REPUBLIC OF THE PHILIPPINES
NATIONAL IRRIGATION ADMINISTRATION
REGION VII

# UPPER BINALBAGAN SIP

## (CONSTRUCTION OF LINED CANAL & CANAL STRUCTURES), CANLAON CITY, NEGROS ORIENTAL

## NOSO-LMC-SIP-18-2022

**16 February 2022**

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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 UPPER BINALBAGAN SIP (Construction of Lined Canal & Canal Structures), CANLAON CITY, NEGROS ORIENTAL

1. National Irrigation Administration – Regional Office 7 (NIA-RO7), through the General Appropriation Act – Small Irrigation Project (GAA-SIP) for Calendar Year (CY) 2022 intends to apply the sum of **Nine Million Five Hundred Eighty-Two Thousand Two Hundred Seventy-Nine pesos and 00/100 (₱ 9,582,279.00) only** being the Approved Budget for the Contract (ABC) to payment under contract for **Upper Binalbagan SIP (Construction of Lined Canal and Canal Structures), Canlaon City, Negros Oriental** with Contract No. **NOSO-LMC-SIP-18-2022.** Bids received in excess of the ABC shall be automatically rejected at bid opening.

2. The NIA-RO7 now invites bid for the above Procurement Project. Completion of the Work is required **Two Hundred Forty (240) calendar days**. Bidders should have completed a contract similar to the project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. Instruction to Bidders.

3. Bidding will be conducted through open competitive bidding procedures using non-discretionary "pass/fail" criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

4. Interested Bidders may obtain further information from the NIA-RO7 and inspect Bidding Documents at the address given below from 8:00 A.M. to 5:00 P.M. except during declared (special & regular) holidays and weekends.

5. A complete set of Bidding Documents may be acquired by interested Bidders who were able to log-in in the Philippine Government Electronic Procurement System (PhilGEPS) wherein the name of the company will be reflected in the Documents Request List of the Bid Notice Abstract of the Procuring Entity, from **February 16, 2022, 8:00 A.M. to March 10, 2022, 8:30 A.M.** during office hour from the given address and website(s) below and upon presentation of the payment from NIA - Negros Oriental Satellite Office Special Collecting Officer of nonrefundable fee of **Ten Thousand pesos (₱ 10,000.00) only** its proof of payment for the fees in person, by facsimile, or through electronic means.

   Interested Bidders' representatives must also present a letter duly signed by the General Manager/Owner, if Sole Proprietorship, or authorized Signatory if Corporation, authorizing him/her to acquire the Bidding Documents.

6. The NIA-RO7 will hold a Pre-Bid Conference on **February 24, 2022, 10:00 A.M.** at **Central Visayas Training Center (CVTC), NIA-RO7, Dao District, Tagbilaran City, Bohol** and/or through videoconferencing/webcasting via Google Meet, which shall be open to prospective bidders.

7. Bids must be duly received by the BAC Secretariat through manual submission at the **NIA Regional Office 7, Dao District, Tagbilaran City, Bohol** on or before **March 10, 2022, 9:00 A.M.** Late bids shall not be accepted.

8. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in ITB Clause 15.

9. Bid opening shall be on **March 10, 2022, 9:00 A.M. at Central Visayas Training Center (CVTC), NIA-RO7, Dao District, Tagbilaran City, Bohol** and/or through videoconferencing/webcasting via Google Meet. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The NIA-RO7 reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with sections 35.6 and 41 of the 2016 revised Implementing Rules and Regulations (IRR) of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:
NIA-Negros Oriental Satellite Office
C/O The BAC Secretariat
Osmeña St., Poblacion, Sibulan
Negros Oriental
Telephone No. (035) 419-9590
Email Address: nianegrosoriental@gmail.com

12. You may visit the website (region7.nia.gov.ph) for downloading of Bidding of Documents.

**ENGR. ORENCIO M. APALE**
BAC Chairperson

# *Section II. Instructions to Bidders*

## 1. Scope of Bid

The *National Irrigation Administration - Regional Irrigation Office No.7(NIA-RO7) i*nvites Bids for the **Upper Binalbagan SIP (Construction of Lined Canal and Canal Structures), Canlaon City, Negros Oriental** with Project Identification Number **NOSO-LMC-SIP-18-2022**.

*[Note: The Project Identification Number is assigned by the Procuring Entity based on its own coding scheme and is not the same as the PhilGEPS reference number, which is generated after the posting of the bid opportunity on the PhilGEPS website.]*

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 GAA-SIP CY 2022 in the amount of **PhP 9,582,279.00**

2.2. The source of funding is:

a. NGA, the General Appropriations Act or Special Appropriations.

## 3. Bidding Requirements

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

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

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

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

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and

obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

## 5. Eligible Bidders

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

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

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

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

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

## 6. Origin of Associated Goods

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

## 7. Subcontracts

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

The Procuring Entity has prescribed that:

a. Subcontracting is not allowed.

7.1. *[If Procuring Entity has determined that subcontracting is allowed during the bidding, state:]* The Bidder must submit together with its Bid the documentary requirements of the subcontractor(s) complying with the eligibility criteria stated in **ITB** Clause 5 in accordance with Section 23.4 of the 2016 revised IRR of RA No. 9184 pursuant to Section 23.1 thereof.

7.2. *[If subcontracting is allowed during the contract implementation stage, state:]* The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the implementation of this Contract. Subcontractors must submit the documentary

requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility criteria specified in **ITB** Clause 5 to the implementing or end-user unit.

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

## 8. Pre-Bid Conference

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

## 9. Clarification and Amendment of Bidding Documents

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

## 10. Documents Comprising the Bid: Eligibility and Technical Components

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

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

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

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

10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

## 11. Documents Comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.

11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

## 12. Alternative Bids

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

## 13. Bid Prices

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

## 14. Bid and Payment Currencies

14.1. Bid prices may be quoted in the local currency or tradable 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:*

a. 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 *120 calendar days from opening of bid.* Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

## 16. Sealing and Marking of Bids

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

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

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

## 17. Deadline for Submission of Bids

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

## 18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

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

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

## 19. Detailed Evaluation and Comparison of Bids

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

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

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

## 20. Post Qualification

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

## 21. Signing of the Contract

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

# *Section III. Bid Data Sheet*

# Bid Data Sheet

| ITB Clause | |
|---|---|
| 5.2 | For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be:<br>***Canalization and Canal Structures.*** |
| 7.1 | ***Sub-contracting is not allowed.*** |
| 10.3 | *[Specify if another Contractor license or permit is required.] None* |
| 10.4 | The key personnel must meet the required minimum years of experience set below: |

| Key Personnel | | Relevant Experience |
|---|---|---|
| 1 – Project Manager | – | Preferably Technical individual with at least three (3) years' experience as Project Manager; |
| 1 – Project Engineer | – | A licensed Civil Engineer with at least two (2) years' experience as Project Engineer in similar works; |
| 1 – Materials Engineer | – | With at least two (2) years' experience as Materials Engineer duly accredited by the DPWH provided that the limits of assignment are the following: |
| Materials Engineer II | - | Two (2) projects located within the same province for simultaneous assignments, with an aggregate cost of not more than P150M |
| Materials Engineer I | - | Four (4) projects located within the same province for simultaneous assignments, with an aggregate cost of not more than P 50M |
| 1 – Safety/Health Officer | – | With Training Certificate and with at least two (2) years' experience as Safety Officer. |
| 1 - Foreman | – | with at least two (2) years' experience as Foreman for Earthworks, concreting and/or other related works; |

<table>
<tr><td>10.5</td><td>The minimum major equipment requirements are the following:<br><br><table><tr><th colspan="2">Equipment</th><th>Capacity</th><th>Number of Units</th></tr><tr><td>1.</td><td>Dump Truck</td><td></td><td>1</td></tr><tr><td>2.</td><td>Cargo Truck</td><td></td><td>1</td></tr><tr><td>3.</td><td>Backhoe</td><td></td><td>1</td></tr><tr><td>4.</td><td>Concrete Mixer</td><td>1 bagger</td><td>2</td></tr><tr><td>5.</td><td>Concrete Vibrator</td><td></td><td>2</td></tr><tr><td>6.</td><td>Bar Cutter</td><td></td><td>1</td></tr><tr><td>7.</td><td>Survey Instrument (set)</td><td></td><td>1</td></tr><tr><td>8.</td><td>Plate Compactor</td><td></td><td>1</td></tr></table></td></tr>
<tr><td>12</td><td>[Insert Value Engineering clause if allowed.]</td></tr>
<tr><td>15.1</td><td>The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts:<br>a. The amount of not less than 2% of the ABC, if bid security is in cash, cashier’s/manager’s check, bank draft/guarantee or irrevocable letter of credit;<br><br>b. The amount of not less than 5% of the ABC if bid security is in Surety Bond.</td></tr>
<tr><td>19.2</td><td>Partial bids are not allowed:</td></tr>
<tr><td>20</td><td>None</td></tr>
<tr><td>21</td><td>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.</td></tr>
</table>

# *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 | *[If different dates are specified for completion of the Works by section, i.e. "sectional completion," these dates should be listed here.]* |
| 4.1 | *[Specify the schedule of delivery of the possession of the site to the Contractor, whether full or in part.]* |
| 6 | The site investigation reports are: *[list here the required site investigation reports.]* |
| 7.2 | *[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. |
| 10 | a. 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 7 days of delivery of the Notice to Proceed. |
| 11.2 | The amount to be withheld for late submission of an updated Program of Work is [*insert amount*]. |
| 13 | The amount of the advance payment is 15% of the Contract Price and to be recouped every progress billing, to be made as per herein schedule:<br>a. First (1st) Installment – 7.5% of the Contract Price – upon submission to and acceptance by NIA of an Irrevocable Standby Letter of Credit of equivalent value issued by a commercial bank, a bank guarantee or surety bond, callable upon demand, issued by a surety or insurance company duly accredited by the Insurance Commission and confirmed by NIA.<br>b. Second (2nd) Installment – 7.5% of the Contract Price – upon submission to and acceptance by NIA of an Irrevocable Standby Letter of Credit of equivalent value issued by a commercial bank, a bank guarantee or surety bond, callable upon demand, issued by a surety or insurance company duly accredited by the Insurance Commission and confirmed by NIA (if amount is not included in the first Installment), and after Contractor has fully mobilized the initial equipment requirement and Key Personnel indicated in its Manpower Utilization Schedule. |
| 14 | Materials and equipment delivered on the site but not completely put in place shall not be included for payment. |
| 15.1 | The date by which operating and maintenance manuals are required is *[date]*.<br>The date by which "as built" drawings are required is *[date]*. |

| | |
|---|---|
| 15.2 | The amount to be withheld for failing to produce “as built” drawings and/or operating and maintenance manuals by the date required is *[amount in local currency]*. |

# *Section VI. Specifications*

## STRUCTURE EXCAVATION

**SCOPE**

Structure excavation includes the removal of all materials within the structure lines including necessary dewatering operations not otherwise specified. It shall also include additional excavation within the vicinity of the structure in order to shape the ground shown on the Drawing or as directed by the Engineer.

**CLASSIFICATION**

Structure excavation shall be classified in accordance with paragraph 402.

**CONSTRUCTION REQUIREMENTS**

All excavation requirements described in 403 are applicable under this section.

**METHOD OF CONSTRUCTION**

All structure where practicable shall be constructed in open excavation. The method of construction or excavations shall be in accordance with the applicable provisions of paragraph 404 and the following requirements.

Foundation shall be excavated according to the outline of the footing and floors of structure as shown on the Drawings or as directed by the Engineers, and shall be of sufficient size to permit free movement of workers.

On excavation of common materials, the foundation bed upon which structures are to be placed shall be finished accurately to the established lines and grades after a thorough compaction and trimming of the foundation with the use of suitable tools and equipment. As soon as the foundation excavations have been trimmed to their final level, it should be protected from degradation by weathering. Should the foundation materials soften exposure then the soft materials shall be removed and replaces at the Contractor's expense. If at any point, material is excavated beyond the lines and grades of any part of the structure, the over-excavation shall be more filled with selected materials approved by the engineer and shall be placed in the layers of not more than 20 centimeters think, moistened and thoroughly compacted by special roller mechanical tempers or by other approved methods. A density not less than 90% of the maximum dry density determines by ASTM test D-698 is required. The cost of filling over-excavation ordered by the Engineer shall be borne by the contractor.

On excavation of rock materials, the bottom and side surfaces of excavated rock excavation upon or against which concrete and weep holes are to place shall conform to the required grades and dimensions as shown on the drawings or as established by the engineer. If at any point, materials are excavated beyond the required limits the over-excavation shall be filled with concrete at the expense of the Contractor including the cost of all materials required.

When concrete is to be placed upon or against rock, the excavation shall be of sufficient depth to provide for the minimum thickness of concrete at all points and any deviation from the required minimum thickness of concrete shall be avoid as much as possible. The surface on which concrete will be laid shall be trimmed ad thoroughly cleaned as directed by the engineer.

When excavation of rock materials reaches the surface upon or against which concrete is to placed, blasting

On excavation of rocks materials, the bottom and side surfaces of excavated rock excavation upon or against which concrete and weep holes are to be placed shall conform to the required grades and

dimensions as shown on the drawings or as established by the engineers. If they filled with concrete at the expense of the contractor including the cost of all materials required.

When concrete is to be upon or against rock, the excavation shall be of sufficient depth to provide for the minimum thickness of concrete at all points and any deviation from the required minimum thickness of concrete shall be avoided as much as possible. The surface on which concrete will be laid shall be trimmed and thoroughly cleaned as directed by the Engineer.

When excavation of rock materials reaches the surface upon or against which concrete is to be placed, blasting shall be stopped and the remaining mass of rocks shall be carefully removed by means of jack-hammer or any appropriate hand tool. The point beyond which blasting will not be allowed shall be determined by the engineer. All damages to the rock foundation caused by improper blasting operation shall be repaired by the contractor at his own expense in a manner acceptance to the engineer.

All foundations for bridge pier footing shall be excavated to such depths as may be necessary to secure stable bearing for the structure. Whenever the safe bearing power of the soil as uncovered is less that that called for on the drawing, pilings or appropriate spread footings will be used. The elevations of the bottoms of footings, as shown in the drawings shall be considered as approximate, and the engineers may order, in writing, such changes in elevations and dimensions of footings as may be necessary to ensure a satisfactory foundation. Bearing test, upon written order of the engineer, shall be taken to determine the supporting power of the soil. Cost of bearing test will be paid as "Extra work".

If, in the opinion of the engineer, the material at the base of the excavation is unsuitable for the foundation he shall instruct the contractor to either a] carry out additional excavation to a depth of 50 cm. below the proposed bottom of concrete shown on the drawings and to maximum depth of 60 cm. outside of the outermost lines of said base and replace with backfill compacted to at least 90% of the maximum dry density or b] strengthen the soft materials by ramming in gravel and cobbles until a firm foundation is obtained. Measurement and payment for the backfill shall be made under section XII, "Structure backfill".

**METHOD OF MEASUREMENT**

Structure excavation shall be measured by the cubic meter in its original position before being excavated in accordance with the drawings, or as may be ordered by the engineer, no excavation beyond the pay lines shown on the drawings will be measured for payment. For canal structures, the limit of measurement along the lines perpendicular to the flow of water shall be the vertical planes at the outer edges of the inlet cut-off walls. The upper limits of the solid, measured for payment shall be the canal bottom for canal structures of the original ground surface in case of diversion structures. The lower limits shall be the bottom of the required excavation. Excavated materials not vertically above the boundaries as specified above shall not be measures for payment. The volume measured shall not include water and other liquids removable by pumping. Such materials as mud, quagmire and other similar semi-solid not removable by ordinary pumping shall be considered pay quantities and shall be measured and paid for as "Structure Excavation".

However, in case of structure excavation for canal structures is done before canal excavation, the upper limit of the solid measured for payment shall be the original ground surface in accordance with the surface in accordance with the structure excavation pay lines.

**BASIS OF PAYMENT**

The volume measured as provided above will be paid per cubic meter, which price and payment shall constitute full compensation for furnishing all materials, supplies, labor, equipment, tools and accidents and subsidiary works necessary to complete the work described under this section.

For diversion works, canal siphons and bridge structure excavations, the cost of the dewatering operation unless otherwise specifies in the Bill of Quantities shall be paid under a separate item in the Bill

of Quantities. For all other structure excavations, dewatering operations involved are considered subsidiary work and the cost thereof shall be considered included in the unit price of structure excavation.

The contractor shall be paid sixty percent [60%] of the pay quantities of the actual excavation acceptably accomplished in accordance with the pay lines as shown on the drawings or as directed by the engineer. The remaining forty percent [40%] will be paid upon pouring of concrete for the foundation or upon placing the riprap, gravel blanket or grouted riprap in accordance with drawing and specifications.

## STRUCTURE BACKFILL WITH COMPACTION

### SCOPE

The work under this section shall include hauling [if necessary] and backfilling with suitable materials taken either from Structure excavation, canal excavation, side borrow or borrow haul all spaces excavated and not occupied by the structure and spaces between the natural ground surface and the finished lines indicted to be filled and all other sections directed to be filled by the engineer, all in accordance with these specifications and in conformity with the lines, grades and dimensions shown in the drawings or as ordered by the engineer. It shall also include the dewatering and removal of all unsuitable materials as ordered by the Engineer from the spaces to the backfilled or filled.

### METHOD OF CONSTRUCTION

All spaces to be backfilled or filled shall be cleared of all rubbish and other objectionable matter. The excavation pit to be backfilled shall be dewatered and all mud and loose materials shall be removed before backfilling. The filling materials, with the proper moisture content determined by the Engineer, shall be deposited loose and in layers not exceeding 30 centimeters and then thoroughly compacted by ramming rolling or by means of mechanical tampers or portable vibratory compactors to obtain at least 85% compaction bridge abutments, increasing to at least 90% compaction up to the surface of the roadway in the case of approaches to bridges, Road Crossing or Culvert Structures. The time when to start backfilling operation shall be determined by the Engineer.

### METHOD OF MEASUREMENT

Backfill with compaction shall be measured in cubic meters in its final compacted and uncompact position within the limits of structure excavation pay lines and surfaces of concrete in contact with the backfilled materials as shown on the drawings or directed by the engineer. Volumes occupied by the structure and other features will not be included.

### BASIS OF PAYMENT

Backfill with compaction will be paid for at the contract unit price cubic meter, which price and payment shall constitute full compensation for side borrow, borrow haul and overhaul operations and for furnishing all labor, equipment, tools and all incidentals and subsidiary works necessary for the successful completion of the work under this section.

## CANAL EXCAVATION

### 401 SCOPE

The work under this Section shall consist of excavating and removal of all classes of materials in canal prism including placing into canal embankments within excavated suitable materials, stocking of excavated materials suitable for embankment and backfilling, and trimming of side slopes inside canal

prism and canal beds except on portion of the canal where concrete lining is required [trimming of the foundation bed will be considered included under Section XX. Concrete Canal Ling] all in accordance with the Drawing and these Specifications or as directed by the Engineers.

## 402 CLASSIFICATION

All excavated materials under this Section shall be classified as follows:

1. **Rock Excavation -** For purpose of classification of excavation, rock is defined as sound and solid masses or formation, layers or ledges of mineral matter in place of such hardness and texture that:

   a. Cannot be effectively loosened or broken down by ripping in a single pass with a latest model tractor mounted hydraulic ripper equipped with one digging point of standard manufacturer's design adequately sized for use with and propelled by a crawler-type tractor above 300 HP.

   b. In the areas where it is impracticable to classify the use of the ripper described above, rock is defined as sound and solid material of such hardness and texture which cannot be loosened or broken by 2.72 kg. [6 pound] drifting pick.

   c. Can only be loosened or broken by a special equipment such as jack hammer and pencil hammer attached to an excavator.

   All formation of materials as defined above whose volume is one [1] cubic meter or more will be classified as rock.

2. **Common Excavation-** Excavation of any materials and boulders [whose volume is less than cubic meter] that can be ripped to be loosened by, a dozer of equal or below 180 HP capacity.

3. **Hard Excavation -** Excavation of any materials and boulders [volume of which is at least one cubic meter] that can only be ripped to be loosed by a dozer of above 180 HP to 300 HP.

## 403 CONSTRUCTION REQUIREMENTS

### [a] Explosives and Blasting

1. Explosives

Caps or other exploders or fuses shall in no case be stored in the same place in which dynamite or other explosives are stored, transported to keep. The location and design of powder magazines, the magazines, the methods of transporting explosives and the precautions taken to prevent accidents shall be in accordance with the provisions of all laws, orders, regulations and decrees that are in force in the Philippines or may be issued from time to time by the Government.

The Contractor shall maintain an inventory for storage and withdrawal of power stocks and detonators. The NIA shall be notified immediately of any loss or theft of explosives. The Contractor shall provide such reasonable and adequate subversive action or sabotage to any property. Only reliable personnel shall be permitted to store and handle explosives.

Explosives, if used, shall be of such quantity and power and shall be used in such locations so as to minimize opening of seams and disturbing of material outside the prescribed limits of excavation.

As excavation approaches its final limits, the depth of hole for blasting and the quantity of explosives used for each hole shall be reduced so that the underlying or adjacent material will not be disturbed or shattered. Whenever further might blasting injure the surface of the final excavation and determined by the Engineer, the use of explosive shall be discontinued.

The Cost of furnishing, hauling, storing and handling all explosives shall be included in the contract unit price of the work for which they are required.

**2. Blasting**

Blasting will be permitted only when no proper precautions are taken for the protection of persons, the works, and public or private property. The Contractor shall satisfactorily cover all shots in deep cut excavations and shall take extra precautions on all blasting work as maybe required by the NIA. The Contractor shall blast to the extent necessary and in such a manner that the excavation will not be unduly large or irregular, nor unduly disturb the ground and make it unstable, nor shatter the rock, if encountered, upon or against which concrete is to be placed, nor injure concrete already placed or existing structures at the site or in the vicinity thereof. Whenever, in NIA's opinion, the Contractor's operations are liable to result in duly large excavations or unstable ground, as to injure the rock, concrete or structures, the Contractor shall drill shorter holes and use lighter charges. Approval by the NIA of any of the Contractor's blasting operations shall not relive the Contractor of his responsibility under this paragraph.

The Contractor shall submit his drilling and blasting operations for approval of the Engineers before commencing with his blasting works. No blasting operations shall be undertaken without the approval of the Engineer.

When concrete is to be placed upon or against rock, the excavation shall be of sufficient depth to provide for the minimum thickness of concrete at all points and any deviation from the required minimum thickness of concrete shall be avoided as much as possible. The surface on which concrete will be laid shall be trimmed and thoroughly cleaned as directed by the Engineer.

When excavation of rock materials reaches the surface upon or against which concrete is to be placed, blasting shall be stopped and the remaining mass of rock shall be carefully removed by means of jackhammer or any appropriate hand tool. The point beyond which blasting will not be allowed shall be determined by the Engineers. The damages to the rocks' foundation caused by improper blasting operation shall be repaired by the Contractor at his own expenses in a manner acceptable to the Engineer.

**[b] Section and Slopes**

Excavation sections, profiles and slopes shall be cut true and straight in conformity with the lines and grades shown on the Drawings within the following tolerances, measured normal to the excavated surfaces:

| ITEM | TOLERANCES |
|---|---|
| 1. Side slopes above minimum elevation of cms. operating | ± 30 cms. |
| 2. Profile of operating roads, access roads and protection dike | ± 9 cms. |
| 3. Profile of invert of canals | ± 3 cms. |
| 4. Side slopes inside canal prism for canal and laterals | ± 15 cms. |

5. Side slopes inside canal prism for canal and laterals ± 15 cms.

The extreme of the above tolerance shall not be continuous over a distance of 40 meters measured at any place, in any direction, parallel to the excavated surface.

**[c] Excavation Beyond Established Lines**

Precautions shall be taken to preserve, in an undisturbed condition, materials beyond the designated limits of excavation as shown on the Drawings except unsuitable materials ordered removed by the Engineers. Material loosened beyond the excavation limits as result of excavation limits as a result of excavation operations shall be considered defective work and shall be compacted or removed and replaced with compacted embankment at the Contractor's expenses, as directed by the Engineer.

**METHOD OF CONSTRUCTION**

Canal excavation shall include all excavation works in the canal prism whether common, indurate or rock materials, except additional at structure sites which is specified to be done and measured for payment under excavation for structure.

The Contractor shall only excavate after the area of operation is acceptably cleared grubbed in accordance with Section II, "Clearing and Grubbing". Excavation of all canals shall be accordance with the cross section, lines and grades shown on the Drawings. On portion of the canal where concrete lining is required, canal excavation shall not extend beyond the neat lines of the underside face of the canal lining as shown on the Drawing. The Contractor must exercise care not to extend his excavation beyond the limits called for in the Drawings.
Excavation operations shall be such that all materials suitable for embankment or backfilling and filling shall be separated from objectionable materials which are to be wasted. All surfaces from excavation shall be trimmed to the required slopes and grades within the specified tolerances under paragraph 403 [b]. blasting if permitted by the NIA, shall be in accordance with paragraph 403 [a]. "Explosive and Blasting".

In sections of deep cut in which the canal section is continuous with the road way section and its side slopes, excavation for roadway shall be included under this section. If slides occur on excavated slopes or if run-off flows deposit additional materials in excavations before acceptance of the works, the removal of said slides and/or deposits shall be at the expense of the Contractor.

Large canals like main canals should preferably be excavated with the use of motorized scrapers, excavating in successive layers of about 30 centimeters followed subsequently by trimming of the side slopes using a Grader. Medium sized canals like laterals should preferably be excavated by initially using a D-6 or D-7 Bulldozer for the upper layers and then excavating the bottom layers and side slopes with the use of a Backhoe. Should the Contractor propose to do excavation works by some other means, prior approval of the Engineer must be secured.

**FINISHING CANAL AND ROADWAYS**

Upon completion of all construction operations, the canal section, including slopes embankments, and roadway embankments, shall be finished as specified and shown on the Drawings.

Canal beds, canal embankments and side slopes shall be trimmed and shaped to the finished cross-section to produce smooth surfaces and slopes, and uniform cross-sections.

Stockpiling of materials on finished canal sections, roadways and embankments shall not be permitted. All finished works and surfaces shall be cleaned of all dirt and foreign materials.

The contractor shall also be required to clear the entire right-of-way and areas outside the limits of the right-of-way for all excess of objectionable materials, if such excess or objectionable materials are the result of the Contractor's operation as determined by the Engineer.

All weeds and other objectionable growth, roots, excess earth, debris, loosened rock larger than 7.5 centimeters shall be removed and disposed of in approved sites outside the right-of-way as specified or directed by the Engineer.

The entire canal sections including roadways, side slopes and structure approaches shall be left in a neat and presentable condition.

**METHOD OF MEASUREMENT**

Canal excavation will be measured for every cubic meter of material excavated from the canal prism. Measurement shall be made in its original position after undertaking clearing and grubbing including stripping operations and computed by the Average-End-Area method for every 20-meter section of finished canal within the pay lines or neat lines shown on the Drawings, acceptably excavated and formed into embankments or used for structure backfill, or wasted as directed.

Hauling of excavated materials within the free haul distance either for embankment or disposal to waste areas and trimming of side slopes in canal prism and canal beds except on portion of the canal where concrete lining is required subsidiary work under canal excavation, thus, shall be paid under his section and the cost thereof shall be considered included in the contract unit price for Canal Excavation. Hauling beyond the free haul distance [for waste materials only] and spreading of excavated materials into a canal and roadway embankments and structure backfill shall be paid under Section IX and XII, respectively. Hauling or overhauling for disposal of excavated materials into canal embankments is a subsidiary work for embankment construction and compaction, thus, it will not be measured for payment and the cost thereof is considered included in the contract unit price for Embankment Construction and compaction.

**BASIS OF PAYMENT**

The volume measured as provided above shall be paid per cubic meter, which price and payment shall constitute full compensation for furnishing all materials, supplies, labor, equipment, tools and all incidentals necessary for the successful completion of work described under this Section and for all subsidiary works except for hauling of excavated materials beyond the free haul distance for disposal to waste areas which shall be paid under Section IX, OVERHAUL, and except for trimming of side slopes on portion of canal where concrete lining is required which shall be considered as a subsidiary work under Section XX, Concrete canal Lining.

## EMBANKMENT CONSTRUCTION AND COMPACTION

### SCOPE

The work under this section shall consist of spreading materials taken from canal excavation, structure excavation, side borrow and borrow haul into canal embankments or protection dikes or approaches to bridges and road crossings into all other embankments indicated on the drawings; moisture conditioning and then compacting said materials into the desired degree of compaction, all in accordance with the drawings and these specifications or as directed by the engineer. All works associated with side borrow and borrow haul operations and overhaul for canal embankment are considered subsidiary works for embankment Construction and Compaction.

### SOURCES OF MATERIALS

Materials for embankment and structure backfill for canal and diversion structures may be taken from canal or structure excavation in accordance with section IV and VI. In case where excavated materials from canal prism or from structure excavations are insufficient or unsuitable for embankment formation, additional materials may be taken from side borrow or borrow haul areas not necessarily designated by NIA including acquisition of necessary right-of-way and access thereto. Likewise, materials for protection dikes and approaches to bridges and road crossing may be taken from sources at the Contractor's choice including acquisition of necessary right-of-way. However, possible borrow areas are indicated in the Bid Drawings or as suggested by the Engineer.

### COMPACTION EQUIPMENT

Compaction of canal roadway embankments, protection dikes or approaches to bridges and road crossings or for backfill [if applicable may be done by the use of sheep's foot roller, pneumatic rollers, vibratory compactors or other type of compaction equipment at the Contractor's option as approved by the engineers. The suitability of the proposed compaction equipment to achieve the desires degree of compaction must be demonstrated during the initial phases of compaction operations. The engineer shall have the right to require the Contractor to change compaction equipment if such equipment is deemed unsuitable in achieving the specified degree of compaction with a reasonable period of time.

Watering equipment for moisture conditioning of the embankment materials, prior to compaction, shall be designed to apply water uniformly at the rates required by NIA. Water tank shall be equipped with positive shut-off valves that no leakage will result from the nozzle when the equipment is not in used.

| Soil Classification and/ or Proctor maximum Dry Density Obtained | Minimum Compaction Required Percent of In place Density Maximum Dry Density for | |
|---|---|---|
| | Roads, Dikes and Canal Embankments with roadway | For normal Embankment [without roadway and intrasite or Feeder Roads] |
| L, SM & ML, 85-89 | 100% | 100% |
| CL, SM & ML, 90-99 | 95% | 95% |
| SC, 100-109.9 | 95% | 95% |
| GC, 110-119.9 | 90% | 90% |
| GC, 130- and above | 905 | 90% |

When embankments are to be made on hillsides, whether paralleling a hillside, abutting into a hillside or crossing over a hill, the slope of the original hillside shall be cut horizontally as the work is brought up in layer. Material thus cut shall be re-compacted, along with the new embankment material.

During construction, the contractor shall keep the top of the embankments at such elevation and section to provide natural surface drainage at all times. If the contractor stops work on any portion of the embankment on account of rain or the surface shall be graded to facilitate drainage and the surfaces shall be sealed by passing rubber-tired equipment or flat drum rollers over the surface. Before work is resumed on the area, the surface scarified to a minimum depth of not less than 15 cm., releveled, moisture conditioned, and re-compacted to the specified density.

Should the NIA determined that any portion of the surface of the embankment has become so dry glazed during construction that bond with the succeeding layer to be thereon cannot be obtained, or should ruts develop on the embankment, such surface shall be surface shall be scarified to a minimum depth of 15 cm., releveled, moisture conditioned and re-compacted to the specified density just prior placing of the succeeding layer of the embankment.

All surfaces of the compacted embankment shall be compacted to the lines, and grades shown on the Drawing or as directed by the Engineer with the tolerances in accordance with paragraph 403 [b] for slopes and surfaces and a tolerance of ± 10 cm. for profile surfaces and shall be graded to a uniform slope.

**METHOD OF CONSTRUCTION**

This paragraph covers the construction of all embankments designated on the drawing as compacted embankment including the placing of embankment materials to the low and over excavated areas in the canal. All compacted embankments shall be constructed to the lines, grades and dimensions shown on the drawings, or established by the NIA on a properly prepared foundations approved by the NIA. No objectionable materials shall be placed on the embankments.

Ground surface upon which the embankment is to be constructed shall be scarified to a depth of at least 15 cm. after clearing and grubbing, moisture conditioned, and compacted to not less than the required degree of compaction as shown in Table A below. Materials unsuitable for embankment foundations shall be removed as directed and replaced with suitable materials and compacted as compacted embankment.

Where canal embankment is to be constructed across low swampy ground or where the top soil is not satisfactory for foundation as determined by the Engineer stripping of top soil of the foundation area and compaction will be ordered before construction of the embankment, stripping and disposal of the stripped material is subsidiary work and will not be measured for payment; Provided, however that when stripping to a depth beyond 10 centimeters from the natural ground surface is ordered by the Engineer the stripped materials below the 10 centimeters free stripping depth will be paid for under “Canal Excavation”. In case stripping of the top soil exceeds 10 centimeters, the Contractor should request to NIA for a re-survey to determine the actual volume subject for payment. Verification and approval by the administrator should be obtained first before proceeding with the stripping operation.

Embankments shall be constructed to the lines, grades and dimensions shown on the Drawings or as established by the engineer. Embankment shall be constructed in horizontal layers which extends the full width of the embankment. Thickness of the layers shall not exceed 15 cm. after compaction. The moisture content of the material at the start of compaction shall have optimum moisture of plus or minus 5% as determined by the standard laboratory compaction test on soils [ ASTM Designation D698]. Embankment materials which do not contain sufficient moisture for compaction in accordance with the above requirement shall be thoroughly mixed additional water as directed by the engineer. Embankment material containing excess moisture shall be permitted to dry to the proper consistency before being compacted. After layer has been spread for the full width of the cross-section and brought to satisfactory moisture content, it shall be compacted. The degree of compaction in each layer shall be determined by the standard field density test ASTM D- 1556. each layer should attain the required percentage of compaction before the succeeding layer is allowed to be placed. The compaction requirements for the different type of soil placed on embankments are shown in the following table:

**METHOD OF MEASUREMENT**

Measurement shall be done by the cubic meter of embankment in its final accepted compacted position less the volume for road surfacing materials if any, regardless of the origin of materials and the required degree of compaction. Computation shall be by the Average End Area Method for every 20 M station or by the applicable method suitable for the work involved. The volume shall be the theoretical volume of the embankment as computed based on the neat lines or pay lines shown on the Drawings. The lower limit shall be the elevation of the ground surface stripping and the upper limit shall be the top of the embankment.

**BASIS OF PAYMENT**

The volume measured for embankment as provided above shall be paid at the contract unit price per cubic meter, the price and payment shall constitute full compensation for any side borrow, borrow haul, blending, moisture conditioning and compaction and trimming side slopes [where necessary] including all labor, tools, equipment and all incidentals and subsidiary works, necessary for the successful completion of the work described under this section. Provided, however, that payment shall only be made after preservation by the Contractor of a certification issued by the NIA Materials Testing Engineering to the effect that the constructed embankment measured and covered by such progress payment has attained degree of compaction.

## CONCRETING WORKS

**SCOPE**

This section covers all the materials as cement, aggregates, water admixtures and proportioning, mixing, transporting, placing, finishing, curing, and protection of concrete, including supplies, equipment, tools and all other incidentals necessary for concrete works.

All the applicable provisions of the latest version revision of the ACI Building Code [ACI-318-63] and American Society for Testing Materials [ASTM] shall govern in all cases not specifically provided for herein.

**CONCRETE COMPOSITION**

Concrete shall be composed of Portland cement, fine and coarse aggregates, water, and if necessary, admixtures or agents approved by NIA. The design of concrete mixtures and consistency shall be as specified in this Section.

**CEMENT**

a. General -the cement shall conform to the requirement of the standard specifications for Portland cement [ASTM: C-150 Type 1]. Special cement may be used subject to the approval of the engineer provided it meets the requirements of Portland cement with regards to strength, soundness and setting time.

b. Storage - Contractor shall, immediately upon delivery of cement to the jobsite, store the same in a dry, weather tight and properly ventilated structure with adequate provisions for the prevention of absorption of moisture. All storage facilities shall be subject to the approval of the Engineer and shall be such as to permit easy access for inspection and identification. The Contractor's method of handling and storing cement shall be subject to the approval of the Engineer. The Contractors shall not use any cement which is stored at the site for the period more than three (3) months. Not more than fourteen (14) sacks of cement shall be permitted to be piled up and this number shall be limited to seven (7) each, when the storage is expected to be longer than two (2) months; these sacks of

cement shall be piled up or stored so as to permit easy access for identification, inspection and testing.

c. Payment -payment for cement shall be considered included in the contract unit price for the various items of concrete in the Bill of Quantities for which cement is used.

**WATER**

The water used in concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter, alkali, salts and other impurities. The recommendation of the seventh edition of the U.S Bureau of Reclamation Concrete Manual for mixing water shall be followed.

**FINE AGGREGATES**

a. General. The term "Fine Aggregates" is used to designate aggregates in which the maximum size of the particles is 5 millimeters. Fine aggregates for concrete, mortar and grout shall be provided by the Contractor and shall consist of natural sand, manufactured-sand, or a combination of both. The different components shall be batched separately, or subject to the written approval of the Engineer, or blended prior to delivery to the batching plant.

As means of providing moisture control, the Contractor may be required to stockpile the fine aggregates over porous storage to drain excessive water and to stabilize moisture content.

b. Quality. Fine aggregates shall conform to the requirements of ASTM C-33 and shall consist of hard, tough, durable, uncoated rock particles. The Contractor shall exercise every possible precaution in transporting, washing, and screening operations to prevent contamination of sand particles. Fine aggregates shall conform to the following requirements:

1. Grading - it is assumed that the sand available in natural deposits will require processing to provide a suitable gradation. Regardless of the source, the fine aggregates shall be well graded from fine to coarse and the gradation as delivered to the mixers shall conform to the following requirements unless otherwise approved:

| Sieve Designation US Standard Square M e s h | Percent by Weight Passing Individual Sizes |
|---|---|
| 3/8" [9.50mm] | 100 |
| No. 4 [4.75 mm] | 95-100 |
| No. 8 [2.36 mm] | 85-95 |
| No. 16 [1.18 mm] | 60-85 |
| No. 30 [600 um] | 25-60 |
| No. 50 [300 um] | 10-30 |
| No. 100 [150 um] | 2-10 |

In addition to the grading limits shown above, the fine aggregates as delivered to the mixer shall have the fineness modulus of not less than 2.30 or more than 3.00. The grading of the fine aggregates also shall be controlled so that the fineness moduli of at least 9 to 10 test samples of the fine aggregates as delivered to the mixer shall not vary more than 0.10 from the average fineness modulus of all samples previously taken. The fineness modulus shall be determined by dividing by 100, the sum of the cumulative percentages retained on US Standard sieves No. 4, 8, 16, 30, 50 and 100. At the option of the Contractor fine aggregates may be

separated into two or more sizes or classifications, but resulting sand when combined before entering the concrete mixer shall be of uniform grading within the limits specified above.

2. Particle Shape. The shape of the particles shall be generally spherical or cubical and reasonably free from flat and elongated particles is defined as a particle having a maximum dimension in excess of five times the minimum dimension. Rocks which break down into such shape, regardless of the type of processing equipment used, will not be approved for use in the production of fine aggregates.

3. Deleterious Substances. The maximum percentages of deleterious substances in the fine aggregates as delivered to the mixer shall not exceed to the following values:

| | Percent by Weight |
|---|---|
| Materials passing No. 200 Screen [Designation 16] * | 3 |
| Shale [Designation 17] | 1 |
| Clay [Designation 13] | 1 |
| Total of other deleterious substances Such as alkali, mica, soft, flaky, particles and loam | 2 |

- the designation in parenthesis refers to methods of testing described in seventh [7th] edition of the US Bureau of Reclamation Concrete Manual and ASTM.

The sum of the percentages of all deleterious substances shall not exceed 5% by weight. Fine aggregates producing a color darker than the standard in the colometric test for organic impurity [USBR designation 14 or ASTM C-40] may be rejected. Fine aggregate having specific gravity [USBR designation 9 or ASTM C-128, saturated surface dry basis] of less than 2.60 may be rejected. The fine aggregate may be rejected if the portion retained on No. 50 [300 um] screen, when subjected to five cycles of sodium sulphate test for soundness [USBR designation 19 or ASTM C-88] shows an average loss of more than 18% by weight. Fine aggregates delivered to the batching plant may be rejected if it contains more than 0.15% soluble sulphate for any one sample or more than 0.10% for an average of at least 9 out of 10 consecutive test samples of finished sand, when samples are taken hourly. The percent soluble sulphate in the fine aggregates shall be determined in accordance with the method of test prescribed in sub-paragraph 4 below.

4. Sampling - sampling of fine and coarse aggregates shall be done in accordance with Aggregate Sampling and Testing. The source from which fine and coarse aggregates is to be obtained shall be selected well in advance of the time when the materials will be required in the work. Unless otherwise specified, all test samples shall be taken under the supervision of the engineer in sufficient time as approved to permit adequate testing and examination of results sufficiently in aggregates at various in the processing operation shall be made. The approval of a source shall not be construed as containing approval of the materials from the source, the Contractor will be held responsible for the specified quality of all materials used in the work.

c. Storage - fine aggregates shall be stored in such a manner as to avoid the inclusion of any foreign materials in the concrete. The storage or stockpile shall be constructed so as to prevent segregation. Depositing of materials in storage and its removal there from shall be done in such a manner as to result in increasing the uniformity of the grading insofar as this is practicable. All fine aggregates shall remain in free drainage storage for at least seventy-two [72] hours prior to use. Sufficient live storage shall be maintained at all times to permit continuous placement of concrete.

d. Measurement and Payment. - fine aggregates will not be measured for payment. The cost of excavation, stockpiling, transporting, processing, blending, handling and other cost for providing fine aggregates shall be considered in the unit price bid for the various items in the Bill of Quantities for which fine aggregates are used.

**COARSE AGGREGATES**

a. General - the term "Coarse Aggregates" is used to designate of such size to fall within the range of 0.5 cm. to 7.5 cm or any or range of sizes within such limits. The coarse aggregates shall be reasonably well graded within the nominal size ranges hereinafter specified. Coarse aggregate for concrete shall be furnish by the Contractor and shall consist of crushed rock or mixture of natural gravel and crushed rock as provided in paragraph 1508. Coarse aggregate, as delivered to the batching plant shall have uniform and stable moisture content. Any rewashing found necessary to provide clean aggregates shall be done prior to finish screening. Rewashing shall not be performed in finish screen.

b. Quality - Coarse aggregates shall conform to the requirements of ASTM C-33 and shall consist of hard, dense, uncoated durable rock fragments.

1. Grading - the coarse aggregates shall be well graded from fine to coarse. It shall be separated into the following specific size groups. The grading of the aggregates within the separate size groups as delivered to the mixer shall be as follow:

| | SIZE GROUPS | | | | |
|---|---|---|---|---|---|
| Sieve Size | Percent by Weight | | Passing Individuals | | Size |
| US Std. Sq. Mesh | 12.5 mm Size | 18 mm Size | 37.5 mm size | 50 mm size | 75 mm |
| 6" [150mm] | - | - | - | - | |
| 3" [75mm] | - | - | - | - | |
| 2½" [63mm] | - | - | - | 100 | 90 |
| 2" [50mm] | - | - | 100 | 95-100 | 35 |
| 1½" [37.5mm] | - | - | 90-100 | - | 0 |
| 1" [25mm] | - | 100 | 20-55 | 35.7 | |
| ¾" [19mm] | 100 | 90-100 | 0-15 | - | |
| ½" [12.5mm] | 90-100 | - | - | 10-30 | |
| 3/8" [9.5mm] | 40-70 | 20-55 | 0.5 | - | |
| No. 4 [4.75mm] | 0.15 | 0-10 | | - | 0-5 |

Coarse aggregates shall not contain more than 1.5 percent of materials padding the No. 200 sieve by meshing, nor 5% of soft fragments.

It shall have an abrasion loss of not more than 45 percent at 500 revolutions.

Unless otherwise directed, the maximum sizes of aggregates to be used in concrete for the various parts of the works shall be in accordance with the following:

| General Use | Maximum Aggregate Diameter |
|---|---|
| Lean Concrete to control water Intrusion and other miscellaneous uses | 37.5 mm |
| Concrete for Footing, Walls, Slabs Beams, 0.22 to 0.75 meters thick | 37.5 mm |
| Concrete for thin wall, slabs, beams, less than 0.22 meters thick | 19 mm |
| Concrete for reinforced concrete pipes | 12.5 mm |

In all cases, the diameter of the aggregated shall not exceed ½ the distance between the reinforcing steel bars of the members being placed.

2. Particle Shape - the particle shape of the crushed coarse aggregate shall be generally spherical or cubical and reasonably free from flat or elongated particles. A flat or elongated particle is defined as the particle having a maximum dimension such shape will not be approved for the production of aggregate.

3. Deleterious Substances- the deleterious substances in any size of coarse aggregate, as delivered to the mixer, shall not exceed the following values:

| | Percent by Weight |
|---|---|
| Material Passing no. 200 | ½ |
| Shale [ Designation 18] | 1 |
| Clay Lumps [Designation 13] | ½ |
| Other deleterious substances | 1 |

- The designations in parenthesis refer to methods of Testing described in the seventh edition of the US Standard of Reclamation Manual and ASTM.

The sum of the percentages of all deleterious substances in any size, as delivered to the mixer, shall not exceed 3% by weight. Coarse aggregate may be rejected if it fails to meet the following:

1. Petrographic Examination - If more than 10% of poor aggregate particles can be identified in physical test in case 20% of the particles would be classified with respect to the chemical quality [USBR Designation 7 or ASTM C- 295].
2. Sodium-sulphate test for soundness [USBR Designation 9 or ASTM C-88]- if the weighted average loss, after 5 cycles is more than 10% by weight.
3. Specific Gravity [USBR Designation 10 or ASTM C-127] - If the specific gravity [saturate surface-dry basis] is less than 2.60.
4. Sampling - all sampling of coarse aggregates shall be in accordance to Mixture Composition.

c. Storage- coarse aggregate storage or stockpiles shall be built in such a manner as to avoid the inclusion of any foreign materials in the concrete and to prevent

segregation and excessive breakage. Water sprayers shall be installed to keep that portion of the coarse aggregate stockpile saturated which is for immediate use in the concrete. Sufficient live storage shall maintain at all times to permit continuous placement of concrete.]

d. Measurement and Payment - Coarse aggregates will not be measured for payment. The cost of excavation stockpiling, processing, blending, handling and other cost for providing coarse aggregates shall be considered included in the unit price bid for the various items in the Bill of Quantities for which coarse aggregates are used.

**AGGREGATE SAMPLING AND TESTING**

Sampling of the aggregate materials approved for use in the work, shall be done by the contractor in accordance with ASTM Sampling Method at 10 days in advance of time when placing of concrete is expected to begin. Aggregate studies and test will be made by the contractor at its own expense. It shall be the responsibility of the contractor to designate the source[s] of aggregates early enough to give NIA sufficient time to obtain the necessary samples and have them subjected to tests.

The samples of aggregates shall be obtained and tested in accordance with the following ASTM standard methods:

| | |
|---|---|
| Sampling aggregate | - C 75 |
| Sieve Analysis | - C 136 |
| Amount of material finer than 200 sieve | - C 117 |
| Organic impurities | - C 40 |
| Mortar Strength | - C 87 |
| Soundness | - C 88 |
| Soft Particles | - C 235 |
| Abrasion | - C 131 |
| Clay lumps | - C 142 |

No aggregate shall be used until official advice has been received that it has satisfactorily passed all test, at which time written authority shall be given for its use. Material from source which has been previously tested and shown satisfactory compliance with all the requirements given herein may be used without further testing upon written permission of NIA. Test reports for previous tests must be available before approval can be given.

During construction, aggregates will be sample as delivered to the mixer to determine compliance with specification provisions. Test shall be made in accordance with the applicable ASTM Standards. Routine control test and analysis of aggregates at various stages in processing Contractor shall provide such facilities as may be considered necessary for the ready procurement of representative test samples. All tests will be made by the contractor under the supervision of NIA.

**CLASSIFICATION AND PROPORTIONING OF CONCRETE MIXTURES**

a. Classification and Design Mixtures. The mixture for all classes of concrete shall be designed by the contractor and approved by NIA to obtain the compressive strength at the age of 28 days as specified below:

| Class | Minimum Strength [$kg/cm^2$] | Maximum Aggregate Size [mm] | Minimum Cement [$kg/m^3$] | **Maximum Water/ Cement Ratio** |
|---|---|---|---|---|
| X | 300 | 19 | 375 | **0.55** |
| Y | 210 | 12.5 | 350 | **0.60** |
| AA | 210 | 19 | 325 | **0.60** |
| A | 210 | 37.5 | 300 | **0.60** |

| | | | | |
|---|---|---|---|---|
| B | 170 | 50 | 250 | **0.70** |
| C | 170 | 75 | 225 | **0.70** |
| Z | 140 | 75 | 200 | **0.85** |
| **Blinding 70** | | **37.5** | **150** | **No limit [Concrete]** |

b. Aggregate Content - Concrete mixtures shall be designed to use the largest size and the maximum amount of coarse aggregate as practicable for the intended use of the concrete.
c. Consistency. - the amount of water to be used in the concrete shall be regulated as required to secure concrete of the proper consistency and to adjust for any variation in the moisture content or grading of the aggregates as they enter the mixer.

It shall be such consistency that it will flow around reinforcing steel bar but individual particles of the coarse aggregate when isolated shall have coating of mortar containing its proportionate amount of sand. The consistency shall be gauged by the ability of the equipment to properly place it and not by the difficulty in mixing or transporting. Addition of water to compensate for stiffening of the concrete before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

The slump of the concrete at the time of placing shall not exceed 5 centimeters in heavy concrete sections and at top of walls, piers and parapets, 10 centimeters for pumped or air placed concrete, and 7.5 centimeters for concrete elsewhere.

The engineer reserves the right to require lesser slumps whenever concrete of lesser slumps can be consolidated easily into placed by means of the vibration specified in Paragraph Construction Joints.

d. Notwithstanding the approval of the Engineer of the design mixtures and minimum cement content for different classes or gradation of aggregates, the Contractor shall be responsible that all the concrete meet the designed strength.

**SAMPLING AND TESTING OF CONCRETE**

The Contractor shall at his expense perform sampling and testing of concrete materials in accordance with the latest Japanese Industrial Standards and the Manual of Concrete Quality Control to be prepared by NIA.

All the tests designated in the manual shall be carried out at the Project site by the Contractor under the direction of the Engineer. The Contractor shall furnish all materials and labor for testing and shall provide own laboratory, tools and equipment for testing except compression machine.

Concrete sampling shall be carried out during concrete operations at the rate of one standard sample for each 75 cubic meters of concrete or fraction thereof placed during each continuous placing operations but in no case shall there be less than one sample for each day of concreting. Each standard sample shall consist of three (3) standard cylinders 6 inches (15 cm) diameter by 12 inches (30 cm) high.

The Contractor shall keep a record of the samples and the portion of the structures and volume represented which shall be available to NIA on demand.

Superintendents, testing equipment and tools to be provided by the Contractor for quality control of the construction shall be subject to the prior approval of the Engineer.

**FAILURE TO CURE**

The engineer shall have the authority to suspend the work whole or in part, by written order, for such period as he may deem necessary for failure on the part of the Contractor to perform proper curing of

the concrete work and withhold payment for the corresponding work pending results of tests, that shall subsequently be made on these concrete works. The contractor shall immediately secure more samples of such members and from part of the structure as shall be designated by the engineer and shall have been testes in a Testing Laboratory approved by the NIA. If the results of tests are found satisfactory, payment of the concrete in question shall be made and the work ordered resumed, but if the results of tests are unsatisfactory to meet the structural requirements, the contractor shall remove, wholly or partly, the concrete work in question at the discretion and upon written order of the Engineer and the Contractor shall replace such parts at his own expense.

**FAILURE TO MEET CONCRETE REQUIREMENTS**

If the specified strengths have not been met, the Contractor shall remove and replace the concrete concerned or take such other remedial measures as the Engineer order, all at his own expense.

Before proceeding with the remedy, the Contractor shall subject for approval of the Engineer details of the action proposed to ensure that the concrete and steel to be placed in the works will comply with the Specifications.

**PROTECTION OF CONCRETE WORKS**

The Contractor shall protect all concrete against injury until final acceptance by NIA. Final acceptance shall be considered to mean acceptance of the whole after the Contract has been completed or satisfactorily terminates.

**MEASREMENT AND PAYMENT**

(1) Concrete

Measurement and payment of concreting works shall be made separately for every class specified in the Bill of Quantities. Measurement for payment of concreting works for each class shall be made by volume in cubic meter for respective items of various works in the Bill of Quantities, unless otherwise stipulated. It shall be computed to the neat lines as if these works were constructed to the details shown on the Drawings or as established by the Engineer. In measuring concrete for payment, volume of all cavities, depressions, openings, embedded wood works and metal works, except reinforcement bar, anchor bolts and bars, and dowel bars, will be deducted. Payment for concrete works measured as provided above shall be made at the unit prices per cubic meter bid therefore in the Bill of Quantities, which price and payment shall include the cost of all labor, materials and equipment, furnishing and handling of cement, aggregates and admixtures, mixing hauling, placing and finishing concrete furnishing of forms and subsequent removal of form works and necessary false work (unless otherwise stipulated), construction of joint (excluding furnishing and placing such joint materials as waterstops, dowel bars, etc., as specified in Section XVI "Concrete Joints and Joints Materials"), dewatering and keeping dry during pouring concrete, and all necessary items incidental thereto for the successful completion of the work described in the Drawings and these Specifications, except for payments for furnishing and placing reinforcement bars and joint materials which shall be separately made at appropriate unit prices therefore in the Bill of Quantities

## REINFORCING STEEL BARS

**SCOPE**

All reinforcing steel bars required for the works as detailed in the construction drawings or as directed by the engineer shall be furnished by the contractor.

The work under this section includes the hauling of all reinforcing steel bars required for the works to the project site, storing, cutting, bending and proper placing, all in accordance with the drawings in these Specifications.

The length for each size of reinforcing steel bar to be furnished by the contractor shall be computed by taking the theoretical length required for the work. All reinforcing steel bars shall be furnished in commercial standard lengths and the contractor shall cut and bend the reinforcing steel bars to the detail and dimensions shown on the drawings.

**MATERIALS**

All reinforcing steel bars to be furnished by the contractor shall be Grade 40 or PS 275, deformed type and conforming to the requirements of ASTM A-615. The nominal dimensions and unit weights of bars designation shall be in accordance with the following table:

| Nominal Perimeter Bar Diameter | Unit wt. Kg/m. Area (sq. mm.) | Nominal Dimensions Cross Section | (mm.) |
|---|---|---|---|
| | | | |
| 6 mm | 0.222 | 28.27 | 18.85 |
| 8 mm | 0.395 | 50.27 | 25.13 |
| 10 mm. | 0.616 | 78.54 | 31.42 |
| 12 mm. | 0.888 | 113.10 | 37.70 |
| 16 mm. | 1.579 | 201.10 | 50.17 |
| 20 mm. | 2.466 | 314.20 | 62.83 |
| 25 mm. | 3.854 | 491.90 | 78.54 |
| 28 mm. | 4.833 | 615.75 | 87.96 |
| 32 mm. | 6.313 | 804.15 | 13.10 |
| 36 mm. | 7991 | 1,017.90 | 113.10 |

The nominal diameter of a deformed bar is equivalent to the diameter of a plain bar having the same weight per unit length of the deformed bar.

**CONSTRUCTION REQUIREMENT**

Workmanship shall be the highest grade and shall be in accordance with the latest standard practice of the industry.

1. Cutting and Bending - Cutting and bending of reinforcing bars may be done in shop or at the job site. All bending works shall be in accordance with the latest standard practice and by approved machine methods. Radii for bends and hooks will be specified on the approved detailed reinforcement drawings in accordance with sound design procedures.

2. Placing - Reinforcement shall be laid, anchored and embedded in the concrete as shown on the drawings or as directed by the engineer. Unless otherwise directed, the spacing of reinforcement bars shall be measured along the center line of the bars. Reinforcement shall be inspected for compliance with requirements as to size, length, splicing, position and number after placement based on the approved reinforcement drawings.

   Before reinforcement are placed, the surfaces of the bars and the surfaces of any metal support shall be cleaned of heavy flaky rust, loose scales, dirt, grease or other foreign substances which, in the opinion of the Engineer, are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap or equivalent treatment is considered objectionable. After being placed, the reinforcing bars shall be maintained in a clean condition until in a clean condition until completely embedded in concrete.

Reinforcing bars shall be accurately placed and secured in position so as to avoid displacement during the pouring of concrete. Special care shall be exercised to prevent any disturbance of the embedded reinforcement during the setting of concrete. Metal chairs, hangers, spacers or other approved support may be used by the Contractor for supporting bars. Metal supports shall be galvanized when they are to be exposed to view on completed concrete surfaces or where it contributes in any way to discoloration or deterioration of the concrete.

3. Relation of Bars to concrete surfaces - the minimum cover for all reinforcements shall conform to the dimensions shown on the reinforcement drawings.

4. Splicing - all splices in reinforcement shall be as shown on the drawings or as directed by the Engineer. The lapped ends bars shall be either supported sufficiently to permit the embedment of the entire surface of each bar in concrete or shall be securely wired.

5. Welding - welding of bars shall be performed only where shown on the Drawings or as authorized in writing by the Engineer and shall conform to the requirements of LAWS: D12.1, latest revision. All welders employed shall be shown proof of their welding qualifications to the engineer. All welding shall be done using metal arc welding, pressure gas welding, submerged arc welding or thermo welding. An electric shall be acceptable to NIA. Covering of low

6. Protection - Reinforcement to remain exposed and intended for future concrete embedment shall be protected from corrosion or other damages in an approved manner where directed. The reinforcement protection shall be of such nature that it can be thoroughly cleaned without difficulty prior to encasement in concrete.

**PREPARATION OF REINFORCEMENT DRAWINGS**

Contractor shall submit for the approval of NIA detailed reinforcement drawings. These drawings will include bar-placing drawings, bar bending drawings, bar list, and any other reinforcement drawings as may be required to facilitate placement and checking of reinforcing bars. No work shall be done by contractor until such approval has been secured from NIA.

The reinforcement drawings submitted shall show the name of the structure location by stationing where the reinforcement drawings is intended and all the necessary information required by NA. It shall likewise bear the stamp or seal of Contractor as evidence that the drawings have been checked by contractor.

Contractor shall be held responsible for any delay in the progress of the work occasioned by his failure to observe the requirements and the time for the completion of the contract will not be extended on account of his failure to promptly submit said drawings in strict adherence herewith.

**SAMPLING FOR TESTING AND ACCEPTANCE OF MATERIALS THAT FAIL TO MEET CONTRACT REQUIREMENTS (FOR STEEL BARS FURNISHED BY CONTRACTOR)**

Sampling of reinforcing steel bars furnished by the contractor for incorporation in the Permanent Works shall be carried out by NIA at the Manufacturer's stockyard before delivery to the project site. The NA authorized representative shall, at random, take three (3) representative samples of reinforcing steel bars per lot covered by the manufacturer's mill certificate. A lot shall consist of all steel bars of the same heat or blow as shown in the mill certificate, and the same nominal cross-section and grade. Samples shall be tested at the manufacturer's testing laboratory, if any, or to any approved Government testing laboratory at Contractor's expense. A lot or lots represented by samples tested which failed to meet specified requirements shall be rejected and will not be counted for delivery to the project site. Sampling and testing shall be in accordance with ASTM requirements. All deliveries shall be subject to prior approval of NIA.

The NIA reserves the right to accept steel bars that fail to meet the contract requirement provided that the deficiency is not more than nine percent {9%) of the requirement per each type of test and provided further that a corresponding reduction in the unit price will be made. The percentage of reduction equal to the percentage of deficiency based on the minimum requirement of the ASTM A-615 Standard. For example, if the value of the test result for one type of test is five percent [5%] below the minimum requirement, the unit price for payment will be reduced by 5%. If the non-compliance with the test requirements is on two or more tests, the price reduction will be the summation of the percentage of the deficiencies.

**METHOD OF MEASUREMENT**

a. Cutting Bending and Placing. Measurement for payment of reinforcing steel bars will be made on the weight of reinforcing steel bars actually placed with the concrete structure and drilled holes for anchorage in accordance with the Drawings and Bar Schedule approved by NIA or as directed by the Engineer and weights will be computed based on the published manufacturer's weights or in the absence thereof, on the weights specified in the table presented in Paragraph 902. Steel bars in laps or splices indicated in the approved reinforcement Drawings, as required by NIA will be measured for payment. Additional steel bars in laps which are authorized for the convenience of the Contractor and such items as measured for payment. Where weld splices are specified on the Drawings, weld splices will not be measured for payment. Where contractor chooses to weld reinforcement bars for his convenience and welding is not specified, no separate payment will be made for such welds. Where Contractor substitute welded splices for lapped splices, separate payment will not be made for such welds, but instead the weight for the lapped splices shown on the Drawings will be measured for payment.

**BASIS OF PAYMENT**

Payment for reinforcing steel bars measured as provided above, will be paid for at the contract unit price per kilogram which price and payment shall constitute full compensation for furnishing all labor, tools, equipment and all incidentals and subsidiary works necessary for the successful completion of the work described under this Section .

## OVERHAUL

**SCOPE**

Overhaul shall include the hauling of materials excavated from Canal Excavation or structure excavation and to be disposed either for roadway embankment, normal embankment, freeboard embankment, fill, structure backfill, or for disposal to waste disposal areas suggested by NIA or at the Contractor's choice including acquisition of right-of-ways thereto.

**DISPOSAL OF EXCAVATED MATERIALS**

a. general

NIA shall determine the suitability of all excavated materials in the various portions for the work in accordance with the provisions specified herein.

b. Compacted Embankment

Materials from excavation which are suitable for compacted embankment [such as canal embankments, protection dikes, etc.] shall be dense and homogeneous when compacted. The materials shall be free from all organic material larger than 12 centimeters in maximum dimension.

Materials suitability for the construction of compacted embankment shall be those solid having a classification as determined by the Engineer in the following order of preference:

GC [Clayey Gravel], SC [Clayey Sand]. C [ Inorganic Clay], SM [ Silty Sand] or ML [ Inorganic Silt].

c. Compacted Backfill

Materials from excavation which are suitable for compacted backfill shall be same as those which are suitable for compacted embankment, except that it shall be free of all materials larger than 7.5 centimeters in maximum dimension and that compacted backfill behind bridge abutment and retaining walls shall conform to the materials specified in the drawings.

d. Free Board Embankment

All excavated materials that are free of oversized materials and of organic matter as determined by the engineer maybe utilized for the construction of free board embankment.

e. Waste materials

Waste materials consisting of all excess excavated suitable materials and objectionable materials for canal embankment, and compacted backfill shall be placed in waste disposal areas outside the NIA right-of-way chosen by the contractor, leveled and sloped to drain as directed.

**METHOD OF MEASUREMENT**

Overhaul of waste materials will be measured by the cubic meter. The volume of waste materials to be measured for payment shall be computed based on the Net End Area versus Stationing Diagram and Mass diagram for each Lateral or canal which shall be submitted by the Contractor to the Administrator for approval.

Overhaul for canal embankment is a subsidiary work under Embankment Construction and compaction [ECC] hence, it will not be measured for payment, as the cost is already considered included in the contract unit price of ECC.

**BASIS OF PAYMENT**

Payment for overhaul for waste materials shall be per cubic-meter, which price and payment shall constitute full compensation for furnishing all labor, supplies, tools, equipment and all incidents necessary for the successful completion of the work including acquisition of right-of-way and access thereto for disposal areas chosen by the Contractor. Payment for overhaul for waste materials shall only be made when said Net End Area versus Stationing Diagram and Mass Diagram, where the volume measured for payment are based has been approved by the Administrator.

If during the implementation of the project, the waste disposal areas differ from those chosen by the Contractor considered in the derivation of his unit bid price for overhaul, the contractor shall not be entitled to any claim for unit price adjustment as a result of such alteration of disposal areas.

## SIDE BORROW

**SCOPE**

When suitable materials from canal excavation are not sufficient to form the required section of canal embankment, roadway embankment (especially at stretches of canal where both cut and fill are encountered), additional suitable materials from the adjacent sides of the embankment within 60 meters

from the center line of the canal shall be obtained by side borrowing as directed by the Engineer. Side borrow may also be done to form the required section of bridge abutment approaches.

The work under this Section shall include clearing and grubbing and stripping of the top soil on the side borrow area; excavation and placing or dumping of the side borrow materials to canal embankment, roadway embankment or dike and returning and spreading the stripped top soil after the side borrow operations.

**METHOD OF OPERATION**

After having been determined that materials obtainable from side borrow areas are suitable for embankment construction in accordance with Paragraph 902 (b), these side borrow areas shall be cleared, grubbed and stripped to about 10 cm. thick top soil before starting any excavation, pushing and dumping operation. The cleared and grubbed materials and/or stripped top soil shall be placed outside the limits of the entire canal right-of-way and side borrow areas as directed by the Engineer, all in accordance with the provisions of Section II, Clearing and Grubbing.

Excavation of side borrow materials needed for the construction of embankments shall be made more or less uniform in depth within the limits staked by the Engineer and shall in no case exceed a depth of 30 cm. measured from the original ground surface; a berm of not less than five meters in width shall be left between the outside toe of the embankment and the edge of the borrow pit with side slope provisions not steeper than 3:1 or unless otherwise shown on the Drawings or as directed by the Engineer.

Materials from side borrow areas shall be placed and/or spread in the canal embankment or roadway embankment and subsequently compacted in accordance with the applicable provisions of Section XIII, Embankment Construction and Compaction.

Before the Contractor leaves any particular work after completion of side borrow operations, the side borrow area shall be releveled and destroyed paddy dikes restored; and the cleared and grubbed materials or stripped top soil deposited outside work area shall be returned and spread uniformly throughout the borrow area to the satisfaction of the Engineer. The Contractor shall not be allowed to shift his operation to another work area unless said works are completed and approved by the Engineer.

**MEASUREMENT AND PAYMENT**

Side borrow is a subsidiary work for Embankment Construction and Compaction, thus it will not be measured for payment. The cost of which is considered included in the contract unit price for Embankment Construction and Compaction or for Structure Backfill as the case maybe.

## STEEL GATES AND LIFTING MECHANISM

**SCOPE**

The Contract work calls for the fabrication, supply, delivery and installation supervision of steel gates, stoplog, lifting mechanism, embedded parts including all accessories and field painting all in accordance with these specifications and the drawings:

**STANDARDS AND SPECIFICATIONS**

All materials and equipment to be incorporated in the works shall conform to the latest applicable standards and specifications as specified in the Contract Documents or to approved equivalent applicable standards and specifications established and adopted in the country of manufacture of the materials and equipment.

Reference to standards and specifications or to materials shall be considered as followed by the words "or equivalent". Contractor may propose equivalent standards, specifications and materials which shall conform to that specified.

If Contractor proposes equivalent standards and specifications or equivalent materials, Contractor shall state the exact nature of the change, and shall submit complete standards and specifications of the materials for the approval of NIA.

Such submittals shall be along with the bid and failure to do so, or purchase of any proposed equivalent materials prior to approval of NIA, will be at the Contractor's risk.

Abbreviations of the titles of official bodies which issue standards or specifications whenever referred to in these specifications are as follows:

ASTM - American Society for Testing Materials

AISC - American Institute of Steel Construction

AISI - American Iron and Steel Institute

ANSI - American National Standards Institute

AISE - Association of Iron and Steel Engineers

AWS - American Welding Society

JIS - Japanese Industrial Standards

SSPC - Steel Structures Painting Council

AGMA - American Gear Manufacturers Association

SAE - Society of Automotive Engineers

ASME - American Society of Mechanical Engineers

**MATERIALS**

**A. General**

All materials shall be new and shall be the best available for the purpose for which they will be used, considering strength, ductility, durability for the intended service and best engineering practice

Materials to be used for the various components of gates and hoists shall conform to the following specifications:

| Components | Material | International Specifications |
|---|---|---|
| Fixed wheel gates frames, girders, sill beam, rail beams, guide frames, seal clamps and other | Structural Steel | ASTM A36 Specifications for Structural Steel |

| | | |
|---|---|---|
| miscellaneous fabricated parts | | |
| Gate Wheels & Guide Rollers | Wrought Steel | ASTM A-504/A-148 Specifications for Wrought Carbon Steel |
| Wheel pins | Corrosion Resistant Steel | ASTM A-276 Specifications for Hot-Rolled and cold finished corrosion resisting steel bars Type 316 |
| Seal seats and clamp plates for rubber seals | Corrosion Resistant Steel | ASTM A-240 Specifications for Chromium-Nickel Stainless Plate, Sheet and Strip |
| Standard steel bolts, nuts and washers | Galvanized Steel | ASTM A-307 Specifications for Low Carbon Steel Externally Threaded Fasteners |
| High strength steel bolts, nuts and washers | Carbon Steel | ASTM A-325 Specifications for Steel bolts and studs with suitable nuts and plain washers |
| Rope drum | Cast steel | ASTM A-27/ASTM A-36 Specifications for mild to medium strength carbon steel castings for General Applications |
| Gears/Pinions | Cast Steel/Forged Steel | ASTM A-27/ASTM A-291 Specifications for Alloy and Carbon Steel Forgings for Gears and Pinions |
| Worm Gear | Phosphor Gear Bronze | SAE 65 |
| Worm | Case hardened Ground Steel | AISI-3120 |
| Iron Castings | | ASTM A-48, Class 30 |
| Stems & Shaftings | Carbon Steel | ASTM A-108, Grade 1018 or Grade 1117 Specifications for cold finished carbon steel bars and shaftings |
| Wire Rope | Improved Plow Steel | R R W-410 Fed. Specifications |
| Bronze bushings, bearings, washers | High Lead Tin Bronze or Manga-nese Bronze | ASTM B-144 or B-147 |
| Covers | Mild Steel | ASTM A-36 |

| | | |
|---|---|---|
| Bronze casting for lift nut, thrust nut | Manganese Bronze | ASTM B-147 Specifications for Manganese Bronze Sand Castings- Alloy 8A |
| Anti-friction Bearing | | Ball & Roller Bearings shall be equivalent to those manufactured by SKF Industries |
| Gear Housing Oil Seals | | Spring loaded and made of synthetic compound enclosed in a metal retainer, "Synthetic Seals" or equivalent |
| Lubricating Fitting | | Alemite type 1610-3 or equivalent |

Rubber Seal

The rubber seal shall be molded from natural or synthetic rubber containing not less than one percent by weight of copper inhibitor and shall have the following physical properties:

| Property | Limit | ASTM-Test |
|---|---|---|
| a) Shore A Durometer Hardness | 65 + or - 5 | D-675 |
| b) Minimum Elongation | 450 percent | D-412 |
| c) Ultimate Tensile Strength (min.) | 14.5 N/sq.mm | D-412 |
| d) Water Absorption ($70^0$ C - 7 days) | Less than 10% by weight | D-471 |
| e) Tensile strength after accelerated ageing test of 48 hours in oxygen at $70^0$ C and 2.1 N/sq.mm pressure | 80 or more percent of strength before ageing | D-572 |
| f) Compression Set (Max.) | 30 percent | D-395 |

**B. Tests of Materials**

i. All materials, supplies, parts, assemblies used for the work to be done under these Specifications shall be tested according to modern approved methods for the particular type and class of work. Certified copies in triplicate of the tests made and results thereof shall be made available to NIA as soon as possible. The data shall be in such a form as to provide means of assessing compliance with the applicable relevant specifications for the material tested. The Contractor shall state in his tender the place of manufacture, testing, inspection of the various components of the work included in the contract.

ii. Wherever required, at their discretion, NIA may nominate an Inspector to inspect the tests or trials on their behalf. Sufficient notice must be given by the Contractor to the Inspector to enable him to reach the site of tests/trials except the pay and expenses of the Inspector shall be included in the quoted price. All authorized representatives of NIA shall have free access to the work premises of the contract at all reasonable times and shall be provided by the Contractor full facilities and safety to inspect the process of manufacture and the materials used. NIA will reject any material/work that in their opinion does not conform to the speci-

fications and will order the same to be removed and replaced or altered at the expense of the Contractor to conform to the specifications.

iii. If materials are not referred to in the applicable Standard Specifications but are required to have certain physical and /or chemical properties, such properties shall be checked by two chemical samples for each 5 tons of materials and fractions thereof in each lot. For lots less than 250 kilograms, Contractor's warrants will be acceptable in lieu of actual tests provided heat treatment of the fabricated parts using such materials is not required. A lots shall consist of all materials of the same physical size and conditions submitted at one time in which the material is from the same melt or heat and on which any subsequent heat treatment has been performed at the same conditions. Not more than two heat treatment to attain the desired physical properties shall be permitted.

iv. Notwithstanding the above tests, examination and inspection, the Contractor shall be responsible for the acceptability of the finished work.

**C. Manufacturing/Fabrication Program**

i. The fabricator/manufacturer shall prepare a manufacturing/fabrication program in Bar Graph Form showing the activities and its sequencing in sufficient details such that the contract works can be properly monitored from commencement to completion.
ii. The fabricator/manufacturer shall submit said program within thirty (30) calendar days after the date of receipt of Notice of Award.
iii. The fabricator/manufacturer shall show the target dates for commencing and completing the principal activities as required for in the contract works including but not limited to the following:
    a. procurement of materials and the like
    b. fabrication and manufacture
    c. painting
    d. delivery dates

**D. Pre-fabrication Inspection Works**

i. The fabricator/manufacturer shall be required to submit mill and/or manufacturer's certificate for the steel materials, welding electrode, paints, etc. intended for use in the works.

ii. Materials to be used in the fabrication shall be adequately sampled and tested to check its compliance with the specification/standard requirements.

iii. No fabrication work and/or use of materials in such works shall commence unless materials for said works are duly inspected, tested, and certified by NIA or his authorized representatives as to conformity with the specification/ standard requirements.

iv. NIA technical inspector shall prepare and submit inspection and acceptance report on materials for use in the fabrication works.

**E. Inspection Works During Actual Fabrication**

1. The NIA should assign a knowledgeable and experienced technical inspectors, to conduct inspection.
2. The NIA's authorized technical inspector shall be entitled at all reasonable time free access to the manufacturer's/fabricator's plant to conduct inspection during fabrication, to ascertain that all the works shall comply in all aspect with the standards and requirements set forth in the contract documents.
3. The NIA technical inspectors shall monitor progress and conduct of the fabrication works and prepare and submit progress report on said works at regular intervals.

**F. Final Inspection Works**

1. Intake Gates, Main Canal Gates, Lateral and Turnout Gates

i. The NIA technical inspector shall conduct final inspection based on the approved fabrication drawings and specifications.

ii. The gates should be properly marked with the corresponding identification as per approved schedule of dimension such as size of gate, lateral, stationing for proper identification by the end user.

2. Sluice Gate, Barrage, Stoplog and Radial Steel Gates

i. The NIA technical inspector should see to it that all component parts should be properly pre-assembled at the fabricator's/manufacturer's shop to ascertain the proper fitness of all adjoining parts and should be properly punch mark before disassembling for guidance and reference during field installation.

ii. The NIA shall issue certificate of pre-delivery inspection and acceptance of completed fabrication works as a basis for the final inspection and acceptance by the field office of deliveries made at the site.

**WORKMANSHIP**

**A. General**

i) All works shall be performed in accordance with the best modern practice of the manufacturer of high grade machinery. All parts shall have accurately machined mounting and bearing surfaces so that they can be assembled without filing, chipping, or remachining. All parts shall conform accurately to the design dimensions and shall be free from any defect in workmanship or material that will impair their services. All attaching bolt holes shall be accurately drilled to the layout indicated on the approved drawings. The steel gates shall be completely shop assembled to insure the proper fit and adjustment.

**B. Welding**

i) *General*

Whenever welding is specified or permitted, the electric arc welding process, manual or machine welding shall be used.

Contractor shall provide adequate amount of materials for each type of welding and shall specify the materials on all relevant drawings. Contractor shall also provide detailed drawings showing joint preparation required for each type of welding to be carried out on the site.

ii) *Preparation*

The parts to be joined by electric welding shall be cut precisely to the correct size by machine methods suitable for the type of weld to be used and to allow the proper penetration and good fusion of the weld with the base metal. The cut surfaces shall not have visible defects such as scabs, superficial defects caused by shearing or torch cutting operations or any other damaging effect. The surfaces of a 40 mm wide strip on each side of the plate adjacent to the edge and the edges to be welded shall be free from rust, oil, grease and other foreign matter.

iii) *Lamination*

Any plate in which lamination has been discovered after cutting shall be rejected unless the laminated portion of plate is local and can be cut out and replaced by the welding of a sound plate in the cut-out area with the approval of NIA. Repaired surfaces shall be ground smooth to assure neat appearance.

iv) *Welding Methods and Welder's Qualifications*

The welding method that would be employed by the Contractor shall be submitted to NIA for approval. Welds shall be balanced as far as possible to minimize distortion. Welding shall conform to AWS D1.1, Parts Procedures (Welding of Stressed Structural Components) not only with regard to workmanship but also with regard to qualifications of welders. Welders should be certified in the trade and such certification shall be submitted to NIA.

v) *Electrodes*

Contractor shall indicate on all detailed drawings the type and size of electrode he proposed for use for shop and/or field welding.

In general, welding electrodes for structural steel shall conform to Table 1.17.2 of the AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

Contractor shall provide the net quantity plus ten percent (10%) of each type of electrode required to complete each field welded joint.

**C. <u>Non-Destructive Testing</u>**

i) *General*

All tests shall be conducted with the approval of NIA and the cost of tests shall be borne by the Contractor.

Radiographic, ultrasonic, magnetic particles or liquid dye penetrant tests shall be conducted on components as specified below. Where ultrasonic or magnetic particle tests indicate the possibility of a flaw, the suspected part shall be tested by radiography. All flaws shall be removed by thermal or mechanical gauging processed and replaced by welding. The replacement weld and contiguous parts of the original weld, if any, shall then be tested radiographically. All radiographs shall become the property of NIA.

The acceptability of parts inspected by magnetic particle and liquid dye penetrant test and the acceptability of use of these methods will be subject to agreement between Contractor and NIA.

ii) *Welds*

Radiographic examination shall be applied to the whole length of butt welds in plate furnishing stressed members.

Ultrasonic examination shall be applied to all other stressed groove welds.

Radiographic and ultrasonic examination shall be in accordance with AWS D1.1, Section 6.

iii) *Castings*

Castings shall be of fine grain quality and the surfaces which do not undergo machining, particularly those of steel or iron in contact with water, shall be dressed smooth in the foundry with all joints blended into adjacent surfaces and shall be free from foundry irregularities, such as projections, ridges, hollows, honeycombing, pock marks, blow holes and crack or chip marks, so that they will not require surface smoothing operations prior to painting. All defects shall be fully explored and castings shall be repaired, plugged or welded to the satisfaction of NIA.

iv) *Carbon Steel Plates and Shapes*

Carbon steel plates, shapes, bars, etc. for welded construction shall conform to materials specifications ASTM A-36, Steel shapes shall be in accordance with ASTM specifications. Plates from which webs, flanges and other stressed members are cut shall be ultrasonically tested for laminations according to ASTM A-578 at the place of manufacture.

v) *Forgings*

Forgings shall conform to ASTM A-668 Class D and shall be free from defects affecting their strength and durability, including seams, pipes, flaws, cracks, scales, fins, porosity, hard spots, excessive non-metallic inclusions and segregations.

The largest fillets compatible with the design shall be incorporated wherever a change in section occurs.

Tool marks or tearing of the metal by the finishing tools will not be acceptable on the surface of fillets. Such marks if it occurs, shall be removed by grinding or polishing. All finished surfaces of forging shall be smooth and free from tool marks.

All forgings in excess of 150 mm diameter shall be subjected to examination internally for the detection of flaws and to heat treatment for the relief of residual stresses.

**D. <u>Fastenings</u>**

i) All screws, bolts, studs and nuts shall be of International Standard (Metric) form of threads. Bolt heads and nuts shall be hexagonal. Hexagonal recesses shall be provided in the head of countersunk head bolts and machine screws. The bolt length shall be such as to ensure that at least two full threads are projecting after the nut has been tightened.

ii) Nuts and bolts for pressure containing parts shall be of best quality bright steel machined on the shank and bearing faces of head and nut.

iii) Where there is risk of corrosion, bolts shall be finished flush with the top of the nut after tightening, except in cases where the connected components are required to be frequently removed for replacement or adjustment when the bolts and nuts shall be of corrosion resisting steel or bronze.

All nuts shall be provided with washers, parallel or taper as appropriate. Mechanical locking devices of an approved form shall be provided where there is a possibility of nuts becoming loose due to vibration. Spring type washers will not be permitted where they maybe damaged any protective coating. Special locking compounds may be used as an alternative to mechanical devices subject to NIA approval.

**E. <u>Structural Work</u>**

i) Unless otherwise, specified, design and fabrication of structural parts shall conform to the applicable provisions of the AISC "Specifications for the Design, Fabrication and Erection of Structural Steel in Building" of the AISC "Code Standard Practice for Steel Building and Bridges".

**F. <u>Machine Work</u>**

All tolerances, allowances and gauges for metal shall conform to the ASA Standard B42, Tolerances, Allowances and Gauges for Metal Fits, for the class of fits as required.

Finished contact or bearing surfaces shall be true and exact to secure full contact. All holes or field assembly with bolts shall be accurately located and drilled for shop assembly. Journal surfaces shall be polished and all surfaces shall be finished with sufficient smoothness and accuracy to insure proper operation when assembled. All drilled holes for bolts shall be accurately located and drilled from template.

**PROTECTION OF MACHINED SURFACES**

Machined finished surfaces shall be thoroughly cleaned of foreign matter. Finished surfaces of large parts and other surfaces shall be protected with wooden pads or other suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means.

**FABRICATION**

a. General

All members shall be free from twist, bonds or other deformations, and all surfaces that will be in contact shall be thoroughly cleaned before assembling.

All parts shall be cut accurately to the dimensions shown on the drawings. All edges shall show sound metal, free from laminations, surface cracks and other injurious defects.

Bumping or heating will not be allowed. Parts shall be adjusted to fit, and shall be firmly bolted or otherwise held securely together so that surfaces are in closer contact before welding is commenced. Close adherence to the dimensions and tolerance called for in the drawings is required.

b. Straightening

Rolled materials shall be straight and true before being laid out or worked. Necessary straightening shall be accomplished by methods that will not injure the metal. Sharp kinks or bents will be considered causes for rejection.

c. Bending

Where bending or forming of plates or shapes is required, the plates or shapes shall be bent to the proper curvature by cold forming. Heating shall not be employed except with specified approval of the Administrator, and special precautions, therefore shall be taken to avoid overheating. Prior to rolling or bending the plates, the edges shall be pressed properly to the correct curvature, as determined by templates, to produce continuity from the edges. Corrections of curvature by hammering will not be permitted.

d. Shearing, Chipping and Flame-Cutting

All plates or shapes shall be cut accurately to shape and size, with the edges to be joined by welding formed properly to suit the selected type of welding and to allow thorough penetration of the weld metal. Sheared edges shall be machined to a depth of not less than one-quarter of the thickness of the materials, to remove surface cracks caused by the shearing operation. Flame-cut edges shall be uniform and smooth and shall be free from loose scale and slag accumulations before being welded. Whenever possible, flame-cutting shall be guided by mechanical means. No materials shall be cut by electric arc. Chipping shall be done neatly and accurately, and exposed edges, shall be smooth.

e. Preparation for Field Welding

All necessary chipping, grinding, leveling and other preparation for joints or splice to be made by field welding shall be done in the shop.

f. Punching

In punch works, holes in materials having a thickness of less than three-quarter of an inch may be punched to full size. Holes in material having a thickness equal to or greater than three-quarter of an inch shall be drilled to full size. All holes shall be clean-cut, without torn or ragged edges.

g. Drilling, Reaming, Countersinking and Tapping

Unless otherwise called for on the drawings and except where reaming or tapping is required or where tight bolts are to be used, full sized drill and/or reamed holes shall be not less than 1.59 millimeter not more than 2.38 millimeter larger than the nominal drilled and/or reamed perpendicular to the face of the member and if necessary, shall be drilled to a template. Countersinking, where required, shall be true and square with the holes. Outside burns shall be removed. Tapped holes shall be drilled to the proper diameter for the tap used and shall be tapped carefully so that the threads will be continuous, smoothly cut, and free from imperfection

h. Tolerance

Contact faces of gates and guides shall not depart more than 1 millimeter from a plane surface. Bottom contact edges shall not depart more than 2 millimeters from the designated planes. Fits, tolerance and finish when not specified, shall conform with the best modern shop practice in the manufacture of finished products of similar nature.

i. Lubrication

Before assembly all bearing surfaces, journals, grease and oil grooves shall be carefully cleaned and lubricated with an approved oil or grease. After assembly each lubricating system shall be filled with an approved lubricant.

## GENERAL DESCRIPTION OF THE INSTALLATION AND OPERATING ARRANGEMENT

### A. Sluice Gates

Sluice gates as shown on the Drawings are to be installed to desilt the sluiceway. The gates shall be of fixed wheel type. Each gate shall consist of an upstream skin plate supported by vertical and horizontal stiffeners spaced at required intervals which in turn shall be supported by end vertical girders. Wheels are to be mounted on the end vertical girders and provided with necessary bronze bushings. The total horizontal load on the gate shall be transmitted through the wheels on to the wheel track plates fixed on the piers with necessary embedments. Rubber seals on sides and bottom shall be provided on the upstream side of the gate to render the gate leak proof.

### B. Intake Gates

i) Intake Gates of different sizes as shown on the drawing are to be installed to regulate the flow of water through the intake. The gates shall be of sliding type. Each gate shall consist of a downstream skin plate supported by vertical stiffeners spaced at required intervals and horizontal girders which in turn shall be supported by end vertical girders. The total horizontal load on the gate shall be transmitted to the vertical frame fixed on the piers with necessary embedments. The details of construction are shown in the NIA bid drawings.

ii) The gates are to operate at water level corresponding to normal and high flood level condition and the operation is hydraulically unbalanced.

iii) The gates are to be operated through manually operated pedestal lift with rising stem, of adequate capacity.

**C. Flap Gate**

a. *General*

Flap gates are to be installed to allow free flow through the gate and to close automatically to prevent backflow should a head reversal occur.

b. *Flap Cover and Frame*

The flap gate cover shall be made of steel and shall consist of an upstream skin plate supported by vertical and horizontal stiffeners spaced at required intervals. Music note type rubber seals shall be provided on the two sides as well as on the top and bottom of the upstream side of the flap to render the gate leak proof. These rubber seals shall be fixed to the flap by means of clamp steel plate and stainless-steel bolts.

The flap gate shall be provided with arms mounted on steel hinges of the double pivot type using stainless steel pins and bronze bushings. A concrete counterweight shall be provided and attached to the arms in such a way that its position is adjustable in order to ease the opening of the flap gate. Final position of this counterweight will be determined by the field office

All edges of the gate opening where the music note type rubber seal is in contact shall be provided with stainless steel seal seats. This seal seats shall be fixed/welded to the steel frames embedded on the concrete.

**STRUCTURAL DESIGN CRITERIA FOR GATES**

a. General

The design shall ensure that:

1) The gates shall be reasonably watertight.

2) They shall be capable of being raised or lowered by the hoist at the speed specified.

3) Since all the gates are for regulation, they shall be held in partially open position within the range of travel to pass the required discharge without undue vibration.

b. Wheels and Wheel Tracks

1) The gate wheels shall be suitable to withstand the stresses developed due to the loads they carry.
2) The wheels and wheel tracks shall be machined true and shall operate smoothly without vibration and without undue drift.
3) The hardness of wheel track shall be 50 points Brinell Hardness Number (BHN) higher than the BHN of the wheel tread.

c. Wheel Bearing

1) The wheel bearing shall be bronze bushing with grooves for lubrication.

d. Wheel Pi

1) The wheels shall be mounted on fixed pins and the pin shall be harder than the bushing. Wheel pin shall be of stainless steel and the contact surfaces shall be finished smoothly.

2) The wheel pin shall be of cantilever type with support from the cantilever box of the end vertical girder. The rigidity of cantilever box should be ensured.

e. Seals and Accessories

1) Seals shall be fixed by means of stainless-steel seal clamps and galvanized steel bolts to ensure positive water pressure between the seal and the gate and to bear tightly on the seal seat to prevent leakage. Edges of seal clamp adjacent to seal bulb shall be rounded.

2) Side rubber seals shall be flat or angle shape type - Bottom seal may be of wedge type.

3) The initial interference of side rubber seals shall be 3 mm pre-compression. The projection of bottom wedge seal shall be 6 mm. Suitable chamfer shall be provided at the bottom of skin plate/clamp plate to accommodate the bottom wedge seal in compressed position.

f. Guides and Sill Frame

1) The guide frames and sill frames shall be composed of steel plates and steel sections so built up as to suit the gate structure. They shall be securely fixed in concrete by means of anchor members to ensure that all hydraulic loads exerted on the gate will be safely carried and transmitted to the concrete works.

2) The guide frames shall be true and shall be sufficient for the lifting height of the gate.

3) The side seal seat shall be stainless steel with a minimum width of 75 mm. The seal seat shall be fixed on the seal seat base by welding. The fixing of the seal seat on its base shall ensure rigidity and watertightness. The seal seat shall be finished smooth and the edges shall be rounded/chamfered to prevent damage to the seal.

4) All the seal seat base including the sill beam shall be embedded in concrete.

5) Sill beam flange width shall not be less than 100 mm and the length shall cover the entire waterway. The seal seat (stainless steel plate) welded to the top flange shall be at least 25 mm wider than the top flange width of sill beam. It shall be flushed with surrounding concrete. Each end of sill beam shall have provision for the connection of each side vertical frame to facilitate their location.

g. Embedded Parts

i) All structural parts of the guides, seal seats, wheel tracks shall be constructed straight and be free from twists and warping. The ends of sections of side guides shall be machined so that when assembled, the finished surfaces of adjoining sections shall be flushed and ends shall butt firmly to form watertight joints. The faces of all seal seats shall be in a true common plane and this plane shall be parallel to the plane tangent to wheel-track face. The ends of track sections shall also be machined smooth and square so that when tracks are assembled to the track base, the ends of adjoining sections shall butt firmly.

## HOISTS

### A. Hoist for Sluice Gate

1. *General*

a) The Contractor shall provide manually operated rope drum hoist of adequate capacity complete in every respect along with hoist supporting units and all accessories that would be required for the satisfactory operation of the sluice gates.

b) Each hoist mechanism shall consist of gear reducers, wire ropes, rope drums, shaftings, bearings, sprockets for diesel engine drive and all other mechanical accessories for the satisfactory operation of hoist.

c) The hoisting equipment shall be designed to raise, lower and hold the gate in any position between fully opened and fully closed positions. Hoisting equipment shall be enclosed in dust proof housing with suitable lugs and eye bolts for handling.

d) The complete equipment shall rest on a steel base framework which shall rest on the pier top.

**B. <u>Mechanical Part</u>**

1. *General*

a) The components of the hoist mechanism shall be so proportioned as to take the severest load coming on individual components.

2. *Wire Rop*

a) The wire rope shall be made from improved plough steel of 6 x 37 construction with steel center, right regular lay, preformed and lubricated.

b) A turnbuckle shall be provided on one side of the wire rope connecting the gate and hoist to equalize the tension in the rope. Turnbuckle and wire rope fitting shall be galvanized.

c) The breaking strength of wire rope shall be as per standard manufacturer's specifications.

d) The strength of socket end of wire rope shall be approximately equal to the strength of the rope itself. The ends shall be safely secured against twisting.

3. *Drum*

a) The groove drum shall be of such size that there will be not more than one layer of rope on the drum when the rope is in its fully wound position.

b) The length of drum shall be such that each lead-off rope has minimum two full turns on the drum when the gate is at its lowest position and one spare groove for each lead-off of the drum when the gate is at its highest position.

c) If the ends of the drum are flanged, the flanges shall project to a height not less than two rope diameters above the rope. A spur gear secured to the drum may be regarded as forming as one of the flanges.

d) The lead angle (fleet angle) of the ropes shall not exceed 5 degrees or 1 in 12 on either side of helix angle of groove in the drum.

e) The drum shall be made of cast steel.

f) The drum shall be machined groove. Grooving shall be finished smooth and edges

between groove rounded. The contour at the bottom of the grooves shall be circular over an angle of at least 120 degrees. The groove radius shall be 0.53 times the diameter of rope. The depth of groove shall not be less than 0.35 times the diameter of the rope.

f) The pitch of the grooves shall be such that the clearance between adjacent turn of rope is at least:

1.5 mm for ropes up to 12 mm diameter

2.5 mm for ropes over 12mm diameter up to 30 mm diameter an

3.0 mm for ropes of over 30 mm diameter

h) The ends of the rope shall be fixed to the drum to such a way that the fixing device is accessible. Each rope shall be wound at least two turns before it is fixed (dead wrap).

4. *Gearing*

a) The reduction units of the hoist shall be composed of spur gears, bevel gears, worm and worm gears. The gears shall be machined cut with smooth finish.

b) Tooth form of spur and bevel gears shall be 20 degrees full depth involute system.

c) Spur and bevel gears shall be of cast steel, forged steel or surface hardened steel. The gears and pinions shall be made from two different grades of materials; the higher strength grade material for the pinion.

d) Standard worm and worm gears shall be high grade reduction unit of good efficiency suitable for long service life. The proportioning of parts therein shall be in accordance with the best engineering practice. The bearing section of the rotating shaft shall be fitted with anti-friction bearings designed for thrust and radial loads and the helical angle of the worm shall be designed for self-locking.

e) Keys in gear trains shall be fitted and secured that they should not work loose when in service.

f) Gears shall have removable housing with provision for convenient access for lubrication. All bolts and cap screws shall be provided with lock washers. All machined units shall be thoroughly cleaned to ensure that they are free of cutting and objectionable and abrasive material.

5. *Shaft*

a) The shafts shall be designed for appropriate torque/load that is being transmitted. Shafts shall have liberal factor of safety for strength and rigidity and shall have adequate bearing surfaces. They shall be finished smooth and, if shouldered, shall be provided with fillets of large radius.

b) All shafts shall be designed for safety against simple bending, pure torsion and the combined effect of bending and torsion.

6. *Bearings*

a) All the running shafts shall be provided with ball, roller or bush bearings. Selection of bearings shall be done on consideration of duty, load and speed of the shaft.

b) Bearings shall be easily accessible for lubrication and/or replacement.

**C. <u>Intake Gate Hoists</u>**

1. *General*

Intake gate hoist shall be manually operated. The pedestal lift shall be crank operated and the direction of rotation of the crank to open the gate shall be clearly indicated on the lifting mechanism

2. *Manual Operation*

i) The manual operation should be designed in such a manner that the continuous effort per man does not exceed a crank force of 98 Newtons (10 Kgf) with 400 mm of crank radius at a continuous rating of 24 RPM.

3. *Gate Stem, Coupling and Stem Guide*

i) Stems shall be of cold finished steel. Each stem shall be of adequate size to safely withstand operation of the gate (both raising and lowering) under the specified head and shall be furnished in sections of suitable length with necessary couplings to facilitate removal and replacement, if necessary. The couplings shall be of the same materials as the stem and shall be safely pinned, bolted or threaded and keyed to the stem. The bolts and pins shall be of stainless steel. The stems shall be provided with suitable stop nuts with provision for adjustment to prevent damage to the bottom of the gate due to overrun of the gate when closing.

ii) Stem guides shall be as recommended by the manufacturer and shall be adjustable in two directions. Stem guides shall be provided with either bronze-bushed cast iron or steel collars bolted into place

4. *Pedestal and Lifting Mechanism*

i) The pedestal shall have a cast bronze lift nut threaded to fit the operating stem. Ball thrust bearings shall be provided above and below the flange of this lift nut to take the computed maximum thrust developed in opening and closing the gate.

ii) Gears shall be of cast steel accurately machined with cut teeth and smooth operating with drive shafts running in bronze sleeve bearing of ample size.

iii) All gears and bearings shall be enclosed in a cast iron housing. The gears and bearings shall be easily accessible for maintenance and lubrication. The housing shall be adequate to withstand the tropical climate.

iv) The lift mechanism shall be provided with a cast iron or structural steel pedestal machined and drilled to accommodate the gear housing and suitable for bolting to the operating floor.

v) The crank shall be of cast iron and detachable and provided with a rotating handle.

**D. <u>Lubrication</u>**

1. *General*

i) All bearings, journals and locations where sliding between parts takes place shall be provided with adequate means of lubrication.
ii) Adequate seals shall be provided wherever necessary to prevent the escape of lubricants during normal operation and the entry of foreign matter.
iii) All the equipment covered under the scope of this contract shall be handed over to NIA in running order with all moving parts properly lubricated and fully charged with the recommended lubricant.
iv) Contractor shall provide a list of all recommended lubricants for each location and the compatible types of lubricant from the product line of all major companies in the Philippines.

2. *Grease Lubrication*

i) Unless otherwise specified, all greasing shall be effected by high pressure hand grease gun.

ii) All fittings shall, if possible, be of the same size.

iii) Underwater equipment shall be charged with lithium based grease, for other locations the grease shall be calcium based.

3. *Oil Lubrication*

i) Gear boxes shall be provided with an oil level sight glass or dipstick, a screw capped filling hole and drain cock.

ii) Where pressure oil lubrication of bearings is adopted, a filter and overload facility shall be provided in an accessible position.

iii) All opening or joints in the gear box casing shall be provided with gaskets to avoid oil leakage.

iv) Contractor shall provide the net quantity plus ten percent (10%) of the required oils and grease for the first filling and charging of the equipment at site.

v) The oil shall be delivered in steel drums and grease in steel kegs. The containers shall be non-returnable.

**LIFTING MECHANISM INSTALLATION, TESTS AND ADJUSTMENTS**

The installation of the lifting mechanism and anchorage shall be in accordance with the details as shown on the Drawings. The Contractor shall send qualified and experienced Installation Supervisor who will supervise the installation of the lifting mechanism

Lifting mechanism shall be installed complete with gear reductions, couplings, shafting, shaft bearings, drums, wire ropes, anchor bolts and all other materials for complete assembly. Lifting mechanism shall be assembled and accurately placed in correct alignment by the use of shims and wedges between the sole plates or base plates and concrete. Dry packing shall be done after the dry-pack has set

After the lifting mechanism have been completely installed, adjusted and made ready for operation, the Contractor shall conduct test runs for the gates and lifting mechanism. All units shall be tested for normal operating speed to ensure that all necessary clearances and tolerances have been provided and that no binding occurs in any moving part. The cost of performing all the required test shall be borne by the Contractor.

All tests shall be performed in the presence of an authorized representative of NIA. All data shall be certified correct and submitted to NIA. All defects found during the test as a result of the installation work shall be corrected accordingly to the satisfaction of NIA.

**EMBEDDED PARTS**

Special attention shall be given to the method by which embedded parts are aligned during erection and secured against movement during the placing of the second stage concrete

The proposed method which is indicated on the Drawings utilize adjusting anchors welded at one end to anchor plates embedded in first stage concrete and fastened by means of two adjusting nuts at the other end to the embedded parts.

**ANTI-CORROSION MEASURES AND PAINTING**

a. General

i. The steel gate shall be designed to minimize as much as possible the effects of localized corrosion. Drain holes shall be provided in all locations where the entrapment of water can occur.

ii. All steel surfaces except stainless steel surfaces shall be coated and/or painted with a protective film specified under Section C below.

iii. Crevices over which the protective film can bridge shall be retouched or repaired prior to coating.

iv. Boxed in members shall be provided with access holes or shall be treated internally with an effective coating material.

v. All coating or paint materials to be used shall be original sealed container bearing the manufacturer's label revealing complete identification of content and shall be subject to inspection by NIA prior to coating and/or painting. The NIA shall have the right to reject any paint material supplied under these specifications which is found to be defective.

b. Surface Preparation and Shop Painting

Upon completion of fabrication and machining works but prior to application of coating materials, the Contractor shall notify NIA in writing that the surface preparation for painting is in progress. Coating application shall commence only after the NIA or their duly authorized representatives have inspected and subsequently approved the surface preparation in accordance with these specifications

NIA or their designated inspectors shall undertake from time to time, inspection of the painting works while it is in progress. NIA shall be at liberty to reject outright any deviation to material specifications and procedure noted during inspection.

Notwithstanding such inspection, the Contractor shall be held responsible for the acceptability of the finished work

All oil, grease, soil and other contaminants shall be removed from steel and cast-iron surfaces by the use of clean solvent, emulsion, cleaning compound or other methods which involve cleaning action.

Following the solvent, the surfaces shall be cleaned of all defective or damage areas of existing paint, and of all loose rust, loose mill scale and other foreign substance in accordance with the requirements for surface preparation as specified hereunder.

i. Immersed Steel

Except where otherwise specified, all steel surfaces and all parts of structures that have surfaces which are exposed and/or permanently immersed in water, shall be blast cleaned by commercial blast cleaning (SSPC-SP6) then painted with 2 coats of coal tar epoxy paint conforming to U.S. Military Specifications MIL-P23236 (Ships) Type I, Class 2 to produce a total dry film thickness of 400 microns (16 mils.),

ii. Steel Exposed to Atmosphere (Lifting Mechanism and Accessories including Enclosures)

Except where otherwise specified all steel and cast-iron surfaces of lifting mechanism and accessories including its enclosure which are exposed to atmosphere shall be blast cleaned by commercial blast cleaning (SSPC-SP6) then applied with 1 coat of Alkyd Red Lead Primer. After proper drying time is attained apply 2 coats of Alkyd Enamel finish to attain a total dry film thickness of 175 microns (7 mils.).

iii. Embedded Steel Work

Where not otherwise specified, all steel surfaces which will be embedded or against which concrete will be placed shall be cleaned by power tool cleaning (SSPC-SP3) then painted with 1 coat of cement latex milk consisting of 10 parts of Portland Cement (by weight), 5 parts of water and 1 part modified latex emulsion.

iv. Repair of Paint Film

The Contractor shall retouch or repair areas of steel gates which maybe damaged during transit from shop to the site of delivery.

All paints shall be applied in conformity with SSPC-PAI Shop, Field and Maintenance Painting, by skilled personnel fully experienced in this type of work.

**C. Machine Surfaces**

All finished surfaces of ferrous metals that will be exposed during shipment or while awaiting installation shall be cleaned in accordance with a coating of heavy, gasoline rust preventive compound.

**D. Stainless Steel Surfaces**

No painting is required for finished or unfinished stainless steel parts

**PREPARING FOR TRANSPORTATION**

i) Shipment of fabricated works to the Project Office should be made only upon issuance of pre-delivery inspection and acceptance report to the fabricator/manufacturer by the NIA Office.

ii) The Project Office reserves the right to conduct its own final inspection upon arrival at the project office before issuance of final acceptance report and any findings made thereat should be noted in the final inspection report for appropriate action by the Central Office.

iii) All parts shall be prepared for transportation so that slings for handling maybe attached readily wherever the parts are to be moved. When it is unsafe to attach slings to the boxes/crates, boxed parts shall be packed with sling attached to the part and the slings shall project through the box or crate so that attachments can be made easily.

iv) All exposed finished surfaces shall be adequately protected against abrasion and injury during transportation and all long and slender pieces shall be safely supported and blocked.

v) Rubber seals shall be dismantled after shop assembly and shall be transported separately. They shall be so packed and protected that their size, shape and physical properties are not affected during transportation.

vi) The gates shall be prepared for transportation as to involve the minimum amount of field assembly.

a. Packing

i) The bid price shall include and provide for securely protecting and packing the equipment so as to avoid the damage during transport. All packing shall allow for easy removal and checking at site. Special precaution shall be taken to prevent rusting of the parts. Gas seals or other methods if proposed to be used shall have the approval of NIA. Each carton or package shall contain a packing memorandum mentioning the name of the Contractor, the number and date of the Contract and the name of the office placing the order.

ii) The equipment shall be insured for loss or damage during transit to the field, the cost being borne by the Contractor.

iii) Notwithstanding anything stated above, the Contractor shall be entirely responsible for loss, damage or depreciation to the equipment and materials.

b. Marking

Each part of gates, hoist and embedded parts which need to be transported from the shop to the field site as separate piece shall be marked to show the unit of which it is a part and match marked to show its relative position in the unit to facilitate assembly in the field. Unit marks and match marks shall be made with heavy steel stamps and paints. Each piece, sub-assembly or package to be transported separately shall be labeled or tagged with transportation designation consisting of the Specification number and the mark number of such piece or the number of parts grouped in such assemblies or package.

**ACCEPTANCE OF WORKS**

After the steel gates have been installed in the field, it will be operated and tested by the NIA and when so operated and tested it shall meet all the requirements of the specifications. The gates shall be raised and lowered several times for the full length of the travel. The primary requisite for acceptance shall be that each gate operates smooth and shall be watertight.

A. Tests

i) The Contractor shall carry out such tests on the gates and hoist equipment as maybe required by the Engineer. Contractor shall be responsible for all modifications and adjustments required for the works as a result of such tests.

ii) The test shall include:
   a) operational tests in the dry
   b) operational tests with fully hydrostatic load
   c) leakage test

iii) Test maybe repeated, if necessary, until they successfully carried out to the satisfaction of the Engineer.

iv) The tests will be carried out at the convenience of the Engineer the cost thereof shall be borne by the Contractor.

B. Operational Tests in the Dry

Operational tests in the dry shall be carried out after completion of erection when all the power supply have been connected and adjusted. The tests shall include at least two complete traverses from the maximum raised position to the full seating position. Manual operation will also be similarly tested. All adjustments, clearances, brakes, motors and controls, etc. shall be checked for proper operation.

C. Operational Test under Hydrostatic Head

i) These tests shall simulate the actual operating conditions as closely as possible.

ii) At least one complete traverse will be made on the sluice and intake gates from the fully closed position to the normal raised position as follows:

a) With the gate initially in the fully closed position raise it to the normal open position until stopped by the limit switch;

b) Lower the gate to the fully closed position;

c) Ascertain proper operation against over-travel;

d) Record and report fan speed, motor torque and current while raising and fan speed during closing;

D. Leakage Tests

Leakage test shall be carried out with the gate lowered on the sill. Before the observation for leakage, the gate shall be raised and lowered by about one meter, several times to dislodge any debris that might have lodged on the side seals. The leaking shall then be measured. Excessive leakage shall be rectified until it is reduced to 15 (fifteen) litres/minute/metre length of the seal.

**MANUALS**

The fabricator/manufacturer shall prepare and furnish NIA and the installation contractor's staff, the installation procedure, operation, and maintenance manuals for all of the works as provided for in the Contract Documents

**METHOD OF MEASUREMENT**

Measurement for furnishing and installation of gates and stoplog will be made on the number of assemblies of the different classes and sizes acceptably installed and tested.

**BASIS OF PAYMENT**

The cost for the supply and delivery of various steel gates will be paid at the contract unit price per assembly or the lump sum price whichever is stated in the Bill of Quantities, which shall include all equipment and materials prescribed in this section and directed by the Engineer.

The cost for the installation provided under this item will be paid at the contract unit price which shall constitute full compensation for furnishing all labor, materials, tools, equipment, supplies and all incidentals and subsidiary works necessary for the successful completion of the works.

Payment for the work provided under this item will be made separately for the supply and delivery, and installation of various gates and lifting mechanism as follows:

a) Supply and delivery

For the supply and delivery of various gates and lifting mechanism, eighty percent (80%) of the respective unit price in the Bill of Quantities shall be paid upon delivery to the project site in accordance with this technical specification acceptable to NIA.

All equipment/materials delivered at the site, shall be kept by the Contractor and will be responsible for any loss or damage of the equipment/materials until they are installed. Any loss or damage to the equipment/materials shall be replaced by the Contractor at his own expense.

Twenty percent (20%) shall be paid upon installation of the equipment and materials, and ready for operation as certified by the Engineer.

b) Installation

One hundred percent (100%) of the respective unit price of each installation works which shall include labor, consumable materials, subsidiary works and other incidentals required for the successful completion of the works shall be paid upon complete installation of the respective equipment/ materials all in accordance with the drawings and accepted by the Engineer.

## MISCELLANEOUS METALWORKS AND MATERIALS

**SCOPE**

The work under this Section shall include furnishing, delivering and installing all miscellaneous metalworks and materials shown on the drawings which shall include but not limited to the following:

1. Trashracks or screens including frames, guides and anchors
2. Steel ladder rungs
3. Steel gratings including frames, guides and anchors
4. G.I. Pipes guardrails and handrails
5. Bearing plates for bridges
6. Bearing pads and filler board for bridges
7. Perforated drain pipes
8. Embedded metals including plates, anchors, angles, strap anchors, bolts, nuts washers, flanges, fittings, bends, tees, cross, elbow and other metals or materials which are not paid for under other items in the Bill of Quantities
9. Timber

All metalworks treated in this Section shall conform to the following standards or their approved equivalent standards:

| | |
|---|---|
| ASTM AG | General requirements for delivery of rolled steel plates, shapes, sheet piling bars for structural use |
| ASTM A36 | Structural Steel |
| AWS D1-1 | Structural Welding Code |
| AWS | Code for Arc and Gas Welding in Building construction |
| ASTM A307 | Specification for Low-Carbon Steel Externally and Internally Threaded Std. Fasteners |
| ASTM A325 | High Strength Bolts for Structural Steel Joints including Suitable Nuts and Plain Hardened Washers |
| ASTM A108 | Cold Finish Carbon Steel Bars and Shafting |
| AISC | Manual of Steel Construction |
| ASTM A123 | Zinc (Hot Galvanized) Coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips |
| ASTM A53 | Welded and Seamless Steel Pipe |
| Metal Grating | Metal Grating Institute Handbook |
| | Pittsburg, Pa. U.S.A |

| | |
|---|---|
| ASTM 120 | Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses |
| AISC | Specification for Design, Fabrication and Erection of Structural Steel for Buildings |
| ASTM A153 | Galvanized Steel Pipes |

**FABRICATION**

Details of design and fabrication not covered by the drawings nor by these specifications shall conform to the applicable provisions of the latest "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" including all supplementary provisions of the American Institute of Steel Construction.

All metalworks and materials furnished by the Contractor and all works performed will be subject to rigid inspection. No metalworks or materials shall be delivered to the jobsite until inspection at the Contractor's fabricating plant has been made, in accordance with the provisions of these specifications.

Shearing and cutting by torch or electric arc shall be performed carefully, and all portions of the work which will be exposed to view after completion shall be finished neatly. Re-entrant cuts and copes shall be shaped notch-free to a radius of at least 12 millimeters.

In bolted connections, all holes shall be cylindrical, unless otherwise shown on the drawings, perpendicular to the members, and clean cut and without burned or ragged edges. Holes in materials more than 20 mm thick shall be drilled. All other holes may be punched or drilled to full size. Unless otherwise shown on the drawings, drilled holes shall be 1 mm larger than the nominal diameter of the bolt. Outside burrs resulting from drilling shall be removed with a tool making a 1 mm bevel. Likewise, for punched holes, unless otherwise shown on the drawings, the diameter of the punch for punching to full size shall also be 1 mm larger than the nominal diameter of the bolt. The diameter of the die shall be not more than 1.50 mm larger than the diameter of the punch.

Welding shall be done by the shielded-arc method except where otherwise specifically permitted by the Engineer. Welding rods shall be furnished by the Contractor and shall be of heavily coated type designated for all position welding, and the size, type and nomenclature of the rods shall be subject to approval by NIA. Welds shall be made as indicated on the drawings and in accordance with the conventional symbols of the American Welding Society (AWS). Welding shall be done in accordance with Sections 3, 4, 5 and 6 of the AWS' code for Arc Welding and Gas Welding in Building Construction, latest revision. All butt welds shall have complete penetration. Teeming of multiple layer welds will not be permitted.

**INSTALLATION**

All metalworks and materials shall be installed in accordance with the details shown on the Drawings. Care shall be taken to ensure that all parts of metalworks are installed in correct position and alignment. Metalworks to be embedded in concrete shall be located accurately and shall be held in correct position and alignment during placing and setting of the concrete. Anchor bolts shall be set and held in position before concrete is placed, unless otherwise approved. Where it is impractical to embed anchor bolts or ladder, stairways or other comparatively light metal work before the concrete is placed and when it is necessary to anchor parts where inserts or anchor bolts have not been provided, holes shall be drilled in the concrete and expansion anchors with bolts shall be installed as directed. The surfaces of all metalworks to be in contact with or embedded in concrete or grouting mortar shall be cleaned.

Suitable blockouts shall be constructed in the concrete where required for installation of railing posts and other metalworks. After installation of the metalworks, blockouts shall be filled with concrete or

grout as shown on the drawings. Contractor shall drill or drill and tap, as required all holes in metalwork required for installation of the metalwork.

Contractor shall drill all holes in concrete required for the installation of expansion anchors. Contractor shall slot or cut or split metalwork in the field as required for installation.

**TRASHRACKS OR SCREENS**

Trashracks or screens shall be a substantial all welded sectionalized steel structure, generally as shown on the drawings. Special care shall be taken to insure that all members shall be in exact position and alignment. Vertical members shall be welded to horizontal members. Trashracks shall be prime coated and painted in accordance with Section XXXVI, Painting Metalworks.

**STEEL LADDER RUNGS**

Steel ladder rungs shall be furnished and installed in accordance with details shown on the drawings. Bars used for steel ladder rungs shall be cold drawn steel wire conforming to the provisions of ASTM Designation A32 or its latest revision. The wire gage or bar size and spacing shall be as designated on the Drawings.

Ladder rungs embedded in concrete shall be free of mortar, oil dirt, loose mil scale, loose rust and other coatings that would destroy or reduce the bond. Bars shall conform to the dimensions shown on the drawings. Bars with links or improper bends or other deformations shall not be used or made as rungs.

**STEEL GRATINGS**

Gratings shall be provided as indicated on the drawings. Steel gratings shall be fabricated from steel shapes and flat bars provided with stiffeners and welded to form a rigid structure as shown on the drawings.

Flat bars of sizes and spaces shown on the drawings shall be welded at their ends into continuous rolled steel angles and provided with stiffeners. The sizes and dimensions of angles or stiffeners shall not be less than those shown on the drawings.

Steel gratings used as cover for the intake barrel manhole shall be provided with rollers on both ends as shown on the drawings, such that this cover could be opened by sliding. Roller guides shall not be shorter than the length shown on the drawings.

**GALVANIZED IRON PIPE GUARDRAILS AND HANDRAILS**

Galvanized iron pipe guardrail and handrail shall be provided at operating platforms and other places shown on the drawings. Sizes and dimensions shall be as shown in detail on the drawings. All railings shall be of threaded ends and furnished with complete joint fittings.

Vertical members for guardrails shall be installed plumbed and horizontal members parallel to the surface of anchorage. Vertical members shall be installed in prepared sockets, braced in true alignment and secured permanently by either threaded floor flange which is anchored to the concrete structure by means of expansion bolts as shown on the drawings or by cement grout consisting of 1 part cement and 3 parts sand (by wt.) mixed to a consistency as directed by the Engineer. Bolts in bolted connections shall be firmly tightened.

Galvanized surfaces that are abraded or damaged during installation shall be thoroughly wire brushed removing all loose and cracked coating and then painted with two coats of high zinc- dust content paint conforming to the requirements of Federal Specification MIL-P-21035 or approved equal.

**BEARING PLATES FOR BRIDGES**

Bearing plates, bars, rockers, assemblies, and other expansion or fixed devices for bridges shall be constructed in accordance with the details shown on the Drawings and shall be hot-dip galvanized after fabrication conforming to ASTM Designation A120 or its latest revision.

The bearing plates shall be set level and the rockers and other expansion devices shall be set to conform to the temperature at the time of erection or to the setting specified.

When bearing assemblies or masonry plates are shown on the Drawings to be placed (not embedded) directly on concrete, the concrete bearing area shall be constructed slightly above grade and shall be finished by grinding or other approved means to a true level plane which shall not vary perceptively from a straight edge placed in any direction across the area. The finished plane shall not vary more than 0.30 centimeter from the elevation shown on the Drawings.

When elastic bearing pads, or preformed fabric pads are shown on the Drawings, the concrete surface on which pads or packing are to be placed shall be wood float finished to a level plane which shall not vary more than 0.40 centimeter from a straight edge placed in any direction across the area. The finished plane shall not vary more than 0.30 centimeter from the elevation shown on the Drawings.

**BEARING PADS AND FILLER BOARDS**

Bearing pads of sizes indicated on the Drawings shall be neophrene, hardness 60 and filler boards shall be canex board or as indicated on the Drawings. The concrete surfaces on which bearing pads are to be placed shall be wood float finished to a level plane which shall not vary more than 0.15 centimeter from a straight edge placed in any direction across the area. The finished plane shall not vary more than 0.30 centimeter from the elevation shown on the Drawings.

**PERFORATED DRAIN PIPES**

Perforated drain pipes shall be installed at locations shown on the drawings and as directed by the Engineer. The sizes and type of materials to be used shall be as indicated on the drawings.

**BOLTS, ANCHORS, ANGLES, NUTS, WASHERS AND OTHER METALS**

Except for studbolts, the length of connection bolts shall be in 6 mm variations and when in the structure, the bolts shall extend at least six millimeters beyond the nuts. Anchor bolts and studbolts shall be as shown on the Drawings. Threads of anchor bolts shall be given a heavy coat of rust preventive compound in the shop. Washers shall be used under heads of all connection bolts where shown or called for on the drawings. Bevelled washers shall be used on sloping flanges.

**GROUT AND MORTAR**

Grout and mortar for miscellaneous metalworks shall be mixed in the proportions and to the specified consistency in accordance with the requirements of Section XV, Concrete. Before placing grout and mortar, the surfaces of concrete on which grout will be placed shall be roughened and shall be cleaned of all laitance, loose or defective concrete coatings and other foreign materials by effective means followed by thorough washing and such surfaces shall be kept moist for at least 24 hours.

**TIMBER**

This work shall consist of timber structures constructed to the dimension, lines and grades shown on the Drawings and in accordance with the specification. The timber shall be treated or kiln dried.

In handling treated timber, care shall be exercised so as not to break or penetrate the treatment with any tool or handling equipment. Any damage timber shall be replaced without any extra

compensation. Any cut made or hole bored in treated timber that exposes untreated wood shall be given 3-coats of hot creosote oil before the exposed part is assembled.

All timber shall be of the specie specified in the drawing, shall be sound, free from knots, splits, ring separation, wormholes or any defects which will impair its strength or render it unfit for its intended use.

All timber which is to be stored on the job for any length of time, prior to its use in the structure, shall be neatly stacked in piles to prevent warping or distortion. Untreated timber shall be open stacked at least 300 mm above the ground and shall be close-stacked and piled to prevent warping. The ground underneath and in the vicinity of all piles shall be cleared of all weeds and rubbish.

**METHOD OF MEASUREMENT**

Measurement for payment of miscellaneous metalwork and materials will be made either on the weight of metalwork in kilogram or on the number of assembly or pieces actually installed in accordance with the table as follows:

| **Metal/Material** | **Measurement** |
|---|---|
| 1. Trashrack or screens including frames, guides and anchors | Kilogram/Set |
| 2. Steel ladder rungs | Kilogram |
| 3. Steel grating, including frames guides and anchors | Kilogram |
| 4. G.I. Pipe guardrails and handrails | Kilogram/L.M. |
| 5. Bearing Plates for Bridges | Piece |
| 6. Bearing Pads and Filler Boards for Bridges | Piece |
| 7. Perforated drain pipes | Kilogram/L.M. |
| 8. Embedded metals including plates, anchors, angles, strap anchors, bolts, nuts and washers, flanges, fittings, bends, tees, cross, elbows and other metals or materials which are not paid under other items in the Bill of Quantities | Kilogram/Lump sum |
| 9. Timber | Set/Assembly or bd. ft. |

Weights shall be computed based on the theoretical weight of such material duly certified by the manufacturer.

**BASIS OF PAYMENT**

Payment for miscellaneous metalwork will be made at the contract unit price per kilogram, per piece, or per assembly whichever is called for in the Bill of Quantities which price and payment shall constitute full compensation for furnishings all labor tools, materials and all incidentals and subsidiary works necessary for the successful completion of the miscellaneous metalworks and materials described under this Section.

## BASIC PPE'S FOR WORKERS:

1. Helmet/Safety Hardhat
2. Safety Shoes
3. Rubber Boots
4. Working Gloves
5. Rain Coats

# *Section VII. Drawings*

*[Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section, or annexed in a separate folder.]*

# *Section VIII. Bill of Quantities*

Bill of Quantities

Contract No: NOSO-LMC-SIP-18-2022

Description of Contract: Upper Binalbagan SIP (Construction of Lined Canal & Canal Structures)

Location: Canlaon City, Negros Oriental

| ITEM NO. | DESCRIPTION | QTY. | UNIT | UNIT BID PRICE IN WORDS & IN FIGURES | TOTAL |
|---|---|---|---|---|---|
| ***Canalization*** | | | | | |
| 1 | Common Excavation (Mech.) | 526.00 | cu.m. | ₱ | ₱ |
| 2 | Rock Excavation (Mech.) | 210.00 | cu.m. | ₱ | ₱ |
| 3 | Common Excavation (Hard) Mech. | 316.00 | cu.m. | ₱ | ₱ |
| 4 | Side Borrow w/Compaction (Man.) | 516.00 | cu.m. | ₱ | ₱ |
| 5 | 2,400 psi Reinforced Concrete (dry) | 459.00 | cu.m. | ₱ | ₱ |
| ***Canal Structures*** | | | | | |
| 1 | Common Struct. Excav. w/o dew (Mech.) | 193.00 | cu.m. | ₱ | ₱ |
| 2 | Rock Struct. Excav. w/o dew (Mech.) | 75.00 | cu.m. | ₱ | ₱ |
| 3 | Common Excavation (Hard) Mech. | 118.00 | cu.m. | ₱ | ₱ |
| 4 | Backfill with Compaction (Mech.) | 231.00 | cu.m. | ₱ | ₱ |
| 5 | 3,000 psi Reinforced Concrete (dry) | 113.00 | cu.m. | ₱ | ₱ |
| 6 | Fab./ Installation of Trashrack | 8.00 | unit | ₱ | ₱ |
| 7 | Fab./ Installation Of STO Steelgate | 3.00 | unit | ₱ | ₱ |
| 8 | Health and Safety | 1.00 | lot | ₱ | ₱ |
| | **TOTAL AMOUNT OF BIDS** (In Words and Figures) | | | ₱ | ₱ |

The undersigned bidder hereby certifies that he has fully informed himself of all condition, local and otherwise affecting the carrying out of the Contract Works and that his bid has been prepared strict accordance with the terms and condition.

Name of Firm: _____

_____

Name in Print & Signature of Bidder

# *Section IX. Local Condition*

## LC-01 PROJECT LOCATION

Upper Binalbagan SIP is located in Canlaon City, Negros Oriental. The Project is approximately 170 kilometers from Dumaguete City.

## LC-02 ACCESS TO THE SITE

The contract work is located at Canlaon City, Negros Oriental. It is accessible by land through concrete/bituminous roads and highways, as well as air and water transportation through airport and seaport of Dumaguete City. During dry season, access roads to the project site are passable, but it is hard to access during rainy season. Passing through different service roads by fairly to well graveled road which may deteriorate if used during rainy days. Maintenance and repair of these service roads by the contractor is necessary if so, used by them. The cost of maintenance and repair shall be included in the unit bid price of the contractor.

## LC-03 FUEL AND POWER SUPPLIES

The major fuel station outlets such as Petron, Caltex and Shell are found in the nearest city of the project and other surrounding municipalities.

The main source of energy is supplied by the Negros Oriental Electric Cooperative II (NORECO II) and locally distributed to the consumers and is presently available at the above-stated address of the project site.

## LC-04 CLIMATE AND HYDROLOGY

Using the Corona Climate classification System, Negros Oriental falls within the Type III classification, which is characterized by seasons not very pronounced relatively dry from November to April.

Rainfall summarized in the following table, but NIA will assume no responsibility whatsoever for the accuracy of these data. Any risk arising from the interpretation of such data is to be entirely borne by the Contractor.

**CLIMATE**

| Month | Rainfall in Dumaguete PAG ASA Station/1 (mm) | Rainy Days Dumaguete PAG ASA Station/2 |
|---|---|---|
| Jan. | 123.1 | 8 |
| Feb. | 232.9 | 5 |
| March | 46.6 | 3 |
| April | 56.9 | 4 |
| May | 124.1 | 9 |
| June | 85.4 | 4 |
| July | 123.2 | 8 |
| Aug. | 162.8 | 9 |
| Sept. | 183.7 | 11 |
| Oct. | 240.5 | 11 |
| Nov. | 314.5 | 12 |
| Dec. | 152.3 | 5 |
| Total | 1846.00 | 89 |

*/1: Dumaguete PAGASA Station is the rainfall station close to the project area.*

*/2: Daily rainfall less than 5 mm is deemed zero and not counted as rainy day.*

**LC-05 BANKING FACILITIES**

Most rural banks are available at nearby of the project area while major banking facilities are found in Dumaguete City like; Development Bank of the Philippines, Land Bank of the Philippines, Philippine National Bank, Bank of the Philippine Island, Allied Bank, Bank of Commerce, Metro Bank and other private banks.

**LC-06 COMMUNITY AND FIRST AID FACILITIES**

The Contractor is advised that the NIA will take no direct part in providing community facilities such as churches, shops, community center and recreation facilities for Contractor's employees. The Contractor shall make his own arrangements for such as he considers being necessary for the approval of the NIA and shall meet all codes or regulations in effect. It shall be the responsibility of the Contractor to furnish and operate first aid for his personnel. Such facilities may be integrated with the NIA facilities, if any, upon mutual agreement.

**LC-07 CONTRACTOR'S WORKING AREA AND SITE OFFICE**

The Contractor shall, at his own expense, be responsible for housing, feeding and accommodation of all his employees for the execution of the Contract Work. Construction equipment, materials, tools, supplies, and other incidentals, and all cost incurred for the protection and safety shall be borne by him.

## LC-08 WATER SUPPLY

The Contractor shall, at his own expense, be responsible for the provision or installation, operation and maintenance of a safe, adequate and temporary supply of drinking and domestic water, and the adequate water supply for his construction purposes.

## LC-09 RIGHT OF WAY

The NIA will provide all right of way, free of charge to the contractor, which, in the opinion of the Regional Manager, necessary for carrying out the contract work.

## LC-10 SITE INVESTIGATION

It is the responsibility of the Contractor to visit the work site to make their own investigation to satisfy themselves as to the existing conditions affecting the work to be done under these Specifications.

The Contractor shall assume all responsibilities for deduction and conclusions that he may obtain or arrive at from the site inspection.

## INFORMATION AND DATA REFERRED TO IN THESE BID DOCUMENTS

PROJECT: Upper Binalbagan SIP (Construction of Lined Canal and Canal Structures), Canlaon City, Negros Oriental

1. Site Visit and Inspection
   Register at NIA-Negros Oriental Satellite Office, Osmeña St., Poblacion, Sibulan, Negros Oriental

2. Wet Season Period, Article LC-04

3. Contract Duration, Article SCC 1.16, ITB

   240 calendar days

4. List of Officers/Offices to be furnished correspondence from the Contractor

   The Deputy Administrator
   For Engineering & Operations
   National Irrigation Administration
   5th Floor, NIA Complex
   EDSA, Diliman, Quezon City

   The Regional Manager
   NIA Regional Office 7
   Dao District, Tagbilaran City

5. Minimum Equipment Requirement for the Contract:

| Equipment | | Capacity | Number of Units |
|---|---|---|---|
| 1. | Dump Truck | | 1 |
| 2. | Cargo Truck | | 1 |
| 3. | Backhoe | | 1 |
| 4. | Concrete Mixer | 1 bagger | 2 |
| 5. | Concrete Vibrator | | 2 |
| 6. | Bar Cutter | | 1 |
| 7. | Survey Instrument (set) | | 1 |
| 8. | Plate Compactor | | 1 |

6. List of Initial Equipment required to be mobilized within ten (7) calendar days after receipt of Notice to Proceed

| Equipment | | Capacity | Number of Units |
|---|---|---|---|
| 1. | Dump Truck | | 1 |
| 2. | Cargo Truck | | 1 |
| 3. | Backhoe | | 1 |
| 4. | Concrete Mixer | 1 bagger | 2 |
| 5. | Concrete Vibrator | | 2 |
| 6. | Bar Cutter | | 1 |
| 7. | Survey Instrument (set) | | 1 |
| 8. | Plate Compactor | | 1 |

# *Section X. 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);
**Or**

☐ (b) Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;
**And**

☐ (c) Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
**And**

☐ (e) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

*Technical Documents*

☐ (f) 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**

☐ (g) 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**

☐ (h) Philippine Contractors Accreditation Board (PCAB) License;
**or**
Special PCAB License in case of Joint Ventures;
**and** registration for the type and cost of the contract to be bid; **and**

☐ (i) 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**

(j) 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**

☐ (k) 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*

☐ (l) The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**

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

***Class "B" Documents***

☐ (n) 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**

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

*Other documentary requirements under RA No. 9184*

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

☐ (q) 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**

☐ (r) Cash Flow by Quarter.

# Section XI. BIDDING FORMS

REPUBLIC OF THE PHILIPPINES)
CITY OF _____) S.S.

**BID SECURING DECLARATION**
Project Identification No.: **NOSO-LMC-SIP-18-2022**

To: Engr. Reyne B. Ugay
Acting Regional Manager
National Irrigation Administration
NIA, Regional Office 7, J.A. Clarin St., Dao,
Tagbilaran City, Bohol, PHILIPPINES

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f),of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.
3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:
   a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
   b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
   c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of [month] [year] at [place of execution].

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

**SUBSCRIBED AND SWORN** to before me this ___ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no. _____ and his/her Community Tax Certificate No. _____ issued on ____ at _____.

Witness my hand and seal this ___ day of *[month] [year]*.

**NAME OF NOTARY PUBLIC**
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ *[date issued], [place issued]*
IBP No. _____ *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

# Omnibus Sworn Statement

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REPUBLIC OF THE PHILIPPINES )
CITY/MUNICIPALITY OF _____ ) S.S.

## AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. [Select one, delete the other:]
   [If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

   [If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. [Select one, delete the other:]

   [If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

   [If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable;)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. [Select one, delete the rest:]

[If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a partnership or cooperative:] None of the officers and members of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. [Name of Bidder] complies with existing labor laws and standards; and

8. [Name of Bidder] is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

   a. Carefully examining all of the Bidding Documents;
   b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
   c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
   d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the [Name of the Project].

9. [Name of Bidder] did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

IN WITNESS WHEREOF, I have hereunto set my hand this __ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

**SUBSCRIBED AND SWORN** to before me this ___ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her [insert type of government identification card used], with his/her photograph and signature appearing thereon, with no. _____ and his/her Community Tax Certificate No. _____ issued on ____ at _____.

Witness my hand and seal this ___ day of *[month] [year]*.

**NAME OF NOTARY PUBLIC**
Serial No. of Commission _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. _____ *[date issued], [place issued]*
IBP No. _____ *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

# BID FORM

Date : _____

Project Identification No: NOSO-LMC-SIP-18-2022

To: Engr. Reyne B. Ugay
Acting Regional Manager
National Irrigation Administration
NIA, Regional Office 7, J.A. Clarin St., Dao,
Tagbilaran City, Bohol, PHILIPPINES

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers [insert numbers], the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: [insert name of contract];

b. We offer to execute the Works for this Contract in accordance with the PBDs;

c. The total price of our Bid in words and figures, excluding any discounts offered below is: [insert information];

d. The discounts offered and the methodology for their application are: [insert information];

e. The total bid price includes the cost of all taxes, such as, but not limited to: [specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties], which are itemized herein and reflected in the detailed estimates,

f. Our Bid shall be valid within the a period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;

g. If our Bid is accepted, we commit to obtain a Performance Security in the amount of [insert percentage amount] percent of the Contract Price for the due performance of the Contract, or a Performance Securing Declaration in lieu of the allowable forms of Performance Security, subject to the terms and conditions of issued GPPB guidelines[12] for this purpose;

h. We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;

i. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and

j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.

k. We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the [Name of Project] of the [Name of the Procuring Entity].

l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____
Legal Capacity: _____
Signature: _____
Duly authorized to sign the Bid for and behalf of: _____
Date: _____

National Irrigation Administration
Region 7

Contact Ref. No : NOSO-LMC-SIP-18-2022
Name of Contract : UPPER BINALBAGAN SIP (CONSTRUCTION OF LINED CANAL AND CANAL STRUCTURES)
Location : Canlaon City, Negros Oriental

**STATEMENT OF THE BIDDERS OF ALL ITS ON-GOING GOVERNMENT & PRIVATE CONTRACTS INCLUDING CONTRACTS AWARDED BUT NOT YET STARTED**

Business Name : _____

Business Address : _____

| NAME OF CONTRACT | CONTRACT DATE | CONTRACT PERIOD | CONTRACT AMOUNT | Amount or Value of Outstanding Works or Unperformed Portion |
|---|---|---|---|---|
| Government | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Private | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Submitted by : _____
(Printed Name & Signature)

Designation : _____

Date : _____

National Irrigation Administration
Region 7

Contact Ref. No : NOSO-LMC-SIP-18-2022
Name of Contract : UPPER BINALBAGAN SIP (CONSTRUCTION OF LINED CANAL AND CANAL STRUCTURES)
Location : Canlaon City, Negros Oriental

**STATEMENT OF THE BIDDERS'S SINGLE LARGEST COMPLETED CONTRACTS (SLCC) SIMILAR TO THE CONTRACT TO BE BID**

Business Name : _____

Business Address : _____

| NAME OF COMPLETED CONTRACT | DATE OF CONTRACT | CONTRACT DURATION | CONTRACT AMOUNT |
|---|---|---|---|
| Government | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Private | | | |
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Note: This statement shall be supported with:
Owners' Certificate of Final Acceptance or a final rating of at least Satisfactory in the CPES

Submitted by : _____
(Printed Name & Signature

Designation : _____

Date : _____

**LIST OF CONTRACTORS' EQUIPMENT PLEDGE TO THE CONTRACT TO BE BID**

Contract No. :

Name of Contract :

| Name of Equipment | Unit | Plate No./Model | Motor No./Body No./Engine No. | Proof of Ownership | Present Location | Remarks |
|---|---|---|---|---|---|---|
| | | | | | | |
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Submitted by :

_____ Date: _____

(Name of Contractor & Signature)

_____

(Name of Firm)