabrication Tolerances

a) 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".

b) Camber

Reverse camber in any structure steel members in excess of 1/1,000 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.

F.03.4 Inspection and Test of Welding

a) Inspection of Welding

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

1) Before Welding

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

2) 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.

3) 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.

b) Testing of Welding

Twenty percent (20%) of welds contributing to 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 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.

F.03.5 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:

a) Excessive convexity or overlap shall be reduced by grinding.

b) Undercuts, lack of weld shall be repaired with necessary reinforcement of weld after removal of any foreign materials such as slag, dust, oil, etc.

c) Any defects such as slag inclusions, incomplete fusion, or inadequate joint penetration, shall be completely removed, cleaned and re-welded.

d) Cracks in welds or vase 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 using 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 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.

F.03.6 Installation

a) Installation Program

1) 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 procedures, scope and standard of quality judgment, and submit such program to the Engineer for approval.

2) Special Technical Engineering

Special technical engineering different from contact specification can be applied upon receiving approval of the Engineer.

b) Installation Requirements

1) Setting of Anchor Bolts and Others

(a) Anchor bolts shall be set in accurate position by using templates.

(b) The setting method shall be proposed to the Engineer for his approval before setting starts.

(c) The threads of bolts shall be cured with an appropriate method against rust and/or any damage before tightening.

(b) Non-shrink mortar shall be placed under base plates, well cured to obtain the sufficient strength before bearing loads are applied to base plates.

c) Temporary Bracing

1) Temporary bracing shall be installed as necessary to stay assemblies and assume loads against forces due to transport, erection operations or other work.

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.

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.

d) 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.

e) 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.

f) Field Welding

1) Any shop paint or surfaces adjacent to joints where field welding is to be executed shall be wire-brushed to remove paint/primer.

2) Field welding shall conform to the requirements specified herein, except as approved by the Engineer.

g) High-Strength Bolts

Final tightening of high-strength bolts shall be done by using manufacturer's power-operated equipment without any overstress to the threads.

h) Correction of Errors

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.

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.

3) Cutting or alterations other than as approved will not be permitted.

i) Erection

1) Erection and installation shall be as per approved shop drawings.

2) Each structural unit shall be accurately aligned using 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.

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.

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F.04 GALVANIZING

F.04.1 Preparation

All mild steel parts exposed to weather shall be hot-dipped galvanized after fabrication in accordance with the requirements of ASTM A 123 or 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 de-scaled and cleaned with the same abrasive blast or other suitable method as approved by the Engineer.

F.04.2 Coating

The zinc coating shall consist of uniform layers of commercially pure zinc free from abrasions, cracks blisters, chemical spots, or other imperfections, and shall adhere firmly to the surface of the steel. The weight of zinc coating per square meter of actual surface shall not be less than 550 grams. Any surface damaged after galvanizing shall be given two coats of approved zinc rich paints.

F.05 PAINTING

This work shall consist of the preparation of the metal surfaces, the application, protection and drying of the painted surfaces, and supplying of all tolls, tackle, scaffolding, labor and materials necessary for the entire work. Painting shall be applied in the field or shop as approved by the Engineer.

Unless otherwise specified or approved, all painting work for structural steel shall comply with the requirements of this Section.

F.05.1 Shop Painting

All structural steel shall be given a shop primer after fabrication and cleaning before delivery to the site.

All steel work shall be thoroughly dried and cleaned of all loose mill scale, rust, and foreign matters by means of sand blasting or other suitable methods approved by the Engineer before shop painting shall be applied. Each individual piece shall be painted prior to assembly. Portions where field contact with concrete is required shall not be painted.

Shop Paintings - Except for galvanized surfaces and items to be encased in concrete, clean ferrous metal surfaces shall be given one coat of Amerlock 400 Epoxy Primer at 100 Microns or approved equal. Additional coat shall be applied to surfaces that will be concealed or inaccessible for finish painting by Amerlock 400, Top Coat at 150 Microns with color or equivalent.

F.05.2 Field Painting

After erection, the Contractor shall thoroughly prepare and clean the entire surface of all structural steel from all dirt, grease, rust, or other foreign matters. The entire surface of all members shall then be field painted.

F.05.3 Materials

a) Structural Steel Work

1) After surface preparation, steel work shall be given one coat of approved prefabricating primer.

2) Before final assembly of steelwork at the fabricator's shop, two shop coats of special red lead primer shall be applied to the surface of sections to be in the permanent contact, meeting faces and all other concealed surfaces. After final assembly, but before delivery to the project site, the steel work shall likewise be given two shop coats of special red lead primer.

b) Galvanized Steelwork

All galvanized steelworks shall be treated with zinc chromate two-pack etch primer followed by one coat of non-etch zinc chromate primer.

c) Miscellaneous Metal Work

Unless otherwise specified in other sections of the Specifications or shown on the drawing, miscellaneous metal works such as ladders, structural steel ladder rungs etc. shall be given two shop coats of epoxy primer and two coats of epoxy enamel.

F.05.4 Construction Methods

a) Cleaning of Surfaces

Surfaces of metal to be painted shall be thoroughly cleaned, removing rust, loose mill scale, dirt, oil or grease, and other foreign substances. Unless cleaning is to be done by sand blasting, all weld areas, before cleaning is started, shall be neutralized with a proper chemical, after which they shall be thoroughly rinsed with water.

Three methods of cleaning are provided herein. The particular method to be used shall be as directed by the Engineer.

1) Hand Cleaning

The removal of rust, scale, and dirt shall be done using metal brushes, scrappers, chisels, hammers or other effective means. Oil and grease shall be removed using gasoline or benzene.

Bristle or wood fiber brushes shall be used for removing loose dirt.

2) Sandblasting

All steel shall be cleaned by sandblasting to remove all loose mill scale and other substances. Special attention shall be given to cleaning of corners and re-entrant angles. Before painting, sand adhering to the steel in corners and elsewhere shall be removed. The cleaning shall be approved by the Engineer prior to any painting which shall be done as soon as possible before rust forms.

3) Flame Cleansing

All metal, except surface inside boxed members and other surfaces which shall be inaccessible to the flame cleaning operation after the member is assembled, shall be flame-cleaned in accordance with the following operations:

(a) Oil, grease, and similar adherent matter shall be removed by washing with a suitable solvent. Excess solvent shall be wiped from the work before processing with subsequent operations.

(b) The surface to be painted shall be cleaned and dehydrated (free from occluded moisture) by the passage of oxyacetylene flames which have an oxygen to acetylene ratio of at least 1.0. The oxyacetylene flames shall be applied to the surfaces of the steel in such a manner and at such speed that the surfaces are dehydrated; dirt, rust loose scale in the form of blisters or scabs, and similar foreign matters are freed by the rapid, intense heating by the flames. The number arrangement and manipulation of the flames shall be such that all parts of the surfaces to be painted are adequately cleaned and dehydrated.

(c) Promptly after the application of the flames, the surfaces of the steel shall be wire brushed, hand scraped wherever necessary, and then swept and dusted to remove all free materials and foreign particles.

(d) Paint shall be applied promptly after the steel has been cleaned and while the temperature of the steel is still above that of the surrounding atmosphere.

d) Weather Conditions

1) Exterior Coatings: Coatings to surface shall not be applied during foggy or rainy weather, or under the following surface temperature conditions: below 4°C, or over 35°C, unless approved by the Engineer.

2) Interior Coatings: Coatings shall be applied when surfaces to be painted are dry and the following surface temperature van be maintained: between 18 to 35°C during the application.

3) Application

Paint shall be factory tinted and mixed. All paint shall be field mixed before applying in order to keep the pigments in uniform suspension.

1) Field Painting

When the erection work is complete, including all bolting and straightening of bent metal, all adhering rust, scale, dirt, grease or other foreign materials shall be removed as specified above.

As soon as the Engineer has examined and approved each steel and metal works structures, all field bolts, all welds, and any surfaces from which the top or first coat of paint has become worn off, or has otherwise come defective shall be cleaned and thoroughly covered with one coat of paint.

Surfaces to be bolted and surfaces which shall be in contact with concrete, shall not be painted. Surfaces which shall be inaccessible after erection shall be painted with such field coats as are required. When the paint applied for retouching the shop coat has thoroughly dried, and the field cleaning has been satisfactorily completed, such field coats as are required shall be applied. In no case shall a succeeding coat be applied until the previous coat is dry throughout the full thickness of the paint film. All small cracks and cavities which were not sealed in a watertight manner by the first field coat shall be filled with a pasty mixture of red lead and linseed oil before the second coat is applied.

The following provision shall apply to the application of both coats. To secure a maximum coating on edges of plates or shapes, bolt heads and other parts subjected to special wear and attack, the edges shall first be striped with a longitudinal motion and the bolt heads with a rotary motion of the brush, followed immediately by the general painting of the whole surface, including the edges and bolt heads.

The application of the second field coat shall be deferred until adjoining concrete work has been placed and finished. If concreting operations have damaged the paint, the surface shall be re-cleaned and repainted.

2) General Manners

Painting shall be done in a neat and workmanlike manner. Paint may be applied with hand brushes or be spraying, except aluminum paint which preferably shall be applied by spraying. By either method, the coating of paint applied shall be smoothly and uniformly spread so that no excess paint shall collect at any point. If the work done by spraying is not satisfactory to the Engineer, hand brushing shall be required.

3) Brushing

When brushes are used, the paint shall be so manipulated under the brush as to produce a smooth, uniform, even coating in coating in close contact with the metal or with previously applied paint, shall be worked into all corners and crevices

4) Spraying

Power spraying equipment shall be used to apply the paint in a fine spray. Without the addition of any paint, the sprayed area shall be immediately followed by brushing, when necessary, to secure uniform coverage and to eliminate wrinkling, blistering, and air holes.

5) Removal of Paint

If the painting is unsatisfactory to the Engineer the paint shall be removed and the metal thoroughly cleaned and repainted.

G. ROOFING AND TINSMITHRY

G.01 SCOPE OF WORK

The work shall include but not limited to all labor, materials, tools, equipment and incidentals necessary to furnish and install the roofing sheets including fittings, flashing caps, ridge rolls, gutters and construction of concrete eaves and canopy excluding eaves and canopy excluding waterproofing, to provide completely sound watertight roof the building as shown on the Drawings and specified herein.

G.02 MATERIAL REQUIREMENT

G.02.1 Concrete Canopy

Concrete materials shall comply with the requirements in Section C, Concrete Works.

Reinforcing Steel bars shall likewise conform to the requirements in Section F, Steel and Metal Works of these Specification.

G.02.2 Tubular Canopy

(See the Plans and drawings for specifications of G.I. tubular canopy)

G.02.3 Metal Roofing

a) Metal Roofing Panel

Roofing for the new fish processing facility shall be pre-painted metal roofing as specified and indicated on drawings. Roof panels shall be capable of supporting design loads between unsupported spans with deflection not greater than 1/180 of the span width on roofs, but in no case shall the wall thickness of the sheets of the panels be less than specified herein. Where gauges are specified, they are subjected to normal manufacturing tolerances. Roofing panels shall be long span rib-type roofing system, with a total coated thickness of not less than 0.60 mm (ga.24) utilizing a double baked-on epoxy primer and high-grade polyester color finish.

Form sheets of galvanized steel shall have an alloy coating of 55% aluminum, 43% zinc and 1.6% silicon. Coating standard shall conform to AZ 150 (150gm/m2) and ASTM A-792. Steel sheets shall be no lighter than 0.6 mm (ga.24) thick for roofing sheet but in no case lighter than required to meet the deflection requirement specified herein for maximum deflections. Sheet profile shall be as specified herein.

Pre-finished coating shall be factory applied. Finish coating shall feature a baked-on high-grade polyester coating providing excellent weather, corrosion, stain, and chemical resistance, and having passed all standard test requirements. Coating shall have a minimum topcoat of 20 microns for exterior surfaces and not less than 8 microns for back coat finish. Exterior color as selected and approved by the Owner and Architect/Engineer.

b) Accessories

Sheet metal flagships, trim, moldings, closure strips, caps, splash pans, and other similar sheet metal accessories used in conjunction with preformed metal panels shall be made of the same materials and finish as used for the panels, except that such accessories which will be concealed after installation, may be provided without the finish if they are aluminium-coated or zinc-coated steel. Thickness of the metal shall be closed cell or solid cell synthetic rubbers, neoprene, or polyvinyl chloride pre-molded to match the configurations of the preformed metal panels. Finish color for flashing, trims, moldings, caps, and other exterior metal components shall be the same as that of the roofing panels.

c) Fastener

Fasteners for attaching panels to structural supports and to adjoining panels shall be as approved and in accordance with the manufacturer's recommendations. Unless specified otherwise, the fasteners shall be either self-tapping screws, bolts and nuts, self-locking rivets, self-locking bolts, end-welded studs, bolted or riveted studs, or step rivets held by steel straps. Design the fastenings system to withstand the design loads indicated. Fasteners, with the exception of those having integral hexagonal washer heads and those having aluminum drive caps, shall have composite metal and neoprene washers. Fasteners having integral hexagonal washer heads and fasteners having aluminum drive caps shall have polychloroprene washers.

d) Screws

Screws shall not be less than No. 14 diameter self-tapping type or self-drilling and self-tapping type.

e) Blind Rivets

Blind rivets shall be stainless steel with 5 mm (3/16 inch) nominal diameter shank or aluminum with 5 mm (3/16 inch) nominal diameter shank. Use threaded-stem-type rivets for other than the fastening of trim. Rivets with hollow stems shall be closed.

f) Bolts

Bolts shall not be less than 6 mm (1/4 inch) diameter, shouldered or plan shank required, with nuts.

g) Joint Sealing Materials

Joint sealing material shall be as recommended by the roofing panel manufacturer.

G.03 INSTALLATION

G.03.1 Concrete Canopy

Construction of concrete eaves and canopy shall be in accordance with Section C, "Concrete Works" as shown on the Drawings and as directed by the Engineer.

Waterproofing shall be in accordance with Section D, "Concrete Waterproofing".

G.03.2 Metal Roofing

a) Installation

Install in accordance with the manufacturer's approved erection instructions and diagrams, except as specified otherwise herein. Panels shall be in full and firm contact with supports and each other at side and end laps. Where sheets are cut in the field or where any of the factory-applied coverings or coatings are abraded or damaged in handling or installation, they shall, after the necessary repairs have been made with materials of the same types as the weather coating, be approved before installation. All cut ends and edges, including those at openings through the sheets, shall be sealed completely. Defects or errors in the materials shall be corrected in an approved manner. Remove materials which cannot be corrected in an approved manner and provide non-defective materials. Provide molded closure strips where indicated and whenever sheet terminate with open end after installation.

b) Roof Sheets

Apply roofing sheets with the configurations parallel to the slope of the roof and as indicated on drawings. Provide roofing sheets in the longest lengths obtainable, with end laps occurring only at structural members with no transverse joints except at the juncture of ventilators, roof hatch, and similar openings. Lay all side laps away from the prevailing wind and seal side and end laps with joint sealing material. Flash and seal the roof at the ridge, at eaves and rakes, at projections through the roof, and elsewhere as necessary. Accomplish the placement of closure strips, flashing, and sealing material in an approved manner that will assume complete weather tightness.

c) Flashing

All flashing and related closures and accessories in connection with the preformed metal panels shall be provided as indicated and as necessary to provide a watertight installation. Details of installations that are not indicated shall be in accordance with the panel manufacturer's printed instructions and details or the approved shop drawings. Installation shall allow for expansion and contraction of flashing.

d) Fasteners

Fastener spacing shall be in accordance with the manufacturer's recommendations and as necessary to withstand the design loads indicated. Install fasteners in valleys or crowns as recommended by the manufacturer of the sheet being used. Install fasteners in straight lines within a tolerance of 12 mm in the length of a bay. Drive exposed penetrating type fasteners normal to the surface and to a uniform depth to seat gasket washers properly and drive so as not to

damage factory-applied coating. Exercise extreme care in drilling pilot holes for fastenings to keep drills perpendicular and centered in valleys or crowns, as applicable. After drilling, remove metal fillings and burrs from holes prior to installing fasteners and washers. Torque used in applying fasteners shall not exceed that recommended by the manufacturer. Remove sheets deformed or otherwise damaged by over-torqued fastenings and provide new sheets.

H. CARPENTRY WORKS

H.01 Scope of Work

The scope of work shall consist of furnishing all tools, labor, equipment, and materials, unless otherwise specified to complete all carpentry and joinery works shown on the Drawings and specified herein.

H.02 General Provisions

Lumber shall be of approved quality of the respective kinds required for the various parts of the work, well seasoned, thoroughly dry and free from large, loose or unsound knots, sap shakes or other imperfections impairing its strength, durability or appearance.

Framing lumber shall be of the rough dimensions unless otherwise shown on the Drawings.

All exposed woodwork shall be smoothly dressed and sandpapered.

ANY LUMBER equally good for the purpose intended may be substituted for the kinds specified, subject to the approval of the Owner. Provided, however, that in the substitution of the cheaper kind of lumber that specified, a reduction in the contract price equal to the difference in the cost of the two kinds of lumber will be made.

H.03 Fastenings

Fastenings shall be common nails, glue as specified, flat-head wood screws (F.H.W.S), round-head wood screws (R.H.W.S), bolts or lag screws where specified or called for shall be used.

Conceal fastening as much as possible, or if not possible, locate them in inconspicuous places. Where nailing is permitted through woodwork smooth-finished face, conceal nail heads.

H.04 Protection and Storage

Lumber shall be protected and kept under cover both in transit and at the job site and shall be carefully piled off the ground and be insured of proper drainage, ventilation, and protection from the weather. Surface of wood framework, and other wood members coming in contact with or embedded in concrete shall be painted with two (2) coats of hot applied asphalt.

The Contractor shall protect all finished woodwork and millwork from injury after it has been set in place until the completion and final acceptance of work.

Temporary Supports: Make or provide wood centering or other necessary supports for openings in masonry walls accurately, strongly, and well braced and secured in position until masonry has set thoroughly.

H.05 Wooden Materials

Unless otherwise shown on the drawings, the Contractor shall use the following lumber in accordance with the schedule below:

a) *Apitong* (common grade) for ceiling joist, hangers and nailers.
b) *Tanguile (select grade) for fascia, trims and mouldings.*
c) Coco Lumber for scaffoldings, shoring and bracing only.
d) Marine Plywood for built-in cabinets.

I. DOORS

I.01 Scope of Work

The work under this Section shall include all labor, materials, hardware, painting, equipment, and other facilities and the satisfactory performance of all work necessary to complete all doors shown on the Drawings and as specified herein.

I.02 Doors

All doors shall be guaranteed against warping, twisting or cracking for a period of twelve (12) months from the date of final acceptance of the finished building. This obligates the Contractor to make good such defects or replace entirely any and all such defective doors.

All doors inside public toilets shall be PVC complete with jambs and accessories.

J. WINDOWS

J.01 Scope of Work

The work under this Section shall include all labor, materials, hardware, equipment, and other facilities and the satisfactory performance of all work necessary to complete all aluminum glass windows shown on the Drawings and as specified herein.

J.02 Materials Requirements (Aluminum Glass Windows) Analoc Type

Frame and panel members shall be fabricated from extruded aluminum sections, true to details with clean, straight, sharply defined profiles, and free from defects impairing strength of durability. Extruded aluminum sections shall conform to the specifications requirements as defined in ASTM B211.

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

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

Weather strips shall be of good quality.

For aluminum glass windows, use 6mm thick glass.

J.03 Construction Requirements

For all assembly and fabrication works, cut ends shall be thoroughly and accurately jointed, free of burrs and rough edges. Cut-out recesses, mortising, grinding operation for hardware shall be accurately made and properly reinforced when necessary.

Installation procedure:

a) Main frame shall consist of head sill and jamb stiles specifically designed and machined to interfit and be joined at corners with self-threading screw.

b) Sliding window shall be provided with nylon sheave. Sliding panel shall be suspended with concealed roller overhead tracks with bottom guide pitched outward and slotted to complete drainage. The sliding panels shall be provided with interior handles. The locking devices shall be spring loaded extruded latch that automatically engages special frame hips.

c) All joints between metal surfaces and masonry shall be properly caulked.

J.04 Protection

All Aluminum parts and glasses shall be protected adequately to ensure against damage during transit and construction phase.

J.05 Cleaning

The Contractor shall be responsible for the removal of protective materials and cleaning the aluminum surface including glazing before work is accepted by the Owner.

Aluminum shall be thoroughly cleaned with kerosene or gasoline diluted with water. The surface shall be wiped using clean clothing.

No abrasive cleaning materials shall be permitted in cleaning surface.

K. PAINTING

K.01 Scope of work

The work under this Section shall include all labor, materials, equipment, plant and other facilities and the satisfactory performance of all work necessary to complete all field painting and as specified herein.

K.02 General

Color schemes for the painting of the whole building, complete both inside and outside, shall be furnished by the Architect to the Contractor upon request. Color scheme samples required by these Specifications shall be submitted by the Contractor to the Owner for approval. Expenses for sample of color schemes shall be at the Contractor's expense.

All exposed work shall be protected while the building is being painted. Any dirt, smears, etc., shall be removed by the Contractor to the satisfaction of the Owner.

K.03 Material

All paint materials shall meet the requirements of the standard specifications of the *Standardization Committee* on supplies and shall be in accordance with latest *Classification Class "A" of the Institute of Science, Manila, Philippines*, and shall be delivered on the work in the original containers, with labels intact and seals unbroken.

Davies Paint or Boysen Paint or equivalent shall be used on all surfaces to be painted and certificate of origin and quality shall be submitted to the Owner for inspection and approval before using any of the paint materials.

The use of ready mixed paint may be allowed in this project; provided, however, that such paint is in accordance with the standard Specification No. 13 of the Philippine Government and that ready mixed paints shall be those listed under "Good Substitutes" only.

Tinting colors for latex shall be of the highest grade obtainable. Tinting colors for oil paint shall be color in oil ground in pure linseed oil. Color shall be nonfading. Color pigments shall be used to produce the exact shades of paint which shall conform to the approved color scheme of the building. Except as otherwise noted, color of priming coat shall be white.

All materials to be used in the work shall be stored in a place to be designated by the Owner, and such place shall be kept neat and clean at all times. Any damage on this place and its surroundings shall be rectified. All precautions to avoid danger of fire must be observed by removing oily rags, waste, etc., from the building at the end of daily work.

K.04 Inspection and Preparation of Surface

The Contractor shall inspect all surfaces to be painted and all defects shall be remedied before starting work.

No work shall be started unless the Contractor shall have made certain as to the dryness of surface. Tests shall be made, in the presence of the Owner, to verify dryness of surface to be painted.

Before painting is started, all spaces shall be broom cleaned and all dust, dirt, plaster, grease and other extraneous matter that would affect the finish work shall be removed.

K.05 Workmanship

All painting work shall be done in workmanlike manner by skilled house painters only.

All materials shall be evenly applied on, so as to form a film of uniform thickness, free from sags, runs, crawl, or other defects. The use of a heavy brush (nylon brushes for oil paints) is required, and they shall always be clean and in good condition. Light brushes shall not be permitted. Paint shall be thoroughly stirred to keep the pigment evenly in suspension while paint is being applied.

In general, and unless otherwise specified, and/or instructed by the Owner or due to actual conditions on the job, not less than three (3) days time shall elapse between application of succeeding coats.

Each coat of paint shall be allowed to dry thoroughly and inspected for approval before the succeeding coat is applied. No painting shall be done in damp weather. No work shall be done under conditions that are unsuitable to produce good results. No painting shall be done while plastering is in process or is drying.

Except where otherwise noted or specified, all paints shall be applied in three (3) coats (priming, body and finish). Each coat shall be brush applied (except as otherwise noted), spread evenly and in full covering body.

Surfaces which cannot be satisfactorily finished on the number of coats specified shall have such additional coats or such preparatory coats and subsequent coats as may be required to produce satisfactory finished work.

Spray gun application shall be used where indicated in the color scheme schedule.

Before any painting is started, the Contractor shall furnish the Owner the paint manufacturer's detailed painting recommendation as to surface preparations and applications plus relevant information regarding the use of the paint.

K.06 Concrete and Masonry Surfaces

Surface Preparation

For New Surfaces: Scrape off loose cement, chalk, dust and other surface deposits. Treat the surface with *Davies/Boysen Masonry Neutralizer* or equivalent. Mix one (1) liter Acri-Free Concentrate with sixteen (16) liters of water. Apply by brush and make sure that the alkaline surfaces are completely neutralized. In case of doubt, test the surface with red litmus paper. If it turns blue, then the second neutralization will be necessary. Let dry thoroughly. Do not rinse.

For areas affected by high alkalinity, apply one coat of Dutch Boy Concentrate Sealer. Allow to dry at least four (4) hours before applying succeeding coats.

Application

Apply Davies/Boysen Flat Latex or equivalent as primers. Thin with water if necessary. First coat may be tinted with Davies/Boysen Acrycolor to the desired color of topcoat. Dry for at least 2-4 hours.

Repair minor surface imperfection with suitable putty. Dry for 24 hours, sand then spot coat with topcoat color.

Apply two (2) coats Davies/Boysen Gloss Latex or equivalent for interior/exterior. Tint with Davies/Boysen Acrycolor or equivalent to the desired color.

K.07 Wood Surfaces

For first coat - apply *Davies/Boysen Flat Wall Enamel* or equivalent. Repair surface imperfection with glazing putty.

For second and third coats – apply *Davies/Boysen Quick Dry Enamel or equivalent.* Tint with *Davies/Boysen oil tinting color.*

K.08 Epoxy Polymide Topcoat (1.20 m. from the floor surface)

Surface Preparation

Prepare the surface by removing dirt, oil, grease, burns, weld spatter, loose concrete, masonry and other contaminants before application is performed.

New concrete must be fully cured at least twenty-eight (28) days before etching or neutralizing the surface.

Application

Prime with epoxy Deep Penetrating Sealer to seal up loose aggregates to give perfect hold for subsequent coatings.

Apply two (2) coats of Epoxy Polymide Topcoat. May be thinned up to 25% by volume if necessary. Allow overnight drying in between coats.

K.09 Metal Surfaces

Painting of metal surfaces shall conform to the provisions of **PART III F.05 – STEEL AND METAL WORKS – PAINTING**

K.10 Wood Preservative

Apply two (2) coats of wood preservatives for all wood surfaces such as fascia board and ceiling joist.

K.11 Protection and Cleaning

Protection

a) Lighting fixtures shall be loosened and removed from contact with surfaces, covered and protected, and reset upon completion.

b) Remove all electric plates, surface hardware, etc., before painting, protect and replace when completed.

c) The Contractor, at his own expense, shall make good all undue damage to any part or parts of present structure caused by the Contractor during the execution of the work.

The Contractor shall, upon completion of work, remove all paint, where it has been spilled, splashed, or splattered on the surface, remove all surplus materials, scaffolds, etc., to leave premises in perfect condition and acceptable to the Owner.

Finished surfaces shall be of solid, even colors; and finished texture free from drops, runs, lumps, brush marks, discoloration and other defects. Before final inspection, any work that has become damaged or discolored shall be touched up or refinished in a satisfactory manner.

All other items or work to painted and not specified herein, but necessary to complete the work shall be painted with appropriate first quality paint and suited to the service and nature of the surface and material in accordance with these Specifications.

L. PLUMBING WORKS

L.01 General

a) The Contractor shall provide all items, articles, materials, operations, or methods listed, mentioned, or scheduled on the drawings and/or herein specified, including all labor, materials, equipment and incidentals necessary and required for their completion.

b) All fittings, connections and pipings (hidden or embedded in concrete) shall be subject to inspection by the Authority before covering.

c) The drawings and these Specifications as complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary for the successful operation of any of the particular type of equipment, shall be furnished and installed by the Contractor without additional cost to the Authority. All dimensional locations of fixtures, floor drains, risers and pipe chases shall be verified on the architectural drawings and manufacturer's catalogue.

d) Intent – It is not intended that the drawings shall show every pipe, fitting, valve and appliance. All such items, whether specifically mentioned or not, or indicated on the drawings, shall be furnished and installed if necessary to

complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the Authority.

L.02 Work Included

a) Work included under this Section shall consist of furnishing all labor, tools, equipment, appliances and materials necessary for complete installation testing and operation of the plumbing system in accordance with these Specifications and all applicable drawings in the contract.

b) Inside potable water distribution and supply pipes to fixtures and hose bibs/faucets. The Contractor shall furnish all piping materials and accessories of all water supply line located inside the building structures.

c) Sanitary sewers from the building and their connections to the point of discharge including septic vault as shown in the plans.

d) Drainage system for the entire building from the point of discharge including pipes, open canals, screening tank and catch basin.

e) Soil, waste and vent pipe system within the building.

f) Plumbing fixtures, trims, and accessories.

g) Furnishing of water meter, gate valves, check valves and related accessories.

h) Furnishing and installation of spherical fiber glass water tank and water pump including control for potable water line.

i) Hydrostatic testing and reliability testing.

L.03 Materials

a) All materials to be used shall conform to the standards below. Use of material shall further be governed by other requirements imposed on other sections of these Specifications.

For Water Pipes

- Blue uPVC Fresh/Brackish Water Pipes and Fittings shall conform to ASTM and ISO Standards with nominal pressure of 230 psi. Pipe fittings as per manufacturer's specification.

For Sewer and Drainage Line

- Orange uPVC Sanitary Pipe (for 100mm Diameter and below) uPVC Pipe shall conform to ASTM 2729. Pipes and fittings are specified with integral push on bell complete with elastomeric neoprene O-ring gasket on one end and plain leveled on the other end.

- Orange Gravity Sewer Pipe (for above 100mm Diameter)

- uPVC Pipe shall conform with the Standard Specification of ISO R-161/ISO 4435, SDR-41 Jointing method shall be solvent cement jointing/rubber ring on joint. Pipe fittings shall be as per manufacturer's specifications.

b) Alternative Materials – Use of materials not specified in these Specifications may be allowed provided such alternative has been approved by the Owner and provided further that tests, if required, shall be done by an approved agency in accordance with generally accepted standards.

c) Identification of Materials – Each length of pipe, fittings, traps, fixtures and devices used in the plumbing system shall have cast, stamped indelibly marked on it the manufacturer's trademark or name, the weight, type and classes of product when required by the standards mentioned above.

L.04 Make of Fixtures

Unless otherwise indicated, water closets shall be close coupled, siphon jet, push button dual flush type (equivalent to HCG Eton Model CS4510Q). Water closets shall be equipped with satin finish hand bidet sprayer set.

Kitchen sinks should be stainless steel, schedule 304.

Faucets, bath mixing faucet with hand shower sets shall be quarter turn lever type, chrome plated, HCG brand or equivalent.

L.05 Soil, Water, Drain and Vent Pipes
(For Drainage and Sanitary Sewer Lines)

Underground soil, waste pipes and fittings shall be uPVC Sanitary Pipe, Orange or Brown.

All main vent stacks shall be extended to full size to end, above the roofline except where otherwise specifically indicated.

Vent pipes in roof spaces shall run as close as possible to the underside of the roof, with horizontal piping pitched down to stacks without forming traps. Vertical vent pipes may be connected into one main vent riser above the highest vented fixtures.

Where end or circuit vent pipe from any fixtures or line of fixtures is connected to a vent line serving other fixtures, the connections shall be at least 1,200 mm above the floor on which the fixtures are located, to prevent the use of any vent line as waste pipe, unless indicated otherwise.

Horizontal waste lines receiving the discharge from two or more fixtures shall be provided with end vents unless separate venting of fixture is noted.

Rough in for pipes and fixtures shall be carried along the building construction. Correctly located opening of proper sizes shall be provided where required in the walls and floor for the passage of pipes. All items to be embedded in concrete shall be thoroughly cleaned and free from all rust scale and paint.

L.06 Cleanout, Plugs, Test and Traps

Cleanouts shall be the same size as the pipe but cleanouts larger than 100 mm shall not be required.

Every plumbing fixtures or equipment requiring connection to the sanitary drainage system shall be equipped with a trap. Each trap shall be placed near the fixture as possible. No fixture shall be double trapped.

L.07 Valves and Faucets for Building

Valves shall be KITZ or equivalent and shall be provided on all supplied fixtures as specified.

All valves shall be gate valves, check valves and ball valves unless otherwise specified or noted on the drawings.

Valves up to and including 50 mm dia. shall be brass with threaded ends, rough bodies and finished trimmings.

Faucets shall be U.S. made; chrome plated.

L.08 Fixtures and Equipment Supports and Fastenings

Stub-outs for sanitary lines, and vents shall be 300 mm above the floor line, and properly capped or else installed ready to receive the fixtures. The entire comfort room shall be properly tiled and finished, complete with doors and windows.

All fixtures shall be supported and fastened in a safe and satisfactory manner.

Bolts and nuts shall be horizontal and exposed. Bolts, nuts, cap nuts and screw shall be chromium plated and provided with chromium plated brass washer.

L.09 Drains and Floor Sinks

Floor drains and floor sinks shall be made of high-grade, strong, tough and even grained metals.

L.10 Cleaning

All exposed metal surfaces shall be rid of grease, dirt or other foreign materials.

All plumbing fixtures shall be properly protected from use and drainage during the construction period. At the end of the work and prior to approval, the fixture shall be cleaned as per manufacturer's recommendations to the satisfaction of the Owner.

All pipes, valves and fittings shall be cleaned of grease and sludge, which may have accumulated. The Contractor shall repair any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing due to the system without additional cost to the Owner.

L.11 Defective Work

If inspection or test show any defect, such defect work or matter shall be replaced by the Contractor and inspection and tests repeated until satisfactory to the Owner.

L.12 Septic Vault/Screening Tank/Catch Basin/Holding Tank

Dimensions and locations are indicated in the plan; cement plaster for all inner linings.

Construction shall conform to the Sanitary and Plumbing Code of the Philippines.

All septic vault outlets shall be connected to the nearest sewer system.

The work shall conform to the applicable provision of ***PART III.C – CONCRETE WORKS AND PART III.E – CEMENT AND MASONRY WORKS***.

L.13 Galvanized/Black Iron Pipes and Fittings

Galvanized/black steel pipe shall conform to the requirements of "AST M – 120" and shall be Schedule 40. Fittings for galvanized pipe shall be galvanized malleable iron.

M. DAMPPROOFING

M.01 GENERAL

Division 1, "General Requirements", contain provisions and requirements essential to these specifications; and apply to this Section, whether or not referred to herein.

M.01.1 Scope of Work

The work shall cover the dampproofing and waterproofing requirements for buildings as shown on the drawings.

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

M.01.2 Submittal

a) The Contractor shall submit for approval of the Engineer the name of the manufacturer nominated for the supply of materials and installation. Subcontracting documents shall be submitted to the Engineer by the Contractor.

b) The contractor shall submit the procedure of dampproofing and waterproofing installation/construction for approval of the Engineer.

c) All dampproofing and waterproofing materials shall be installed only by an experienced installer and shall be installed in accordance with the approved manufacturer's installation procedures or methods, approved by the Engineer.

d) Submit mock-up samples of each dampproofing and waterproofing type.

M.01.3 Delivery, Storage, and Product Handling

Refer to item no D.03.2.

M.01.4 MATERIAL REQUIREMENTS

M.01.4.1 Dampproofing

Vapour Barrier: Layer at 6 mils (0.006") polyethylene thick layer.

To be applied for slab on grade of the building interior.

M.01.4.2 EXECUTION - Dampproofing of Slab on Grade

a) Prior to placing the concrete, the hard core should be compacted to a smooth, even surface, eliminating all sharp projections or irregularities which may puncture the moisture barrier.

b) Cover the entire area with a layer of dampproofing film, extending past the perimeter of the slab and turning up against walls for the depth of the concrete.

c) Overlapping of sides and ends, minimum is 0.15 meter.

N. FORMWORKS & SCAFFOLDING

N.01 FORMWORKS

The Contractor shall provide formworks that will produce correctly aligned concrete. Plastering in general shall not be allowed so that extra care shall be exercised by the Contractor in choice of fitting, and rigid supporting of the forms. Plywood, metal, compact phenolic board, or surfaced lumber forms shall be used for all exposed concrete works.

Column formworks shall be checked for plumpness before concrete is poured. Handholds shall be provided in column forms at lowest points of per lifts to render this space accessible for cleaning.

Formworks and shoring shall not be removed until the concrete is adequately set and strong enough to withstand anticipated loading, and in no case less than seven (7) days after pouring.

All girders, beams, centering shall be crowned at least 25 mm in all direction from every eight (8) meters span. However, chambers for all cantilevers shall be as indicated in Plans or obtained from the Owner.

N.02 SCAFFOLDING

N.02.1 General Requirements

Every scaffold shall be of good construction and of sound materials and strength for the purpose for which it is intended.

Timber used for scaffolds shall be in good condition, the bark completely stripped off, and not painted or treated in any manner that defects cannot be easily seen.

All materials and parts of the scaffold not in use or intended for re-use shall be kept under good condition and separate from other materials unsuitable for scaffolds.

N.02.3 Design and Stability

Design

The design shall be in accordance with recognized engineering principles taking into consideration the variability of materials, workmanship, methods of construction, site conditions, construction tolerances and the space for scaffolds.

Scaffolds shall be designed with regard to ease and safety of erection and dismantling.

Supported scaffolds and their components shall be capable of supporting without failure at least four (4) times the maximum intended load, while suspended scaffolds shall have six (6) times factor of safety.

All scaffolds designed by a structural engineer shall be approved by appropriate authority.

Strength and Stability of Scaffolds

All scaffolds shall have vertical members (posts) diagonally and horizontally braced to prevent lateral movement.

All scaffolds shall have no splices between the points of support of load carrying horizontal members and secured to prevent lateral movement.

The footing, sills or anchorage for scaffolds shall be sound, rigid, and capable of carrying twice the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks shall not be used to support scaffolds.

Scaffold posts shall bear on a foundation of sufficient size and strength to spread the load from the posts over a sufficient area to prevent settlement. All posts shall be set plumb.

Any damaged or weakened scaffold members from any cause shall be immediately repaired, replaced, or discarded.

Scaffolds shall not be loaded in excess of the working load for which they are intended.

Scaffolds shall be anchored or secured to permanent or rigid structures. In the absence of permanent structures, guys and sway bracing and/or outrigger shall be used.

N.02.4 Scaffold Erection

No scaffold work shall be undertaken without the direct supervision of a competent/qualified person.

All posts shall be maintained plumb regardless of connection.

All posts spacing and materials shall conform to the designer's specification.

All runners shall be perpendicular to the posts in all situations. Spacing of the runners shall conform to the designed scaffold.

Diagonal brace shall extend from one connection to another. It shall be connected to the post within 150 millimeters from the point of connection.

Diagonal braces shall not exceed an angle of 60 degrees from horizontal.

Diagonal braces shall be installed immediately as the scaffold rises to maintain plumbness of the system.

All posts shall be joined or connected by means of joint pin, spigot, or any appropriate means of connections. No lap connection shall be allowed. Always maintain the base width to height ratio of 1:4 during erection for stability. If the height exceeds what is allowed, refer to Section (strength and stability of scaffolds).

Scaffolds of more than 6 meters in height shall be designed by a structural engineer and shall be erected, installed, and dismantled by TESDA-certified erectors.

Scaffolds shall be erected, added, altered or dismantled only under the supervision of the competent/qualified person in the construction.

N.02.5 Scaffold Dismantling

During dismantling, no component, which endangers the stability of the remaining structure, should be removed.

If dismantling has reached the stage at which a critical member has to be removed, (e.g., a tie or a brace) the stability of the structure should be assured by fixing a similar or otherwise adequate member in place before the member to be taken out is removed.

If changes are made in the scaffold structure during its working life, it is not safe to assume that dismantling can be carried out in the reverse order to the erection; hence, ties and braces shall be inspected prior to dismantling.

Materials should be lowered to the ground and not stored on the scaffold. Components should not be thrown on the ground; they should be lowered hand-to-hand in an orderly manner or brought down by crane, pulley, or other suitable means.

Progressive Dismantling:

1. Scaffolds, which are to be progressively dismantled during the demolition of a building, should not be left projecting above the residual height of the walls more than is necessary. Stabilizing ties should be maintained, especially with sheeted scaffolds.

2. Scaffolds, which are to remain in use while partly dismantled, should be fitted with end guardrails and toe boards at the end of the portion in use.

3. If access is possible on to a partly dismantled scaffold, warning notices should be fixed.

N.02.6 Maintenance and Storage

All scaffolds shall be properly maintained and shall be kept clean, and free of damage. Scaffold accessories requiring lubrication shall be oiled prior to storage in a covered or closed container, or as per manufacturer's recommendation.

N.02.7 Protection from Falling Objects

All materials, equipment, and tools, which are not in use while on the scaffold shall be secured against accidental displacement.

A. GENERAL

GENERAL REQUIREMENTS contain requirements essential to these specifications and apply whether or not individually referred to under this section.

A.01 SCOPE OF WORK

The work shall consist of the supply of labor, materials, equipment, and other facilities necessary to complete the Electrical Works.

All works herein shall comply with the pertinent provisions of the latest edition of the Philippine Electrical Code and is hereby made part of the Contract.

Compliance with the provisions herein shall be the Contractor's responsibility to provide as part of the Contract Work and without separate payment therefor.

NOTE: *Expenses for the power connection/tapping from the existing Local Distribution Utility (DU) including electric meter deposit, billing deposit, drop wires and other accessories necessary for the energization of the project shall be provided by the Philippine Fisheries Development Authority – Navotas Fish Port Complex.*

A.02 EXECUTION AND INSTALLATION WORKS

The work under this contract shall be done in accordance with the provision of the latest edition of the Philippine Electrical Code, the Rules and Regulations of the Bureau of Labor and Standards, and in compliance with the requirements of the local utility company. Nothing contained in these Specifications or shown in the drawings shall be construed as to conflict with national and local ordinances or laws governing the installation of electrical works and all such laws and ordinances are hereby made part of these specifications. The Contractor is required to meet the requirements thereof.

A.03 GUARANTEE

The Contractor shall guarantee that the electrical system is free from all grounds and from all defective workmanship and will remain so for a period of one year from the date of acceptance of the work. The Contractor at his own expense shall remedy any defects, appearing within the aforesaid period.

A.04 WORKMANSHIP

The work throughout shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the PFDA who will interpret the

meaning of the Drawings and Specifications and shall have the power to reject any work and materials that in his judgment are not in full accordance therewith.

A.04.1 Standard of Materials

All materials shall be new and shall conform to the standards of Underwriter's Laboratories, Inc., IEEE, NEMA and the Philippine Standard Agency (PSA) for every case where such a standard has been established for the particular type of materials in question.

All materials on all systems shall comply with the specifications, and all materials, which are not specified, shall be of the best quality of their respective kind.

A.04.2 Ground Test

The entire installation shall be free from improper grounds and from short circuits. Test shall be made in the presence of the PFDA. Each panel shall be tested with mains connected to the feeder and branches, and all switches closed, all fixtures in place, and permanently connected, lamps removed or omitted from the sockets, and all switches closed. Each individual power feeder shall be tested with the power equipment connected for proper and intended operation. In no case shall the resistance be less than that allowed by the Regulations for Electrical Equipment of Buildings. Failure shall be corrected in a manner satisfactory to the PFDA.

A.04.3 Performance Test

It shall be the responsibility of the Contractor to test all systems of the entire electrical installation for proper operational condition. This condition shall apply to the power and lighting installations as well as low voltage and alarm control, signal and communication systems. Where sequence operation is required, the Contractor shall test for proper sequence of the entire electrical installation for satisfactory working condition as approved by the PFDA.

A.04.4 Completion Requirements

Remove waste and debris resulting from this work, as work progresses and upon completion.

Service and adjust moving or mechanical parts for smooth, quiet, and proper operating condition.

Touch up abraded or damaged prime paintings or galvanizing and leave clean and ready for finishing work required.

A.04.5 Trade/Brand Names

Trade/brand names of equipment are intended only to show the degree of standardization on which the design of the particular work is based and also to avoid ambiguous description of the equipment. The indication of the trade/brand names therefore shall in no way be considered to limit the acceptability of other products of equal or better performances, functions, reliability, and durability.

A.04.6 Inspection Test

The Contractor, in the presence of the owner's representative, shall conduct inspection and tests. These tests shall be for the normal operation of the entire electrical system of the project. The decision made by the Owner's representative for correction on any item of work, alteration of incorrect installation, or replacement of defective materials, or any other defects as found by him shall be final and must be complied with by the Contractor within forty-eight (48) hours after receipt of the official written communication before final acceptance can be made.

A.04.7 Routine Test

All routine tests required by the relevant standards shall be carried out even though they are not listed in this specification, at the expense of the Contractor, and these tests shall be carried out at the manufacturer's works. The Contractor shall submit full details of the proposed methods of testing, including connection diagrams, to the Employer for approval, at least one month before testing. The Contractor shall submit to the Employer signed copies of the test certificates, giving results of the prescribed tests. Equipment shall not be dispatched until the Employer has received the test certificates and the Contractor has been informed that they are acceptable. The Employer reserves the right to reject any item of the equipment if the test results do not comply with the values specified or with the data given in the Schedule of Technical Data.

A.04.8 Temporary Light and Power

The Contractor shall provide, install, and maintain adequate incoming service transformer, light feeders, branch circuits, outlets, lamps and fixtures, as required for performance of the work by all trades engaged in the construction of the building structures and installation.

B. LIGHTING SYSTEM

The lighting system shall be complete in every aspect, all as indicated in the plans.

If anything has been omitted in any item of work or material usually furnished which

are necessary for the completion of the lighting system work as outlined hereunder, then such item must be included in this section of the work.

Each lighting outlet shall have standard deep 100 mm. octagonal or square box for each ceiling and bracket fixture installation. Each box shall finish flush against concrete and plaster walls or ceiling, except for exposed work.

The Contractor shall provide and install all lighting fixtures of the size and type as indicated in the drawings. All fixtures shall be wired and installed completely including all lamps and/or tubes, transformers, ballasts, supports, canopies, globes, and other parts and devices necessary for the complete installation and operation.

B.01 RELAMPING

The Contractor shall furnish and install all lamps for the entire lighting fixture installations and shall replace all broken or burned-out lamps up to the time that the owner takes final acceptance of the work.

B.02 LIGHTING FIXTURES/ LUMINAIRES

- 36 maximum watts in weatherproof and dustproof fluorescent fixture light engine, highly efficient built-in LED chip, made with polycarbonate diffuser and housing material, IP65, 1220x85x80 mm, 5000 lumens, 50000 hours (expected life), 6500K CCT with 80 CRI, with Internal Surge Immunity up to 2kV, 220-240V MVolt LED driver, 60Hz, -25°C to 35°C operating temperature, 120° beam angle similar to *Britetech model Halver WP36 LED Weatherproof Luminaire* (valid LED Chip and LED Driver Brand specs sheet submittal and LED Fixtures Photometric or IES file submittal) with minimum two (2) years warranty period

- Moisture-proof and vapor-tight lighting fixture and 1x18 watts essential daylight CFL

- Recessed mounted downlight with center frosted glass cover and plain mirrorized reflector; 6" dia. white powder coated flange and black gear box, complete with E27 socket and Phillips 1x13 watts essential daylight LED lamp

C. WIRING DEVICES

C.01 SWITCHES

Wall switches shall be rated at 15-amps, 240-volts, illuminated switch, wide series, one-way or three-way as required. The type of switch shall be tumbler or snap-on as required, *Panasonic* brand or approved equivalent. Where switches

are installed surface mounted, they shall be installed in type FS conduit fittings and provided with surface mounting covers.

Switches shall not arc during switching operations. Wall switches shall be mounted 1400 mm. from center of device to FFL.

C.02 RECEPTACLES

Receptacle outlets shall be flush-mounted, single or duplex (wall-mounted) or pop-up single or duplex (floor-mounted) rated at 20-amps, 240-volt connection with grounding, wide series, *Panasonic* brand or approved equivalent. Type and color of receptacle outlet plates shall be as selected by the Engineer and appropriate samples of outlets and plates shall be submitted prior to purchase of device.

Weatherproof, if any, shall be *Panasonic* brand or approved equivalent. Wall receptacles shall be mounted 300mm from floor finish unless otherwise indicated in the plan.

C.03 OUTLETS AND SWITCH BOXES

For all outlets of whatever kind for all systems, there shall be provided suitable outlet boxes or other fittings specially designed to receive the type of devices to be mounted thereon. All outlet boxes shall be uPVC type.

Boxes installed in damp or wet locations shall be specifically approved for the purpose and shall be so placed and constructed as to prevent moisture from entering or accumulating within the box.

In walls or ceiling constructed of wood, concrete of other similar materials, boxes and covers shall be flush with finished surfaces. Number of wires and devices contained in the box shall be in accordance with the code. Where necessary flush square outlet boxes shall be fitted with extension rings or raised cover plates.

Boxes shall be securely and rigidly fastened to surface upon which they are mounted or embedded in concrete or masonry and shall be supported from a structural member of the building either directly or by using substantial and approved metal braces.

Standard outlet boxes shall be of the octagonal, square, or rectangular shapes and only deep types no less than 54mm depth shall be used for all installations.

D. PULLBOXES AND WIRE GUTTERS

Pull boxes and wire gutters for the pulling or concealment of wires or cables shall be

provided where indicated and where required though not indicated. It shall be made of steel sheets, thickness not less than gauge 16, galvanized and painted with anti-rust primer.

Pull boxes shall be provided on all conduit runs exceeding 30 meters between outlets. and shall be sufficiently set by bolts braces and fasteners. In large pull boxes, cables shall be tied or racked in an approved manner.

E. RACEWAYS AND CONDUITS

E.01 NON-METALLIC CONDUITS

All conduits shall be unplasticized Polyvinyl Chloride (uPVC), schedule 40, and uniformed wall thickness. It shall be compression and impact resistant, non-corrosive, weatherproof as manufactured by *Moldex, Neltex, Emerald* or its approved equal. The material shall not support combustion and shall not deteriorate when exposed to sunlight, rain, and other elements.

E.02 METALLIC CONDUITS

Conduit shall be Rigid Steel Conduit (RSC), zinc coated high-strength steel tubing meeting Philippine Electrical Code specifications and conforming Underwriter's Laboratories, Inc. requirements, equal to *Nichi* or its approved equivalent. The material shall be hot-dipped galvanized inside and out.

For ceiling drop, conduits shall be flexible metal conduit equal to *Hokki*. The material shall be hot-dip galvanized steel and shall have extruded polyvinyl covering with integral ground.

E.03 INSTALLATION OF CONDUIT SYSTEM

Conduits shall be installed and supported in a rigid and satisfactory manner. No conduits shall be used in any system smaller than 20mm (1/2") outside diameter trade size, nor shall have more than four quarter bends in any one run between outlets and/or fittings. When necessary, pull boxes shall be provided as directed by the Engineer.

All cut ends of conduit shall be reamed to remove rough edges. Where a conduit enters a box or fitting, bushing shall be provided to protect wires from abrasion, unless the design of box or fitting is such as to afford equivalent protection.

Raceways shall be installed at right angles or parallel to building lines. Conduits shall be firmly fastened within 300mm of each outlet box fitting or cabinet by means of standard clamps and intermediately spaced no more than 1.0 meter. All clamps, bolts, straps, etc. shall be galvanized and painted metal.

Support and braces may be welded to structural steel with the specific approval of the Engineer. When running over concrete surfaces, the screws shall be held in place by expansion sleeves.

F. WIRES AND CABLES

600 Volt grade wire shall be copper, hard drawn and annealed and shall be of 98% conductivity.

Wire or cable for lighting and power systems shall be plastic insulated type THHN/THWN as noted on plans or as specified. All wires 8.0 mm^2 and larger shall be stranded unless noted on plans.

No wire smaller than 3.5 mm^2 shall be used except where otherwise specified. Control leads for motors shall be types THHN/THWN, unless otherwise indicated.

All wires shall be color coded (Black, Red, Yellow, Green) and shall be as manufactured by *Phelpsdodge, Philflex, Columbia* or its approved equal.

Ungrounded conductors shall have distinct insulation color from grounded and grounding wires. Grounding wires and cables shall be colored green or white or as approved by the Engineer.

F.01 CABLE CONNECTORS

The connection of conductors from sizes 8.0mm^2 and larger shall be made with copper, solderless, pressure-type connectors. Connection shall be done without damaging the individual cable strands. Connectors shall be provided insulators or fish paperboard separators.

F.02 INSTALLATION OF WIRE AND CABLES

Conductors or cable shall not be installed in conduits, raceways until such systems have been completed, nor it be installed until the inside of conduits has been cleaned.

The Contractor shall exercise due care to prevent damage to conductors, insulation or sheathing when pulling wires and cables.

All feeder cables installed shall be continuous from origin to panel or equipment terminations without running splices in pull box except where taps and splices are approved by the Engineer using suitable connectors.

Wires and cables for power and lighting shall be in separate conduit from any wires or cables for communication and signal systems.

Cable that passes through building exterior walls and underground identification tags of non-corrosive materials shall be stamped on each end and every route.

Wires and cables inside panelboards and control boxes shall be binded by means of plastic straps in a neat and orderly manner.

G. PANELBOARDS

Panelboards shall be as specified in the approved plans.

All protective devices shall meet NEMA and Underwriter Laboratories Inc. specifications. In multiple circuit breakers, all poles shall be interrupted simultaneously during fault conditions.

All busbars and current carrying parts shall be high conductivity copper and shall have current density not more than 1.5 amperes per sq.m. of the cross-sectional area and shall be heavier where required for mechanical strength. Supply with non-ferrous or galvanized bolts, nuts, washers, and other required attachment devices.

Every panel shall be provided on the inside of the door, with directory frame protected by a transparent plastic window, containing typed card indicating the member and designation of the circuits.

All panels shall have swing-type dead front cover and multi-grounding bus or lugs with pressure-type terminals of sufficient quantity and size and so located inside as to permit easy termination of cables.

Panelboards shall be supplied and installed by the Contractor as specified in the plan.

H. CIRCUIT BREAKERS

Circuit breakers shall consist of quick-make, quick-break operating mechanism, thermal magnetic trip unit on each pole and enclosed in a molded phenolic case. The thermal magnetic trip unit shall provide time delay overload protection in case of overload and instantaneous trip for short circuit condition in any one pole.

Rating of circuit breaker shall be suitable for each service application and shall be specified as to rated voltage, current, type, frame, size and frequency as manufactured by similar to *Schneider, GE, ABB, Square-D* or its approved equivalent.

Enclosure of individual circuit breakers or knife switches shall be general purpose NEMA type 1, NEMA type 3R or rain tight NEMA type 4X or as required according to the specific duty called for.

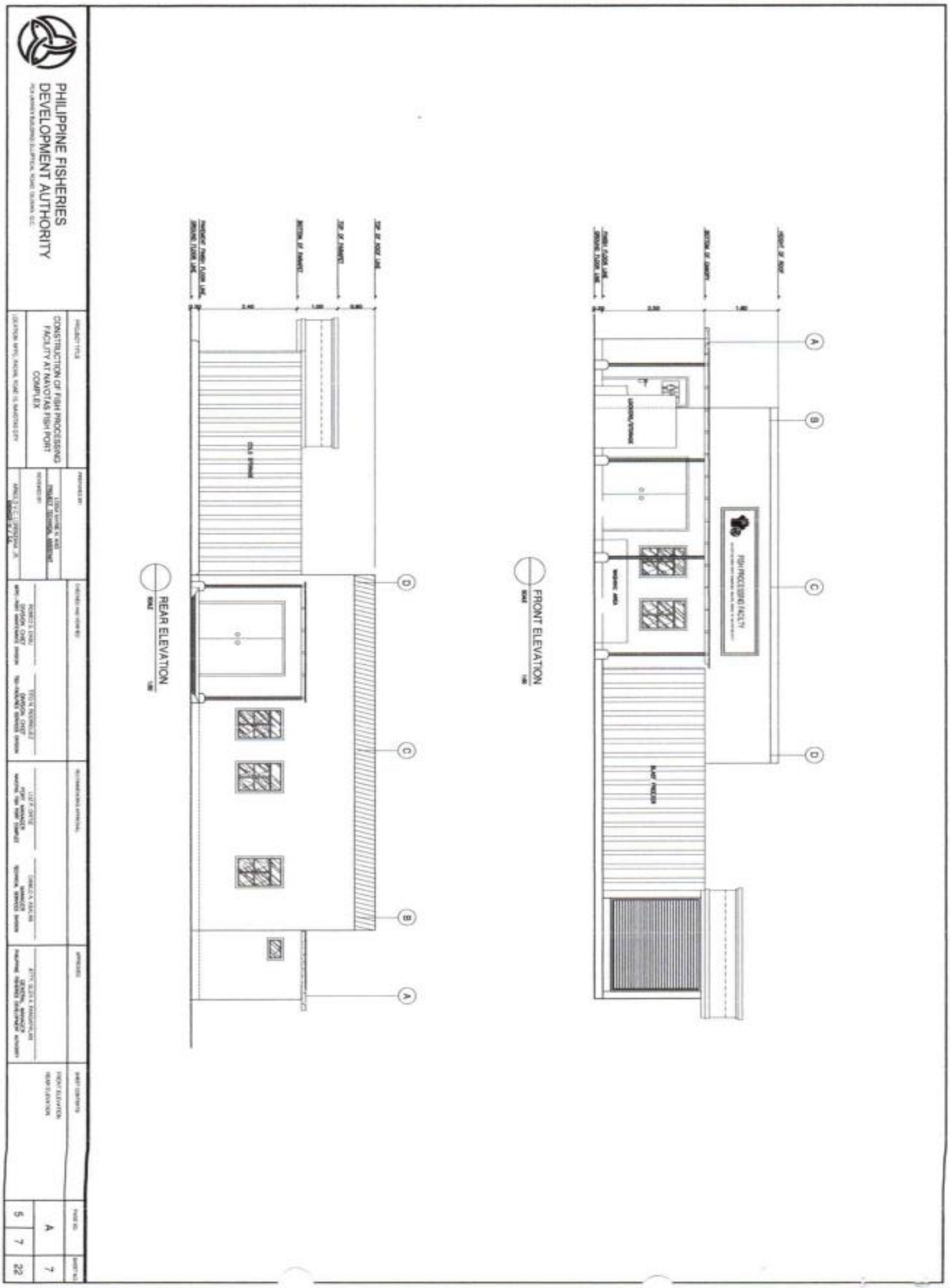
PART V – MOBILIZATION / DEMOBILIZATION OF EQUIPMENT

A. SCOPE OF WORK

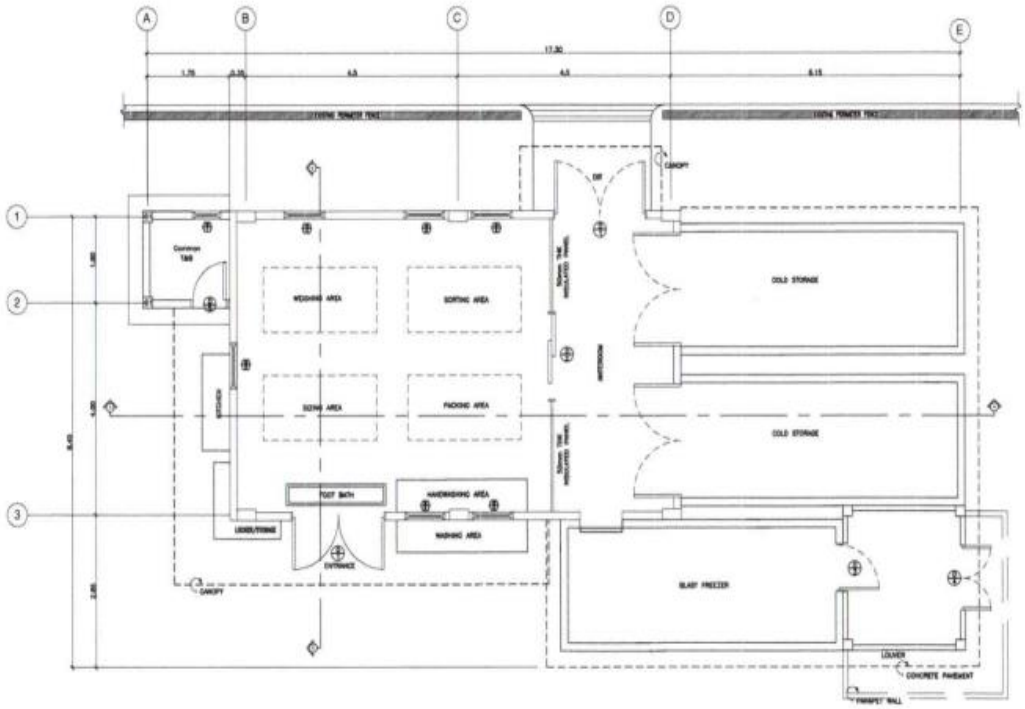
The Contractor shall mobilize and demobilize all equipment necessary to complete all work items of the project.

Mobilization and demobilization shall be treated as a separate item. It shall be computed based on the cost of transportation of all equipment of the Contractor to complete the project.

Section VII. Drawings



PHILIPPINE FISHERIES
DEVELOPMENT AUTHORITY
CONSTRUCTION OF FISH PROCESSING FACILITY AT NAVOTAS FISH PORT COMPLEX
REAR ELEVATION
FRONT ELEVATION
FISH PROCESSING FACILITY
FRONT ELEVATION
REAR ELEVATION
A
7



PROPOSED FISH PROCESSING FACILTY FLOOR PLAN

SCALE 1:50

PHILIPPINE FISHERIES DEVELOPMENT AUTHORITY

PCA (ANNEX) BUILDING ELLIPTICAL ROAD, DILIMAN, Q.C.

PROJECT TITLE: CONSTRUCTION OF FISH PROCESSING FACILITY AT NAVOTAS FISH PORT COMPLEX

LOCATION: NFPC, RADIAL ROAD 10, NAVOTAS CITY

PREPARED BY: MARY ADRIEN A. TAMAYO, ENGINEER I / J.E.

REVIEWED BY: ARNOLD V.C. CERENZANA, JR., ENGINEER III / C.E.

CHECKED AND VERIFIED BY: ROMEO S. DABU, DIVISION CHIEF, NFPC-PORT MAINTENANCE DIVISION; TITO N. RODRIGUEZ, DIVISION CHIEF, TSD-FACILITIES SERVICES DIVISION

RECOMMENDING APPROVAL: LUZ P. ORTIZ, PORT MANAGER, NAVOTAS FISH PORT COMPLEX; DANILO A. AVALAN, MANAGER, TECHNICAL SERVICES DIVISION

APPROVED: ATTY. GLEN A. PANGAPALAN, GENERAL MANAGER, PHILIPPINE FISHERIES DEVELOPMENT AUTHORITY

SHEET CONTENTS: PROPOSED FISH PROCESSING FACILITY FLOOR PLAN

PAGE NO.: A

SHEET NO.: 6

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Section VIII. Bill of Quantities

ITEM NO.	DESCRIPTION OF WORK	PFDA QUANTITY	BIDDER QUANTITY	UNITS	UNIT COST (Estimated Direct Cost & Mark-ups & Value Added Tax)	TOTAL COST
I.	**CONSTRUCTION SAFETY AND HEALTH PROGRAM**	1.00		l.s.		
	TOTAL OF I					
II.	**SITE DEVELOPMENT AND UTILITIES WORKS**					
A.	Demolition of Existing Structures					
1.0	Demolition of Existing Fence and building (Include clearing and grubbing)	1.00		lot		
	Sub-total of II.A					
B.	**Miscellaneous Work Items**					
1.0	Signboard	1.00		unit		
	Sub-total of II.B					
	TOTAL OF II					
III.	**BUILDING FACILITIES**					
A.	Fish Processing					
1.0	Earthworks					
	a. Excavation	23.00		cu.m.		
	b. Backfilling and compaction	14.00		cu.m.		
	c. Gravel bedding	3.00		cu.m.		
2.0	Concrete, Masonry and Tile Works					
	a. Concrete, 20.7 Mpa. (Including lintel beams for all doors and window opening)	22.00		cu.m.		
	b.Floor coating, Chlorinated rubber base (Food grade)	50.40		sqm.		
	c. Rebars and tie wires	1,853.11		kgs.		
	d. Formworks and scaffoldings	1.00		lot		
	e. 150mm thk. 350 psi. CHB (Include rebars in the unit cost)	26.00		sq.m.		
	f. Zocalo wall (Include concrete, rebars, 6"Chb and ect. In the unit cost)	29.00		sq.m.		
	g. Plain cement plaster finish (For columns, beams & parapet and walls)	29.00		sq.m.		
	h. Homogenous Ceramic Tiles, Unglazed 0.30m x 0.30m	3.00		sq.m.		
	i. Homogenous Ceramic Tiles, Glazed 0.30m x 0.30m	16.00		sq.m.		

ITEM NO.	DESCRIPTION OF WORK	PFDA QUANTITY	BIDDER QUANTITY	UNITS	UNIT COST (Estimated Direct Cost & Mark-ups & Value Added Tax)	TOTAL COST
3.0	Water Proofing Works					
	a. Hydrophobic Pore-blocking Ingredient (HPI) Integral Waterproofing w/ 12 mm Anti-crack fiber	10.00		sqm		_____
4.0	Painting Works					
	a. Masonry surfaces, 3 coats	201.00		sqm		_____
5.0	Carpentry and Miscellaneous Works					
	a. White finish aluminum framed awning brown glass window with 6mm thk. (0.60x0.40m)	1.00		set		_____
	b. White finish aluminum framed fixed and awning brown glass window with 6mm thk (0.86x1.16m)	6.00		sets		_____
	c. PVC Door (Inc. jamb/header, hinges.)	1.00		set		_____
	d. HDF Insulated Door 0.90 (Inc. jamb/header, hinges.)	1.00		set		_____
	e. HDF Insulated Double Swing Door 2.0m x 2.10m (Inc. jamb/header,etc.)	1.00		set		_____
	f. Inslulated Double Sliding Door	1.00		set		_____
	g. Metal Louver Double swing Door (Inc. jamb/header, etc.)	1.00		lot		_____
	h. Insulated Double Swing Metal Louver	1.00		lot		_____
	i. Canopy	1.00		lot		_____
	j. GA 25 Pre-painted Roofing sheet (Include bended accessories, teckscrew and sealant)	1.00		lot		_____
6.0	Drainage and Sewerage System					
	a. Catch Basin	6.00		units		_____
	b. Pipes, fittings and accessories (Include pvc pipes, downspout, fittings, strainer, etc.)	1.00		l.s.		_____
	c. Septic Tank (Include rebars and formwork)	1.00		unit		_____
	d. Holding (Include rebars and formwork)	1.00		unit		_____
	e. Screening Tank	1.00		unit		_____
7.0	Plumbing fixtures and Fresh water Supply Works					
	a. Pipes, fittings, valves, stand pipe & accessories	1.00		l.s.		_____
	b. Sanitary plumbing fixtures, (Include water closet, lavatory, bidet, soap & tissue holder , floor drain, etc.)	1.00		l.s.		_____

ITEM NO.	DESCRIPTION OF WORK	PFDA QUANTITY	BIDDER QUANTITY	UNITS	UNIT COST (Estimated Direct Cost & Mark-ups & Value Added Tax)	TOTAL COST
8.0	Electrical Works					
	a. Lighting Fixtures	1.00		l.s.		
	b. Wires and Wiring Devices	1.00		l.s.		
	c. MDP, Lighting Panelboard, Conduits, Boxes, Fittings, and Miscellaneous	1.00		l.s.		
	Sub-total of III.A					
	TOTAL OF III					
IV	**ELECTRO-MECHANICAL AND OTHER RELATED WORKS**					
A.	**Fish Processing Equipment**					
1.0	Ceiling Fans and Exhaust Fans Including Electrical and Mechanical Accessories	1.00		set		
	Sub-total of IV.A					
B.	**Blast Freezer**					
1.0	Miscellaneous materials & consumables such as refrigeration oil, painting, etc.	1.00		l.s.		
	Sub-total of IV.B					
C.	**General Items**					
1.0	Fire Extinguisher Type C	1.00		l.s.		
2.0	Tools, and Other Misc. Materials wrench, pliers, and etc.	1.00		l.s.		
	Sub-total of IV.C					
D.	**Reliability trial testing of whole facility, (1-Weeks)**	1.00		l.s.		
	Sub-total of IV.D					
E.	**Freight Cost of Containerized Blast Freezer (Lucena - Navotas)**	1.00		l.s.		
	Sub-total of IV.E					
	TOTAL OF IV					
V.	**MOBILIZATION / DEMOBILIZATION**	1.00		lot		
	TOTAL OF V					

Section IX. Checklist of Technical and Financial Documents

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;

Technical Documents

☐ (b) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**

☐ (c) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; **and**

☐ (d) Special PCAB License in case of Joint Ventures;
and registration for the type and cost of the contract to be bid; **and**

☐ (e) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**

(f) Project Requirements, which shall include the following:

☐ a. Organizational chart for the contract to be bid;

☐ b. List of contractor's key personnel (*e.g.*, Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data;

☐ c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; **and**

☐ (g) Original duly signed Omnibus Sworn Statement (OSS);
and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Financial Documents

☐ (h) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

☐ (i) If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence;
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

☐ (j) Original of duly signed and accomplished Financial Bid Form; **and**

Other documentary requirements under RA No. 9184

☐ (k) Original of duly signed Bid Prices in the Bill of Quantities; **and**

☐ (l) Duly accomplished Detailed Estimates Form, including a summary shee indicating the unit prices of construction materials, labor rates, and equipmen rentals used in coming up with the Bid; **and**

☐ (m) Cash Flow by Quarter.


Republic of the Philippines
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Government Procurement Policy Board