



REPUBLIC OF THE PHILIPPINES
NATIONAL POWER CORPORATION
(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project : **SUPPLY, ERECTION / INSTALLATION,
TESTING AND COMMISSIONING OF
7.97/13.8 kV DISTRIBUTION LINE AT
LANAWAN, TABUAN LASA, BASILAN
(Rev. 01)**

Project Location : **LANAWAN, TABUAN LASA, BASILAN**

Specification No : **MinP21Z1354Sdg**

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Design and Development Department



SECTION I

INVITATION TO BID





National Power Corporation

INVITATION TO BID

PUBLIC BIDDING – BCS 2022-0694

1. The NATIONAL POWER CORPORATION (NPC), through its approved Corporate Budget of CY 2022 intends to apply the sum of **(Please see schedule below)** being the Approved Budget for the Contract (ABC) to payments under the contract. Bids received in excess of the ABC shall be automatically rejected at Bid opening.

PR Nos./PB Ref No. & Description	Similar Contracts	Pre-bid Conference	Bid Submission / Opening	ABC/ Amt. of Bid Docs
HO-PIG22-016 / PB221121-CM00418 Supply, Delivery, Installation, Test and Commissioning of 1 x 600 kW Containerized Diesel Generating Set and Associated Electrical Equipment for Rizal DPP	Supply, Delivery, Installation, Test and Commissioning or Construction of Power Facilities, Installation, Test and Commissioning of "Unit Diesel Generator – Transformer" with generator capacity of at least 400 kW Prime or Continuous Power and associated Power Transformer of at least 500 kVA rating	07 November 2022 9:30 A.M	21 November 2022 9:30 A.M	₱ 22,751,700.00 / ₱ 25,000.00
S4-PIC22-060 / PB221121-JD00419 Supply, Erection / Installation, Testing and Commissioning of 7.97/13.8 kV Distribution Line at Lanawan, Tabuan Lasa, Basilan • PCAB License: License Category of at least "Category D – Electrical Works" and registration classification of at least "Small B – Electrical Works"	Supply, Delivery, Erection / Installation, Testing and Commissioning of Transmission / Distribution Line with voltage of at least 13.2 kV	07 November 2022 9:30 A.M	21 November 2022 9:30 A.M	₱ 12,745,000.00 ₱ 25,000.00
Venue: Kañao Function Room, NPC Bldg. Diliman, Quezon City				

2. The NPC now invites bids for Items listed above. Delivery of the Goods is required (see table below) specified in the Technical Specifications. Bidders should have completed, within (see table below) from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. (Instruction to Bidders).

PR No/s. / PB Ref No/s.	Delivery Period / Contract Duration	Relevant Period of SLCC reckoned from the date of submission & receipt of bids
HO-PIG22-016	Two Hundred Forty (240) Calendar Days	Fifteen (15) Years
S4-PIC22-060	One Hundred Twenty (120) Calendar Days	-

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

Bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA 5183.

4. Prospective Bidders may obtain further information from National Power Corporation, Bids and Contracts Services Division and inspect the Bidding Documents at the address given below during office hours (8:00AM to 5:00PM), Monday to Friday.
5. A complete set of Bidding Documents may be acquired by interested Bidders from the given address and website(s) and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB. Bidding fee may be refunded in accordance with the guidelines based on the grounds provided under Section 41 of R.A. 9184 and its Revised IRR.
6. The National Power Corporation will hold Pre-Bid Conference (**see table above**) and/or through video conferencing or webcasting which shall be open to prospective bidders.

Only registered bidder/s shall be allowed to participate for the conduct of virtual pre-bid conference. **Unregistered bidders** may attend the Pre-Bid Conference at the Kañao Room, NPC subject to the following:

- a. Only a maximum of two (2) representatives from each bidder / company shall be allowed to participate during the virtual pre-bid conference.
 - b. A "No Face mask / No Entry" policy shall be implemented in the NPC premises. Face mask shall be 3-ply surgical or KN95 mask type.
 - c. The requirements herein stated including the medium of submission shall be subject to GPPB Resolution No. 09-2020 dated 07 May 2020
 - d. The Guidelines on the Implementation of Early Procurement Activities (EPA) shall be subject to GPPB Circular No. 06-2019 dated 17 July 2019
7. Bids must be duly received by the BAC Secretariat through (i) manual submission at the office address indicated below; (ii) online or electronic submission before the specified time stated in the table above for opening of bids. Late bids shall not be accepted.
 8. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in ITB Clause 14.
 9. Bid opening shall be on Kañao Function Room, NPC Head Office, Diliman, Quezon City and/or via online platform to be announced by NPC. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.
 10. The National Power Corporation reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised IRR of R.A. No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

**Bids and Contracts Services Division,
Logistics Department**

BIR Road cor. Quezon Avenue

Diliman, Quezon City

Tel Nos.: 8924-5211 and 8921-3541 local 5611/5211

Fax No.: 8922-1622

Email: bcsd@napocor.gov.ph

12. You may visit the following websites:

For downloading of Bidding Documents: <https://www.napocor.gov.ph/bcsd/bids.php>


RENE B. BARRUELA
Vice President, Corporate Affairs Group and
Chairman, Bids and Awards Committee

SECTION II

INSTRUCTIONS TO BIDDERS



SECTION II - INSTRUCTIONS TO BIDDERS

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SECTION II - INSTRUCTIONS TO BIDDERS

1. Scope of Bid

NPC invites Bids for the **SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN-LASA, BASILAN (REV. 01)**, with Project Identification Number **MinP21Z1354Sdg**.

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

2. Funding Information

The GOP through the source of funding as indicated below for CY 2022 in the amount stated in the Invitation to Bid. The source of funding is the proposed Corporate Operating Budget of the National Power Corporation (NPC).

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.
- 7.1. 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. 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 **Form NPCSF-INFR-01 - Checklist of Technical and Financial Documents, Section VIII - Bidding Forms.**
- 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 **Form NPCSF-INFR-01 - Checklist of Technical and Financial Documents, Section VIII - Bidding Forms.**
- 11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.
- 11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

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

13. Bid Prices

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

14. Bid and Payment Currencies

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

14.2. Payment of the contract price shall be made in Philippine Pesos.

15. Bid Security

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

15.2. The Bid and bid security shall be valid until **One Hundred Twenty (120) calendar days** from the date of opening of bids. 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 15 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 SHEETS



SECTION III - BID DATA SHEET

ITB Clause	
5.2	<p>For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be Supply, Delivery, Erection/Installation, Testing and Commissioning of Transmission/Distribution Line with voltage of at least 13.2 kV.</p> <p>The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process.</p> <p>It shall be a ground for disqualification, if verification and validation cannot be conducted for reasons attributable to the Bidder.</p>
7.1	<p>Only a maximum of fifty percent (50%) of the Works may be subcontracted. All Subcontractors must be approved by NPC.</p>
10.1	<p>The list of on-going contracts (Form No. NPCSF-INFR-02) shall be supported by the following documents for each on-going contract to be submitted during Post-Qualification:</p> <ol style="list-style-type: none"> 1. Contract/Purchase Order and/or Notice of Award 2. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date. <p>The bidder shall declare in this form all his on-going government and private contracts including contracts where the bidder (either as individual or as a Joint Venture) is a partner in a Joint Venture agreement other than his current joint venture where he is a partner. Non declaration will be a ground for disqualification of bid.</p>
	<p>The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid (Form No. NPCSF-INFR-03) shall be supported by the following documents to be submitted during Bid Opening:</p> <ol style="list-style-type: none"> 1. Contract/Purchase Order 2. Owner's Certificate of Final Acceptance issued by the project owner other than the contractor or a final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES). In case of contracts with the private sector, an equivalent document (Ex. Official Receipt or Sales Invoice) shall be submitted.
10.3	<p>The required License issued by the Philippine Contractors Accreditation Board (PCAB): License Category of at least "CATEGORY D – ELECTRICAL WORKS" and registration classification of at least "SMALL B – ELECTRICAL WORKS".</p>

<p>10.4</p>	<p>The list of key personnel shall include the following minimum requirements:</p> <p>a. One (1) Project Manager</p> <p>Professional Electrical Engineer (PEE) who had managed or supervised at least a similar project within the last ten (10) years.</p> <p>b. One (1) Project Engineer</p> <p>Registered Electrical Engineer or Registered Civil Engineer who had supervised at least one (1) similar project within the last ten (10) years. Must have at least five (5) years professional experience on similar project.</p> <p>c. One (1) Safety Officer 2</p> <p>Construction Safety Officer who has completed at least forty (40) hours of Construction Safety and Health Training (COSH) from Occupational Safety and Health Center (OSHC) or Safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE)</p> <p>Valid Professional Regulations Commission (PRC) license for professional personnel, Construction Safety and Health Training Certificate from OSHC/STOs accredited by DOLE for the Safety Officer, shall be submitted and included as an attachment in the Standard Form NPCSF-INFR-09: List of Key Personnel Proposed to be Assign to the Contract.</p> <p>The above key personnel must either be employed by the Bidder or contracted by the Bidder to be employed for the contract to be bid.</p>
<p>10.5</p>	<p>The list of construction equipment (owned or leased) shall include the following minimum requirements:</p> <p>I. UTILITY EQUIPMENT</p> <ul style="list-style-type: none"> 1. Cargo Truck with boom (10 – 15 Tons cap.) - 1 unit 2. Crane (5 - 9 tons) - 1 unit 3. High Bed Trailer - 1 unit 4. Service Vehicle (pickup/van) - 1 unit 5. Tamping Tools - 2 units <ul style="list-style-type: none"> a. 1 – 10 ft. long b. 1 – 7 ft. Long <p>II. STRINGING EQUIPMENT</p> <ul style="list-style-type: none"> 1. Puller - 1 unit 2. Tensioner - 1 unit 3. Stringing Sheaves for ACSR - 30 pcs. 4. Stringing Sheaves for OHGW - 12 pcs. 5. Hydraulic Compressor for Jointing, Clipping of ACSR and OHGW - 1 unit 6. Tools for clamping/crimping of ACSR & OHGW- 2 sets

<p>10.6</p>	<p>Bidders shall also submit the following requirements in their first envelope, Eligibility and Technical Component of their bid:</p> <ol style="list-style-type: none"> Documents to be submitted with the Bid Proposal as specified in Clause CW-2.1.5 of Section VI – Civil Works (CW); <p>Manufacturer’s brochures, manuals and other supporting documents of equipment, materials, hardware and tools proposed by the bidders must comply with the technical specifications of such equipment, materials, hardware and tools. It shall be a ground for disqualification if the submitted brochures, manuals and other supporting documents are determined not complying with the specifications during technical evaluation and post-qualification process.</p> <p>Equipment, materials, hardware and tools proposed by the winning bidder to be supplied, which were evaluated to be complying with the technical specifications, shall not be replaced and must be the same items to be delivered/installed/used during the contract implementation. Any proposed changes/replacement of said items may be allowed on meritorious reasons subject to validation and prior approval by NPC.</p> <ol style="list-style-type: none"> Complete eligibility documents of the proposed sub-contractor, if any
<p>10.7</p>	<p>The prospective bidders shall declare its Joint Venture partner during the purchase of bid/tender documents. Any single bidder/s who already procured/secured the bidding documents but want to avail the Joint Venture Agreement (JVA) shall inform the BAC in writing prior to the bid opening for records and documentation purposes. Failure to do so shall be a ground for disqualification/non-acceptance of its bid.</p>
<p>12</p>	<p>No further instructions</p>
<p>15.1</p>	<p>The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts:</p> <ol style="list-style-type: none"> The amount of not less than 2% of ABC, if bid security is in cash, cashier’s/manager’s check, bank draft/guarantee or irrevocable letter of credit; The amount of not less than 5% of ABC if bid security is in Surety Bond.
<p>19.2</p>	<p>Partial Bid is not allowed</p>
<p>20</p>	<ol style="list-style-type: none"> Contract/Purchase Order and/or Notice of Award for the contracts stated in the List of all Ongoing Government & Private Contracts Including Contracts Awarded but not yet Started (NPCSF-INFR-02); Certification coming from the project owner/client that the performance is satisfactory as of the bidding date for all ongoing contracts stated in form NPCSF-INFR-02. The licenses and permits relevant to the Project and the corresponding law requiring it as specified in the Technical Specifications, if any.

21	<p>The following documents shall form part of the contract:</p> <ol style="list-style-type: none">1. Notice to Proceed2. Construction schedule and S-curve3. Manpower Schedule4. Construction Methods5. Equipment Utilization Schedule6. Construction safety and health program of the contractor duly approved by the Bureau of Working Condition (BWC) of the Department of Labor and Employment (DOLE) or proof of submission to BWC7. PERT/CPM.
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SECTION IV

GENERAL CONDITIONS OF CONTRACT



SECTION IV – GENERAL CONDITIONS OF CONTRACT

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SECTION IV – GENERAL CONDITIONS OF CONTRACT

1. Scope of Contract

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

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

2. Sectional Completion of Works

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

3. Possession of Site

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

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

4. The Contractor's Obligations

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

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

5. Performance Security

- 5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.
- 5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

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

7. Warranty

- 7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.
- 7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the SCC.

8. Liability of the Contractor

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

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

9. Termination for Other Causes

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

10. Dayworks

Subject to the guidelines on Variation Order in Annex "E" of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the SCC, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the

Procuring Entity's Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

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

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

12. Instructions, Inspections and Audits

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

13. Advance Payment

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

14. Progress Payments

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

15. Operating and Maintenance Manuals

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

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

SECTION V

SPECIAL CONDITIONS OF CONTRACT



SECTION V – SPECIAL CONDITIONS OF CONTRACT

GCC Clause	
2	Sectional completion is not specified.
4	<p>It shall also be the obligation and responsibility of the Contractor to carry out the Works properly and in accordance with this Contract, including but not limited to the following conditions:</p> <p>a. The Contractor shall conduct the Works with due regard to safety and health in accordance with its Construction Safety and Health Program (CSHP) duly approved by the Department of Labor & Employment (DOLE) and in compliance with the DOLE Department Order No. 13 – The Guidelines Governing Occupational Safety and Health in the Construction Industry.</p> <p>Failure to comply with the approved CSHP will be considered as non-compliance with the Contract and shall result to the imposition of Section 19, Violation and Penalties of the DOLE Department Order No. 13 and any appropriate sanctions such as, but not limited to:</p> <ol style="list-style-type: none"> 1. Suspend the work until the Contractor complies with the approved CSHP with the condition that the work resumption will not incur additional cost to the Corporation; 2. Suspend payment of the portion of work under question; 3. Correct the situation by employing 3rd party and charge all expenses incurred to the Contractor's collectibles/securities; and 4. Report the condition to the Bureau of Working Conditions of the DOLE for their appropriate action. <p>b. The Contractor shall be responsible for the strict compliance with the provision of the Philippine Laws affecting labor and operation of Work under the contract and shall be responsible for the payment of all indemnities arising out of any labor accident which may occur in the execution of the Works and for which he may be responsible under Republic Act 3428, as amended, known as the Workmen's Compensation Law.</p> <p>c. The Contractor is obliged to exercise due care so as not to endanger life and property in the vicinity of the Works where he operates in connection with this Contract. He shall be liable for all damages incurred in any manner by acts of negligence of his own, or his agents, employees, or workmen.</p> <p>d. It is the responsibility of the Contractor for the strict compliance with the requirements of the Philippine Clean Air Act of 1999 (R.A. 8749) and Philippine Clean Water Act of 2004 (R.A. 9275). The Contractor shall be liable for any damages/destructions to the environment including penalties that will be imposed by the Department of Environment and Natural Resources (DENR) arising from non-compliance of the requirements thereof.</p>



	<p>e. The Contractor shall be responsible for the strict compliance with the requirements of the Environmental Compliance Certificate (ECC) issued for this project (if any) and DENR Administrative Order No. 26. He shall be liable for any damages/destructions to the environment including penalties that will be imposed by the DENR arising from non-compliance thereof, in any manner by his acts or negligence, or by his agents, employees, or workmen in the execution of the Works. The Contractor may employ a Pollution Control Officer accredited with the DENR for the duration of the project, if so required by the DENR Administrative Order No. 26</p> <p>f. It shall be the Contractor's responsibility for the correctness, accuracy and quality of works. NPC's approval does not relieve his contractual obligation and responsibility under this contract.</p> <p>g. Payment of all forms of taxes, such as value added tax (VAT) including municipal licenses and permits, and others that may be imposed by the Philippine Government or any of its agencies and political subdivisions in connection with the Contract shall be for the account of the Contractor.</p> <p>h. In general, the Contractor is totally responsible for the execution of the Works and therefore, takes upon himself all the technical, legal and economic risks and all obligations which could arise therefrom or connected therewith. The overall responsibility of the Contractor includes the responsibility for actions or omissions of his own personnel as well as the personnel of the sub-contractors.</p>
<p>4.1</p>	<p>NPC shall give access to the Site for the Contractor to commence and proceed with the works on the start date. The access to the site referred herein shall not be exclusive to the Contractor but only to enable him to execute the Work.</p>
<p>5</p>	<p>1. The following must be indicated in the performance bond to be posted by the Contractor:</p> <ul style="list-style-type: none"> i. Company Name ii. Correct amount of the Bond iii. Contract/Purchase Order Reference Number iv. Purpose of the Bond: "To guarantee the faithful performance of the Principal's obligation to undertake <u>(Contract/Purchase Order Description)</u> in accordance with the terms and conditions of <u>(Contract No. & Schedule/Purchase Order No.)</u> entered into by the parties." <p>2. The bond shall remain valid and effective until the duration of the contract <u>(should be specific date reckoned from the contract effectivity)</u> plus sixty (60) days after NPC's acceptance of the last delivery/final acceptance of the project.</p> <p>3. In case of surety bond, any extension of the contract duration or delivery period granted to the CONTRACTOR shall be considered as given, and any modification of the contract shall be considered as authorized, as if with the expressed consent of the surety, provided that such extension or modifications falls within the effective period of the said surety bond. However, in the event that the extension of</p>



	<p>the contract duration or delivery schedule would be beyond the effective period of the surety bond first posted, it shall be the sole obligation of the CONTRACTOR to post an acceptable Performance Security within ten (10) calendar days after the contract duration/delivery period extension has been granted by NPC.</p> <p>4. Other required conditions in addition to the standard policy terms issued by the Bonding Company:</p> <ul style="list-style-type: none"> i. The bond is a penal bond, callable on demand and the entire amount thereof shall be forfeited in favor of the Obligee upon default of the Principal without the need to prove or to show grounds or reasons for demand for the sum specified therein; ii. The amount claimed by the Obligee under this bond shall be paid in full and shall never be subject to any adjustment by the Surety; iii. In case of claim, the Surety shall pay such claim within sixty (60) days from receipt by the Surety of the Obligee's notice of claim/demand letter notwithstanding any objection thereto by the Principal.
6	No site investigation report.
7.2	<p>In case of permanent structures, such as buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures: Fifteen (15) years.</p> <p>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.</p> <p>In case of other structures, such as Bailey and wooden bridges, shallow wells, spring developments, and other similar structures: Two (2) years.</p>
10	No dayworks are applicable to the contract.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within Ten (10) calendar days of delivery of the Notice of Award/Letter of Acceptance.
11.2	<p>The period between Program of Work updates is Thirty (30) calendar days.</p> <p>The amount to be withheld for late submission of an updated Program of Work is One percent (1%) of contract amount.</p>



<p>12</p>	<p>During contract implementation, the Procuring Entity shall conduct Constructors Performance Evaluation in accordance with Section 12, Annex E of the Revised Implementing Rules and Regulation of R.A. 9184 using the NPC Constructors Performance Evaluation System (CPES) Guidelines.</p> <p>CPES ratings shall be used for the following purposes: a) eligibility screening/post-qualification; b) awarding of contracts; c) project monitoring & control; d) issuance of Certificate of Completion; and in adopting measures to further improve performance of contractors in the prosecution of government projects.</p> <p>Qualified Constructors Performance Evaluators (CPE) shall conduct project evaluation as follows:</p> <p>(a) During Construction - Except for those projects with a duration of 90 calendar days and below which may be subjected to at least one (1) visit, all projects shall be subjected to a minimum of two (2) evaluations to be performed by the CPE. The number of evaluations beyond the prescribed minimum shall be determined by the CPES-Implementing Unit based on the size, nature and complexity of the project and shall be subject to approval by the proper authorities within the agency. The first evaluation shall be performed when the project is at least thirty percent (30%) physically complete or as maybe required by the CPES-IU using the S-curve or other appropriate means to determine whether there is substantial work completed for evaluation.</p> <p>(b) Upon Completion - only one evaluation shall be performed by the CPE right after the Project Implementation Group reports one hundred percent (100%) completion of the project.</p>
<p>13</p>	<p>The maximum amount of advance payment is fifteen percent (15%) of the Contract Price and paid in lump sum.</p>
<p>14</p>	<p>No further instructions.</p>
<p>15.1</p>	<p>The date by which "as built" drawings and operating and maintenance manuals are required is within thirty (30) calendar days after completion of contract.</p>
<p>15.2</p>	<p>The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is Five percent (5%) of contract amount.</p>



SECTION VI

TECHNICAL SPECIFICATIONS



SECTION VI – TECHNICAL SPECIFICATIONS

CIVIL WORKS

CW-2 – DISTRIBUTION LINE

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SECTION VI – TECHNICAL SPECIFICATIONS**CW-2 – DISTRIBUTION LINE****CW-2.1 STEEL POLE MATERIALS SPECIFICATIONS****CW-2.1.1 Scope**

This specification covers the technical and associated requirements for tubular steel pole used for distribution lines of electric power transmission rated 7.97/13.8 kV. The poles shall be supplied complete with bolts, nuts, washers and miscellaneous fittings.

It is not NPC's intent to outline all the technical requirements or to set forth those requirements adequately covered by applicable codes and standards. Contractor shall furnish high quality work and materials meeting the requirements of this specification and electric industry standards.

The Contractor shall bear full responsibility that the steel poles have been fabricated in accordance with codes and standards specified herein.

No departure shall be made from this specification and standards unless waived or modified in writing by NPC. Contractor shall obtain from its sub-contractors a statement as to compliance with this specification without exception and/or if there are any exceptions, these shall be described in detail and included in Contractor's proposal. Contractor shall add a statement that no other exceptions are taken to this specification.

Contractor shall furnish a complete set of reproducible fabrication drawings to NPC.

CW-2.1.2 Codes and Standards

The specified material and services shall be furnished in accordance with, but not limited to, the following codes and standards or to applicable equivalent standards of the country of the manufacturer, including all addenda, in effect at the time of purchase order, unless otherwise stated in this specification:

ASTM - American Society for Testing and Materials

A36/A36M	Standard Specification for Structural Steel, Book 01.04
A123	Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products, Book 01.06, 15.08.
A143-89	Recommended Practice for Safeguarding Against Embrittlement of Hot Dip Galvanized



	Structural Steel Product and Procedure for Detecting Embrittlement
A153	Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Book 01.06.15.08.
A239-89	Standard Test Method for Locating the Thinnest Spot in a Zinc (Galvanized) Coating of Iron or Steel Articles by the Preece Test (Copper Sulfate Dip)
A307	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile, Book 01.01, 15.08
A325	Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength, Book 15.08
A354	Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
A370	Test Methods and Definitions for Mechanical Testing of Steel Products
A384	Recommended Practice for Safeguarding against Warpage and Distortion during Hot-dip Galvanizing of Steel Assemblies
A449	Specification for Quench and Tempered Steel Bolts and Studs
A490	Specification for Heat Treated, Steel Structural Bolts, 150 ksi (1035 Mpa) Tensile Strength
A563	Specification for Carbon and Alloy Steel Nuts
A572/A573M	Specification for High-Strength Low Alloy Columbium-Vanadium Steels of Structural Quality
A588/A588M	Specification for High Strength Low-Alloy Structural Steel with 50 ksi (345 Mpa) Minimum Yield Point to 4 in. (100mm) Thick
A633/A633M	Specification for Normalized High Strength Low Alloy Structural Steel
A673/A673M	Specification for Sampling Procedure for Impact Testing of Structural Steel
A687	Specification for High Strength Non-Headed Steel Bolts and Studs



- A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- A871/A871M Specification for High Strength Low Alloy Structural Steel Plate with Atmospheric Corrosion Resistance
- F436-82 Standard Specification for Hardened Steel Washers

AWS - American Welding Society

- D1.1-92 Structural Welding Code – Steel
- A5.1-91 Specification for Carbon Steel Covered Arc-Welding Electrodes
- A5.17-89 Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc-Welding

AZI - American Zinc Institute

Inspection Manual for Hot - Dip Galvanized Products (Latest Edition)

ASCE - American Society of Civil Engineers

ASCE / SEI 48-05 - Design of Steel Transmission Pole Structures.

ISO - International Organization for Standardization

- 9001 Quality System Model for Quality Assurance in Design/Development, Manufacture and Testing
- 9002 Quality System Model for Quality Assurance in Production, Installation and Servicing

These codes and standards set forth the minimum requirements which may be exceeded by Contractor if, in Contractor's judgment and with NPC's acceptance, superior or more economical materials are available for successful and continuous operation of Contractor's equipment as required by this specification.

CW-2.1.3 Technical Requirements

CW-2.1.3.1 Design

All outline dimensions in the drawing are fixed but where no dimensions are given, the poles may be modified to suit the design, subject to compliance with all the requirements of the specification.



The direct buried poles fabrication shall be manufactured for the configuration and limitations provided elsewhere in the tender documents.

For directly buried steel pole, the butt plate cover shall be fully welded to the bottom shaft.

Depending on the requirements, columns shall be either circular in cross section or octagonal, and shall be tapered from top to the base.

Cross-arm member, if required in the Bid Drawings, shall be of the same cross section as columns, with taper and shall conform to NPC's general arrangement drawings. The strength of the attachment of cross-arms to the columns shall be sufficient to develop the full capability of the cross arm.

Minimum yield strength of steel specified for rolled plates used in the design shall be 345MPa (50ksi).

Members requiring more than one length of tubular section shall be constructed by telescoping the sections together with sufficient overlap to develop the full strength of the member. Minimum overlap shall be 1.5 times the tubular diameter for each section. The length of the bottom shaft shall not exceed 7.5 m. Alternate method may be recommended by Contractor and submitted to NPC for approval.

Members that are to be painted shall be constructed of plates appropriately shaped to form a hermetically sealed tubular section having a constant taper. Hermetically sealed units are not required for galvanized tubular sections.

Rigging accessories, insulator attachment plates, ladder, lugs for bolted steps and lighting brackets and hand line attachment shall be welded to the structure.

Clearance

Poles shall maintain the clearances between conductor and steel as shown on the drawings. The path of the conductors and jumpers should be accounted for when checking these clearances.

Allowable Stresses

The allowable stresses for tubular members, guys and connection bolts shall comply with the requirements of ASCE / SEI 48-05 - Design of Steel Transmission Pole Structures.

CW-2.1.3.2 Materials

All materials shall comply with the requirements of an ASTM specification unless otherwise specified.

Material to be welded shall comply with the requirements of ANSI/AWS D1.1.

Structural Plate

Plate and “product of a coil” that is used to produce load carrying components shall be considered structural plate. Material used for grounding plates, identification plates, pole caps, disposable cage plates and similar components does not need to be classified as structural plates.

Structural plate less than or equal to 31.75 mm (1.25 in.) in thickness shall conform to ASTM Standards.

Structural plate greater than 31.75 mm (1.25 in.) in thickness shall conform to ASTM Standards.

Structural plate material shall meet the Charpy impact requirements.

The silicon content of plate to be galvanized shall be limited to the following:

Shaft material :	Si \leq 0.06%
Other :	Si \leq 0.06% or 0.15% < Si < 0.40%

Bolts, Nuts and Washers

Material for headed bolts shall conform to: ASTM A307, ASTM A325, ASTM A490 or ASTM A449 when bolt diameter exceeds 38.1 mm (1.5 in.) and shall be galvanized in accordance with ASTM A153.

Nuts shall conform to ASTM A563.

Washers shall conform to ASTM F436.

Charpy Impact Requirements

Charpy impact properties shall be determined in accordance with ASTM A370 and A673.

Weld Material

The material used for making welds shall be compatible with the parent material, as defined by ANSI/AWS D1.1-92 and shall meet the impact requirements for the lowest toughness requirements of the plates being joined.

CW-2.1.3.3 Detailing

Typical Details

Telescoping splices joining sections (slip joints) shall have a minimum lap of 1.5 times the largest inside diameter of the outer section.

Circumferential Welds

Shaft-to-shaft, pole shaft-to-base plate, and pole shaft-to-flange shall be full penetration welds.

Arm shaft-to-arm bracket shall be partial penetration groove weld with fillet overlay, sized to develop the full strength of the shaft.

Other accessories (lugs and plates for grounding, jacking, climbing and identification) shall be fillet and/or groove welds sized to develop the loading requirements of the attachment. The top cover plate shall be convex in shape having the same material as the pole shaft and shall be fully welded thereon.

Longitudinal Welds

Longitudinal welds in outer section of slip joints and within 76.2 mm (3") shall be full penetration weld.

Longitudinal welds shall be a minimum of 80% penetration in other locations.

Conductor plate attachment weld shall be full penetration weld.

Bolt holes shall have a maximum diameter of bolt diameter + 3.3 mm (0.13")

Plate Bends

The minimum inside radius of plate bends shall be such that cracking does not occur. Care must be taken to prevent the steel from cracking especially at the free ends of the bend either during the bending operation or subsequently due to residual stresses.

CW-2.1.3.4 Fabrication

Fabrication shall be performed in strict compliance with the NPC's approved shop detail drawings. Material substitution or deviations from the final approved drawings shall not be made without written approval from NPC.

The manufacturer shall accurately identify all material to assure proper usage.

Pole Shaft

The pole shaft shall present the most pleasing appearance possible consistent with the strength requirements in the specification and drawings. Pole shall be continuously tapered from top to bottom with a uniform slope. No multi-ply steel plates will be allowed for the pole structure fabrication. Shaft shall be made with number of sections specified in the Standard Drawings.



The cross section of the pole shall be as specified in Drawing No. A2EP-BDC-40.007 to A2EP-BDC-40.010. Shaft diameter of a fabricated section should not be less than the design diameter.

Pole Slip Joint

Pole section shall be made with telescopic slip joints for easy assembly either in air or on the ground at the construction site. Overlapping shall not be less than one and a half (1-1/2) times the largest inside diameter of the female section.

The taper of each section at a slip joint should match the taper of the adjacent section to provide proper splice tolerances. No circumferential weld within a shaft section shall be permitted. Other type of connection will not be permitted.

Insulator String, Ground String and Guying Assembly

Insulator string, ground string and guying assembly attach to the pole shaft shall be provided and shall be referred to the general design for different type of poles.

Cross-arms

Cross-arm shall be furnished with hoisting lugs to facilitate line construction and maintenance.

Other Pole Attachments

Step Bolts or Climbing Device

Each pole shall be provided with the required sets of step bolts or climbing device where at least two maintenance personnel can climb together on opposite sides of the pole face. The step bolts shall be approximately 2.5m. above ground level to the pole cross-arm and from thereon to the ground wire peak as hereunder enumerated:

- a. *For poles with less than 500 mm. Base diameter, steps bolted to permanent lugs shall be provided. Easily detachable step bolts attached to the pole by hooking or by any other similar scheme shall not be permitted (For 69 kV and above only).*
- b. *For poles with more than 500 mm. Base diameter, detachable step ladders shall be provided from 2.5 m above ground level to the lowest cross-arm and from thereon to the ground wire peak, step bolts shall be provided as required under Item "a" above. Ladders shall be secured in place to prevent accidental lifting by handling, etc.*

Step bolts shall be full thread double arming bolts with a diameter of not less than 16 mm or 3/4" and 71.12 cm or 28" long spaced not more than 45 cm apart. The bolts and ladder rungs shall withstand without permanent deformation, a vertical load of at least 137 kg or 300 pounds applied at the bolt head and at the center of the ladder rung.

Grounding Provisions

Grounding clamps or nuts shall be provided near the top and base of each pole. The wire lug shall be welded to the exterior of all tubular column sections near the top and the base for grounding, in addition to any other ground wire requirements shown on NPC's general design for different type of poles.

CW-2.1.3.5 Material Preparation

Edges shall be in accordance with ANSI/AWS D1.1. Burrs or sharp notches that may be detrimental to the poles or that pose a safety hazard shall be removed. Reentry cuts shall be rounded.

Care shall be taken to prevent separation of the outer surface and reduction of the cross sectional properties below those required by design. If separation occurs during bending, it shall be repaired in accordance with ANSI/AWS D1.1. Mill scale shall not be considered as the surface.

When hot bending is required, heating shall be done evenly over the entire bend area and shall be of sufficient temperature to minimize separation and necking down of the cross section. The temperature used in hot bending shall be such that the physical properties of the steel are not diminished.

CW-2.1.3.6 Welding

Unless otherwise specified herein, or note on NPC's design drawings, welding shall conform to the AISC Specification and weld procedure qualifications shall be in accordance with AWS D1.1. A written welding procedure specification as shown in Appendix E of AWS D1.1 (Forms E-1, E-2 or E-3 as applicable) shall be prepared for each procedure and submitted for review and acceptance by NPC prior to use. Weld details on Contractor's shop detail drawings shall include identification of weld and method to be used for making the weld in accordance with AWS D1.1, Section 2, "Design of Welded Connections", and Section 4, Technique.

Preheat and interpass temperature of AWS D1.1 shall be followed. Welding shall be done by the shield metal-arc, gas shielded flux core, gas shield metal-arc or submerged-arc processes. Welding electrodes shall be AWS A5.1, low hydrogen classification, for submerged arc welding, unless noted otherwise on NPC's design drawings. Where steel other than ASTM A36 is specified electrode selection will be subject to acceptance by NPC.

The storage of welding consumables (welding wire, electrodes, fluxes and gases) shall be in accordance with AWS D1.1 and the welding consumables manufacturer's recommendations.

Care shall be taken in assembling and fitting, and welding shall be controlled to minimize shrinkage stresses and distortion. All finished

work shall be of good quality and have a neat appearance without warpage.

Caution shall be exercised to obtain full penetration welds where specified on NPC's design drawings.

When inspection of a weld zone is called for on NPC's design drawings, procedures shall be in accordance with non-destructive testing procedures of AWS D1.1 and the following additional requirements:

Circumferential and longitudinal welds within the slip joint area of tubular sections shall be shear wave ultrasonically inspected.

Longitudinal welds in tubular sections, which do not meet the acceptance criteria of visual inspection, shall be magnetic particle or dye penetrant tested.

Attachment welds shall be examined by magnetic particle or dye penetrant testing in accordance with AWS D1.1.

Contractor shall furnish a shop test report indicating complete test results of all nondestructive testing and inspection conducted.

The final weld of a component designated for stress relief on NPC's design drawings shall be subjected to ultrasonic inspection prior to and after stress relieving.

CW-2.1.3.7 Surface Preparation and Painting

Galvanizing

Unless otherwise specified, all structural steel poles shall be hot-dip galvanized after fabrication in accordance with ASTM A 123. SSPC SP8 surface preparation will proceed galvanizing. Exposed welds shall be mechanically cleaned.

Fabrication and preparation of material for galvanizing shall conform to the requirements of ASTM A 143. When specified in the drawings or specification, embrittlement test of designated galvanized material shall be performed in accordance with ASTM A 143.

Bolts, nuts and washers shall be galvanized in accordance with ASTM A153. Bolts and nuts shall be assembled after galvanizing and shall fit with finger pressure only and nuts shall be interchangeable on any bolts without shake. Wrench tightness or spinning fit shall be caused for rejection.

Repair of damaged hot dip galvanized surfaces shall be in accordance with ASTM A780.

Inspection of galvanizing shall follow the procedures of the AZI Inspection Manual.

Heavy runs or lumps of excess zinc will not be acceptable in any area where they will interfere with bolt hole alignment (such as the "drip end"

of punched angle braces, etc.), with matching flat surfaces which are to be bolted together, or are of such size and location that normal handling or erection may cause them to be dislodged. Sharp, pointed, "stickers" of zinc which could cause injuries in handling shall be removed.

Straightening of steel after galvanizing shall be accomplished without the use of heat. Steel so straightened shall be inspected to assure no deformation or cracking of galvanizing layer.

The zinc coating shall withstand the minimum number of dips of the Preece Test, according to ASTM A239-89.

Bolts shall be spun-galvanized and rechasing of bolts threads after galvanizing shall not be permitted. Nut threads shall be tapped after galvanizing but not to cause appreciable rocking of the nuts to the bolts.

All materials shall be cleaned and washed after galvanizing to remove traces of flux, flux inclusions, preflux slats, acid ash, dross or other extraneous materials. The presence of wet storage stain (White Rust) shall be caused for rejection.

Pipe, tubing or box sections shall not be double-dipped.

Painting

When a painted finish is specified, the paint shall be environmentally friendly, with high solids content, low Volatile Organic Compounds, and within toxic acceptable levels.

Only the following materials will be acceptable in the formulation of the paint system:

- Triglycidyl Isocyanurate (TGIC) or Urethane polyester powder
- two-component Organic Zinc-Rich Urethane liquid
- Zinc Rich Epoxy powder
- two-component Polyamidoamine Epoxy liquid
- two-component Acrylic Aliphatic Poly -Urethane liquid
- two-component Tar-Extended Polyurethane Liquid with Pre-catalyzed one component Polyurethane resin (touch-up)

The paint system formulation shall be agreed upon between NPC and the Contractor before acceptance of the purchase order and will be clearly stated on the purchase order.

The Contractor shall furnish as part of the scope of supply for the poles touch-up material with each type of pole structure.

CW-2.1.3.8 Preparation for Shipping and Storage

Each shipment shall include a detailed packing list identifying all items by part number, including hardware. Special care shall be exercised in the handling, packaging and shipping of the materials to prevent denting,



bending, or any other damage of the sections, cross-arms and anchor bolt cages. Suitable cushioning, protective padding, dunnage or non-metallic spacers shall be used to prevent fangs and flanges welded to the tubular sections from damaging other tubular parts and to prevent damage and shifting during transit.

Cross-arm members shall be shipped loose.

Small parts and fasteners shall be carefully boxed, crated, bagged or otherwise containerized and protected for shipment. Small pieces shall be bundled, with all the pieces in any bundle having the same mark. All small pieces such as bolts, ground wire and insulator connections shall be packed in boxes of not over 68kg (150lb) gross weight each. Bolts of different sizes or length shall be wrapped in separate sacks before boxing. Description, quantity and marks or description of contents shall be shown on the outside.

All identifications shown on bundles, boxes or other containers shall be included on Contractor's shipping and packaging lists.

All materials shall be arranged to allow safe unloading at site.

Shop painted or galvanized steel will be stored in the field pending erection. Contractor shall provide storage and handling instructions to minimize damage to painted or galvanized surfaces.

CW-2.1.3.9 Marking

All parts of poles shall be appropriately marked or numbered or to identify the same as belonging to specific type of poles. The pole and its parts shall also bear the marking "NPC" to identify the same as the property of the National Power Corporation. All markings shall be indelible and clearly visible after galvanizing. Pieces which are part of a structure shall be marked with structure type number, followed by the proper assembly item and other identification marks.

Example: DCSPA30-A1 (Steel Pole type DCSPA,
30 m, member A1)

In marking the parts, each marking shall be prefixed by letters, which indicate the type of poles then followed by parts number. Letterings shall have a minimum height of thirty (30) mm. Special care shall be taken to see that all markings are made in such manner as not to be obliterated in transit, or in any way damage the galvanizing or affect the strength of the structure.

Identification marks shall be located conspicuously for easy reading. Marking of like pieces shall be identical in location, and pieces over 4.26 m (14 ft) in length shall be marked at both ends.

Identification marks shall be applied by stamping into the steel a 1.58 mm (1/16 inch) deep identification mark before galvanizing using 30 mm minimum height, steel die letters and numerical. After galvanizing, a straight line with minimum width of 6.35 mm (1/4 inch) shall be stenciled



to underline the identification marks. The stenciled line shall be made with durable paint or ink that will adhere to the galvanized surface, and be legible. All small items that are not adaptable to die marking and are not boxed shall be identified by either attaching die stamped steel tags or standard white cloth shipping tags. The tags shall be attached with non-corrosive wire.

CW-2.1.4 Installation

When the installation and erection is by the Contractor such as for turn-key contracts, complete details of installation and erection, proper handling, transport to various sites, storage and performance guarantees, etc. shall be furnished for NPC's review and approval.

All materials shall comply with test criteria, and NPC's acceptance of the steel poles and its components shall not relieve the Contractor of his responsibility for meeting all the requirements of this specification.

The Contractor shall carry out at his own expense all tests necessary to ensure the satisfactory fabrication of steel poles and its components in accordance with the applicable standards mentioned herein in the specification.

The steel poles and its components shall be given the manufacturer's routine shop tests and quality conformance tests and shall be witnessed by the NPC. Tests results shall be submitted to NPC. No steel poles shall be shipped until released for shipment by the NPC.

CW-2.1.4.1 Material

Contractor shall furnish six (6) copies of certified mill test reports covering chemical and mechanical properties of the structural steel. Stock material may be used with NPC's concurrence where Contractor's stock can be satisfactorily identified with the specified ASTM specification.

Plate material shall be subjected to Charpy V-notch impact testing in the longitudinal direction in accordance with ASTM A370 Type A Figure II, and ASTM A 673. The guaranteed Charpy V-notch properties shall be no less than 2.07 kg-m.

All welded electrode material shall also meet the Charpy V notch impact test requirements and shall have the physical properties equal to the steel to be welded.

CW-2.1.4.2 Shop

Contractor shall furnish a shop test report for NPC's review and records showing the results of all tests made during fabrication.

CW-2.1.4.3 Quality Conformance Inspection

This is intended to eliminate defective materials and components of the steel poles. Each component shall be inspected for conformance to the fabrication drawings. This inspection shall include, but not limited to:

- a. ultrasonic inspection of all plate material prior to welding for laminations;
- b. visual inspection of dimensions to assure that tolerances are met;
- c. visual inspection of cut edges to ANSI/AWS D.1.1 criteria;
- d. visual inspection of bent surfaces for surface separations (supplemented by mag particle in questionable areas);
- e. visual inspection of bolt holes to assure that they are cylindrical, perpendicular, free of burrs and without torn or ragged edges;
- f. visual inspection of all welds to ANSI/AWS D1.1;
- g. ultrasonic inspection of all full penetration welds after galvanizing (maybe waived if routine audits show no history of defects);
- h. magnetic particle inspection of all structural partial penetration or fillet welds to ANSI/AWS D1.1;
- i. visual inspection of finish;
- j. magnetic thickness measurement of finish coatings.

CW-2.1.4.4 Test

Test shall be carried out by the Contractor to the satisfaction of NPC before shipment of the steel poles. All materials shall comply with test criteria, and NPC's acceptance of the steel poles shall not relieve the Contractor if his responsibility for meeting all requirements of this specification.

The Contractor shall carry out at his own expense all test necessary to ensure the satisfactory fabrication of steel poles in accordance with the applicable standards mentioned herein in the specification.

The steel poles shall be given the manufacturer's routine shop test and quality conformance tests and shall be witnessed by NPC, unless waived in writing. No poles shall be shipped until released for shipment by NPC.

The Contractor shall make all preparation for tests and provide test apparatus and personnel and shall notify NPC, the date of the tests to be witnessed forty five (45) days in advance.

CW-2.1.4.5 Full Scale Test

The Contractor shall carry out a full-scale test of the galvanized steel pole or of a large number of structures of the same design and submit to NPC to assure that proper design and fabricating procedures have been used.

The pole shall be erected on a rigid foundation and the vertical axis through the center of gravity shall not be out of plumb by more than two tenths percent (0.2%) of the height at any level.

The pole structure shall sustain the load including overloads. These loads shall be applied in increments and shall be held constant for a period of five (5) minutes before increasing or removing the loads.

The Contractor shall submit for NPC's approval his proposed method and facilities of applying and measuring the loads on the structure. The load measuring devices with appropriate numbering shall be suitably calibrated prior to and following the test in accordance with the manufacturer's recommendation at the presence of NPC Design Engineer.

Structure deflections under load shall be measured by suitable procedure at points designated. Deflection readings shall be recorded for the "before- load" and "load-off" conditions.

The Contractor shall submit, forty five (45) days prior to the performance of the tests, his testing programs to NPC for review and approval. These shall include test procedures, diagrams or test arrangements showing the points of location and magnitude of the loads to be applied, the designated points for deflection measurements, etc.

The pole to be tested shall be carried out in the presence of NPC Design Engineer who shall conduct a visual check and evaluate all parts of the structure for sign of failure following the completion of each test.

After completion of test, the test structure can be considered failure if the structure experienced any of the following:

- a. After the loads have been removed, the pole structure does not return to its original position within reasonable tolerance;
- b. Failure (i.e. bending, yielding, breaking, etc.) of the material or weld is detected; and
- c. Test structure does not pass all physical and dimensional checks as required in the test specified in this specification.

Such a failure shall be corrected and tested at the Contractor's expense.

CW-2.1.4.6 Galvanizing Test

Galvanizing tests shall be carried out according to the latest ASTM Specifications A123, A143, A153 and A239 on the structural shapes, bolts, nuts and other small miscellaneous hard wares.

CW-2.1.4.7 Trial Assembly of Prototype Structures

A trial assembly of each type of pole shall be made in horizontal position on the ground.

CW-2.1.4.8 Test Report

The Contractor shall furnish six (6) copies of a test report that shall include:

- a) The designation and description of the pole tested;
- b) The name of the NPC;
- c) The name of the person or organization (responsible engineer) that specified the loading, electrical clearances, technical requirements and general arrangement of the prototype;
- d) The name of the Engineer of Record;
- e) The name of the fabricator;
- f) A brief description and the location of the test facilities;
- g) The names and affiliations of the test witnesses;
- h) The dates of each test load case;
- i) Detailed drawings of the pole, including any changes made during the testing program;
- j) A rigging diagram with details of the points of attachment to the pole;
- k) Calibration records of the load-measuring devices;
- l) A loading diagram for each load case tested;
- m) A tabulation of deflections for each load case tested;
- n) In case of failure; Photographs of failure; Loads at the time of failure; a brief description of the failure; The remedial action taken; The dimension of the failed members; and test coupon reports of failed members;
- o) Photographs of the overall testing arrangement and rigging;
- p) Air temperature, wind speed and direction, any precipitation and any other pertinent meteorological data;
- q) Mill test reports of poles used in the test report;
- r) Test result of the test coupons taken following the completion of test.

CW-2.1.5 Data and Documentation Requirements

Contractor furnished data and information shall be the performance data, predicted performance, interface requirements and construction features of all Contractor's furnished steel poles and materials. The accuracy of such information and its compatibility with overall performance requirements specified by NPC are the sole responsibility of the Contractor.

All information submitted as part of the Proposal Data will become part of contract data for successful bidder. Any deviation from such data requires NPC's approval for such a deviation to be acceptable to NPC.

CW-2.1.5.1 Data and Information to be Submitted with the Bid

Together with the bid, the bidder shall submit the following information:

- a. Filled-in Technical Data Sheets.

CW-2.1.5.2 Data and Information to be Submitted After Award of Contract

The following shall be submitted after award of contract;

- a. Certified mill test reports;
- b. Detailed assembly and fabrication drawings;
- c. Weights of each type of pole;
- d. Test Reports in compliance with test requirements;
- e. Certificate of Warranty for the period of one (1) year after installation or eighteen (18) months after the last delivery against factory defects/workmanship. This is to be submitted before or upon delivery;
- f. Certificate of origin from the Manufacturer. This is to be submitted during delivery; and
- g. ISO Certification of the Manufacturer.

CW-2.1.5.3 Guarantee

In order to assure that manufacturing defects shall be corrected by the Contractor as the case may be, a warranty clause security shall be required from the Contractor for at least twelve (12) months after the poles have been installed, or eighteen (18) months after the last delivery of poles to the designated delivery site, whichever period comes earlier, after performance of the contract.

CW-2.1.6 Measurement of Payment

Measurement of payment for the supply and installation/erection of steel poles shall be based on the quantity of poles delivered including the following:

1. Hole excavation
2. Furnishing, backfilling and compacting of gravel and sand materials
3. Installation of structure grounding

Payment will be made at the contract unit price for the item, Steel Pole, in the Bill of Quantities which payment shall constitute full compensation for furnishing all materials and labor including transport/delivery and erection of poles at the project site.

CW-2.2 GENERAL CONSTRUCTION WORKS**CW-2.2.1 Scope**

This section covers the construction and/or maintenance of access roads, culverts and other appurtenant structures; moving-in of the Contractor's construction, erection and installation equipment; setting up of the Contractor's camp facilities and the disposition of the Contractor's various facilities at the end of the contract.

CW-2.2.2 Access Road

The Contractor shall construct and maintain all access roads to suit his construction needs only, and public roads utilized by the Contractor shall be properly maintained by him during the duration of the contract. The flow of public traffic shall not be obstructed in the use and maintenance of public roads.

During the life of the contract, the Contractor shall observed or comply with all national and local regulations, regarding barricades, detour arrangements, warning signs and other requirements on the usage of existing public roads and that of his own access roads. Permits, if required shall be secured by the Contractor.

CW-2.2.3 Contractor's Camp Facilities

- a) The Contractor shall provide and grade his camp site, employees housing, warehouse, machine and repair shops, fuel storage tanks, and provide such related facilities and sanitary conveniences that are necessary for maintaining health, peace and order in the camp and work areas.

The areas that may be used by the Contractor within the right-of-way provided will be designated by NPC. Areas that may be needed by the Contractor located outside of the right-of-way shall be negotiated and acquired by the Contractor at his own expense.

- b) The Contractor shall provide, maintain, and operate, under competent supervision, such camps and facilities necessary for the housing, feeding and accommodation of his employees.
- c) The Contractor will be permitted to lease space for the buildings erected by him on land furnished by NPC for conducting such business or services, as, in opinion of NPC, maybe required for the convenience of the residents of the camp, but patronage of such business for the employment of such services shall be optional on the Contractor's employees.

All leases covering business and other concessions in the campsite shall be subject to the approval of NPC and all such leases shall contain provisions making them subject to termination at any time, if, in the opinion of NPC, the lessee is guilty of misconduct, infraction of the law, or of the regulations governing operation of camps.

All leases shall be made subject to termination upon completion or termination of the contract. No concessions or leases shall be granted for the sale of intoxicating liquor or for the operation of public dance halls, games of chance, or gambling of any form.

CW-2.2.4 Water Supply

The Contractor shall be responsible for the supply, installation, operation and maintenance of a safe and adequate supply of drinking and domestic water. Whenever there is a possibility of contamination of the water supply for drinking and domestic purpose, chlorination or some other approved method of sterilization shall be carried out. Installation and maintenance of such services shall be subjected to the approval of NPC.

CW-2.2.5 Power Supply

The Contractor shall provide his own electric power supply required for construction and erection/installation work. However, should electric power be available from franchise holders/cooperatives, the Contractor may avail of such power. The Contractor shall pay for the energy consumed in accordance with the billing rates agreed upon by the Contractor and the supplier.

CW-2.2.6 Materials Storage

The Contractor shall put up his own warehouse for the storage of construction materials including cement, rebars, and line materials. Storage facilities and manner of storage shall be subject to the approval of NPC.

CW-2.2.7 Camp Security

The Contractor shall provide his own security force to the extent he deems necessary for maintaining peace and order in the camp and work



areas and to safeguard materials and equipment, life and property in all areas where he operates.

CW-2.2.8 Sewerage Disposal, Sanitation and First Aid Clinic

The Contractor shall be responsible for the installation, operation and maintenance of an adequate sewerage disposal and sanitation system and shall provide toilet and wash-up facilities for his employees in the camp. Sewerage shall not be disposed in rivers, creeks or other places directly or indirectly affecting the health of residents in the vicinity.

The Contractor shall also put up a first aid clinic with adequate medicine and facilities for the immediate assistance to accident-stricken employees and sick residents in the camp.

CW-2.2.9 Fire Protection

The Contractor shall observe all necessary precaution against fire, provide sufficient portable firefighting equipment and comply with all applicable laws of the Philippines relating thereto.

CW-2.2.10 Removal of Camp and Construction Facilities

After the completion of the work but prior to provisional acceptance, the entire camp and construction facilities of the Contractor shall be dismantled and removed by the Contractor. All areas of operation along the entire length of the distribution line shall also be cleaned of rubbish and left-over materials.

The Contractor shall see to it that these areas shall be left in a clean, neat and orderly appearance satisfactory to NPC.

CW-2.2.11 Measurement of Payment

- 1) No separate measurement of payment will be made for the cost of the Contractor's general construction facilities, whether such facilities are mentioned herein or not.
- 2) There will be no separate payment for demobilization and move-out after completion of the contract.
- 3) All costs pertinent thereto shall be included in the various pay items in the Bill of Quantities.

CW-2.3 CLEARING OF RIGHT-OF-WAY**CW-2.3.1 Scope**

This Section covers the clearing of the right-of-way for the distribution line.

CW-2.3.2 Clearing Work

NPC made a survey of the entire distribution line route and contacted the affected parties for permission and approval for clearing the six (6)-meter width right-of-way of the distribution line. Contractors are expected to inspect the proposed route to familiarize themselves with the clearing work to be done. Clearing shall be for the entire length of the line and/or as required.

Where the distribution line passes through open uncultivated land, bamboo grooves trees and in regions planted with fruit bearing trees and all other trees growth within the right-of-way, such trees and plants shall be cut so as to leave stump extending not more than 15 cms above the ground, with the exception of bamboo grooves, banana plants, and other trees and plants that can still grow out, which shall have their stumps and roots completely pulled out.

If directed by NPC, clearing shall also include the cutting or trimming of all trees outside of the right-of-way if such trees, upon falling would come within three (3) meters of the nearest conductor of the line.

The cleared materials shall be hauled to a designated stockyard as directed or otherwise disposed of as approved in writing by NPC.

Where the line passes through rice fields, sugar cane plantations or other cultivated fields where there are no tall trees or other growths that will interfere with the wires, the Contractor shall clear off only such vegetation as directed by NPC for the convenient handling of materials and equipment during erection of distribution line structures and installation of wires.

In order that the Contractor will not be delayed in the clearing work, NPC will, at its expense provide the necessary number of right-of-way agents to indicate the trees to be cut and see to it that they are properly accounted and coordinated with the LGU and to their respective owners. Cutting or trimming shall be done only upon approval of the right-of-way agents and/or other authorized representatives of NPC.

CW-2.3.3 Measurement of Payment

Payment will be made at the contract unit price for the item Clearing of Right of Way in the Bill of Quantities which payment shall constitute full compensation for all the labor, tools, equipment and other incidentals necessary for the satisfactory completion of work items called for in this section.

CW-2.4 CARE OF WATER DURING CONSTRUCTION**CW-2.4.1 Scope**

This Section covers the construction, installation, operation and maintenance of temporary structures and equipment necessary to protect the work from water coming from any source including river, sea and rain and subterranean, so that construction and erection/installation work can be performed on a suitably dry condition.

CW-2.4.2 Drainage and Dewatering

The Contractor shall construct drainage ditches, culverts, and other forms of conveying water away from the site of work. The Contractor shall also construct temporary cofferdams when necessary to protect pole site areas from encroachment of water.

The Contractor shall furnish, install, operate and maintain all necessary pumps and other dewatering devices to keep all work areas in amply dry condition, especially during excavation works. In addition to the normal number of pumps in operation, the Contractor shall provide standby pumps to take over in case of pump breakdown.

After the work is completed and before it is accepted by NPC, the Contractor shall remove all temporary protective structures and fill or plug all temporary drainage structures all to the satisfaction of NPC.

CW-2.4.3 Measurement of Payment

No separate measurement of payment will be made for the care of water during construction operations. The cost of furnishing, constructing, maintaining, operating and removing temporary drainage structures, pumping system and other dewatering devices necessary to keep construction operations free from water shall be included in the pay items in the Bill of Quantities.

CW-2.5 STRUCTURAL EXCAVATION, FILL AND BACKFILL**CW-2.5.1 Scope**

In accordance with the specifications contained herein and as shown on the drawings and otherwise directed, the Contractor shall perform all the required structural excavation, fill and backfill for the entire project, including the proper disposal of excess excavated materials.

CW-2.5.2 Materials**CW-2.5.2.1 Structural Excavation**

No classification will be made on the materials excavated. The Contractor shall determine his/her unit bid price for structural excavation based on unclassified material regardless of the nature of the materials actually encountered and excavated.



CW-2.5.2.2 Structural Fill

a. Sand and Gravel Fill

The material shall be of the same classification as the sand and gravel base consisting of river sand and gravel as approved by the NPC. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be uniformly graded from coarse to fine in accordance with the grading requirements shown below:

Sieve Designation (Square Mesh Sieves)	Percentage by Weight Passing
50.0 mm (2")	100
25.4 mm (1")	55-85
9.5 mm (3/8")	35-60
4.76 mm (No. 4)	25-50
2.08 mm (No. 10)	20-40
0.42 mm (No. 40)	8-20
0.074 mm (No. 200)	2-8

b. Structural Earth Fill

Structural earth fill shall consist of filling with suitable materials obtained from grading excavation or from borrow areas approved by the NPC.

CW-2.5.2.3 Special Foundation, if any

The NPC shall have the option to use one or both of the following materials for special foundations, whether or not shown on the drawings:

a. Lean Concrete

The strength of lean concrete shall be 13.79MPa or as designated by the NPC.

b. Selected Materials

Selected materials shall consist of compactable material which, when compacted, shall attain the required bearing capacity. The material could be a combination of earth and rock particles not greater than 8 cm including sandy clay, gravelly clay, or shale, all approved by the NPC.

Bed materials for water pipes and/or drainage culverts shall use sand fills.

CW-2.5.2.4 Structural Backfill

Backfill for Structures Other Than Pipes – Material for backfill shall consist of compactable and approved material taken from grading and structural excavations. Any additional material needed shall be obtained from borrow areas proposed by the Contractor and approved by the NPC.



Backfill for Sewerage and Drainage Pipes – The layer of backfill materials immediately above, up to 60 cm. from the top of pipe, and on the sides of the pipe shall consist of selected material consisting of clay soil and/or other fine materials that are free from stone particles, roots, debris. The upper layer shall consist of compactable materials taken from pipe trench and other structural excavation.

Backfill for Water Supply Pipes – Backfill for water supply pipes shall consist of compactable materials taken from trench excavation and approved by the NPC.

CW-2.5.3 Construction

CW-2.5.3.1 Excavation

a. General

The Contractor shall notify the NPC sufficiently in advance before the beginning of any excavation so that a joint survey for baseline data and cross-sectional measurements can be undertaken on the undisturbed/natural ground surface. All excavation shall be carried out according to the lines, slopes and grades shown on the drawings. In case an increase or decrease in quantities occur as a result of changes made by the NPC to such lines, slopes, and grades, the provisions on Variation Orders under the General Conditions of Contract (GCC) shall apply.

After each excavation is completed or where replacement of unsuitable material below required foundation grade has been undertaken, the Contractor shall notify the NPC so that proper inspection and confirmatory test on the bearing capacity of the foundation material can be made. In no case that concrete, sewer, drainage or water supply pipe can be placed unless a written approval has been issued by the NPC.

Over-excavation performed by the Contractor due to his carelessness shall be filled and properly compacted with the suitable material approved by NPC, at no additional cost to NPC.

b. Structural Excavation, Structure Other Than Pipes

The Contractor shall excavate the foundations to the specified side slopes and depths shown on the drawings, after which the NPC will conduct tests on the underlying material below foundation grade to determine the actual bearing capacity at such depth. If the required bearing capacity is not attained, the NPC shall instruct the Contractor to excavate further down until, in the opinion of the NPC, the bearing capacity is adequate to sustain the applied load on the foundation.

Compliance to such instruction shall not entitle the Contractor for additional compensation over and above the unit prices for excavation regardless of the nature of material excavated. For purposes of measurement, the applicable paylines for the excavation under this condition or situation shall be as shown on the drawings that show the paylines for excavation and special foundation materials.

c. Drainage and Sewerage Pipes and Cable Trench

The width of trench excavation for drainage and sewerage pipes and cable trench shall be as indicated on the drawings. All trench bottoms shall be excavated to the foundation grade indicated, regardless of the foundation material classification.

d. Water Supply Pipes

Trenches for main or feeder lines shall be excavated to the depth of no less than 0.25 meter on open ground and 0.60 meter under roadways and parking areas, both depths measured from the finished grade surface.

Service pipes shall be buried to a depth of at least 0.15 meter below grade line.

CW-2.5.3.2 Structural Foundation Fill

No fill materials shall be placed in any part of the fill foundation unless the foundations have been inspected and approved by the NPC. Fill materials shall be placed and spread in layer covering the entire length and breadth of the section under construction, each layer not to exceed 15 cm. in loose volume thickness and compacted thoroughly to the desired compaction as determined by the NPC. No succeeding layer shall be placed until the previous layer has been tested and approved, as to compaction, by the NPC.

CW-2.5.3.3 Special Foundations

If unsuitable material is encountered or if the foundation material is unsuitable such that the required bearing capacity of the foundation cannot be attained at the required elevation, further excavation shall be performed by the Contractor as stated in CW-5.3.1b.

Excavated materials below foundation grade shall be replaced at the direction of the NPC, either by lean concrete or by selected materials as mentioned in CW-5.2.3.

Selected materials shall be placed in 15-cm layers and compacted until the required bearing capacity is attained.

CW-2.5.3.4 Backfill

1. Structures, Other Than Pipes

Excavated areas around structures for backfilling shall be backfilled with approved materials in horizontal layers, each not exceeding 15cm. (6") in loose volume thickness. Each layer shall either be moistened or dried as directed and thoroughly tamped with tampers having no less than 160 cm² of tamping area and weighing not less than 20 kg. The last layer shall be neatly brought up to the level of the adjoining finished grade surface.



In no case shall backfill be placed around concrete structures until after fourteen (14) days from placement of the concrete.

2. Drainage and Sewerage Pipes

After the pipes have been installed and grouted joints sufficiently cured, but in no case less than seven (7) days allowed for curing as specified in NSCP and the whole pipeline inspected, backfill materials specified herein shall be placed in layers as directed, each layer either dried or moistened as directed and thoroughly tamped. The backfill shall be brought up evenly on both sides of the pipe up to the top of the pipe and finally up to the finished grade surface.

3. Water Supply Pipes

After the pipeline has been installed and tested it shall be backfilled in layers as directed and compacted to the satisfaction of the NPC.

CW-2.5.4 Measurement and Payment

CW-2.5.4.1 Structural Excavation

Measurement for payment for structural excavation performed by the Contractor for structures (except drainage, sewerage and water supply pipes, and appurtenances of which cost of excavation and backfill is included in the cost of installed pipe and constructed appurtenances) will be based on the number of cubic meters of materials excavated.

For purpose of payment, all authorized excavation below foundation grade (like in the case of unsuitable materials encountered) shall be included in the measurement.

No separate measurement and payment will be made for structural excavation. Payment will be made at the corresponding pertinent pay items with Structural Excavation in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor and equipment necessary for excavation work and proper disposal of excess material excavated.

CW-2.5.4.2 Structural Foundation Fill

Measurement for payment for Structural Foundation Fill will be based on the number of cubic meters of fill materials placed within the neat lines as shown on the drawings.

No separate measurement and payment will be made for structural foundation fill. Payment will be made at the corresponding pertinent pay items with Sand and Gravel Fill/Base shown in the Bill of Quantities, which payment shall constitute full compensation for furnishing, placing and compacting fill materials; labor which include spreading, compacting, etc., equipment and other incidentals necessary to complete the item.

CW-2.5.4.3 Special Foundations

Measurement for payment for lean concrete and/or selected materials placed within the pay lines for excavation will be based on the number of cubic meters in-place and accepted.

No separate measurement and payment will be made for special foundations. Payment will be made at the various pertinent pay items shown in the Bill of Quantities, which payment shall cover all costs for furnishing all labor, materials, equipment and tools necessary to complete the item.

CW-2.5.4.4 Structural Backfill

Measurement for payment for Structural Backfill (except backfill for drainage and sewerage pipes, appurtenances and other structures of which cost of backfill is included in the cost of installed pipes and appurtenances) will be based on the number of cubic meters of approved materials, backfilled, satisfactorily compacted and accepted. Any backfill material placed outside the pay lines for excavation to replace slides or over-excavation will not be paid.

No separate measurement and payment will be made for structural backfill. Payment will be made at the corresponding pertinent pay items with Structural Backfill, in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor, materials and equipment necessary for backfilling work

CW-2.5.4.5 Trench Excavation and Backfill for Sewerage, Drainage and Water Supply Pipes and Cable Trench

No separate measurement and payment will be made for trench excavation and backfill for all sewerage, drainage and water supply pipes. Payment for trench excavation and backfill for pipes shall be included in the payment pertaining to pipes as shown in the Bill of Quantities.

CW-2.6 CONCRETE**CW-2.6.1 Scope**

In accordance with the specifications contained in this section, the Contractor shall furnish all materials, labor, equipment and tools and perform all concreting works in accordance with the drawings, or as otherwise directed.

CW-2.6.2 Class of Concrete

Class of concrete or strength shall be as indicated on the drawings, which shall conform to the minimum requirement for compressive strength indicated on the provision of NSCP for Concrete and, in no case, shall not be less than 20.7 MPa.



CW-2.6.3 Materials**CW-2.6.3.1 Cement**

Cement for concrete works shall be furnished by the Contractor and shall conform to the requirements of the latest edition of the Standard Specifications for Portland Cement (ASTMC150).

Unless otherwise specified, cement shall be ordinary Portland Cement. Type I for general construction which concrete is not in contact with soils or ground water and Type II for concrete in contact with soil or ground water. However, the use of Portland Pozzolan Cement Type IP meeting the AASHTO/ ASTM requirements may be allowed, provided that trial mixes shall be done and that the mixes meeting the concrete strength requirements of the AASHTO/ ASTM provisions, pertaining the use of Portland Pozzolan Cement Type IP, shall be adopted.

Changing of brand or type of cement within the same structure will not be permitted unless with prior permission and approval obtained from the NPC.

CW-2.6.3.2 Reinforcing Steel

The Contractor shall furnish all reinforcing steel of the sizes shown on the drawings and in accordance with the herein specifications for reinforcing steel.

CW-2.6.3.3 Water

Water for use in concrete shall be subject to the approval of the NPC. It shall not be salty and shall be reasonably clear and free from oil, acid, injurious alkali or vegetable matter.

CW-2.6.3.4 Aggregates

All coarse and fine aggregates shall consist of hard, tough, durable and clean, uncoated particles. All foreign materials and dust shall be removed by processing. Aggregates shall generally be rounded and reasonably free from thin, flat and elongated particles in all sizes and well graded from coarse to fine.

CW-2.6.3.5 Formwork

Timber, lumber and plywood to be used for falsework and formwork shall be sound and shall comply with the requirements of this specifications. Use forms where a smooth form finish is required. Lumber shall be square-edged or tongue-and-groove boards, free or raised grain, knotholes and the other surfaces defects. Steel when used shall conform to the requirements of the ASTM A36. Steel form surfaces shall not contain irregularities, dents, or sags.

Forms shall be wood, plywood, or steel. Wood forms for surfaces exposed to view in the finished structure and requiring a smooth form finish, shall be plywood. For unexposed surfaces, undressed square-



edge lumber may be used. Forms for surfaces requiring special finishes shall be plywood, or shall be lined with plywood, a non-absorptive, hard-pressed fiberboard, absorptive-type lining or other suitable material. Plywood, other than for lining, shall be concrete-form plywood free of raised grain, torn surfaces, worn edges, patches, or other surface defects, which would impair the texture of the concrete surface. Surfaces of steel forms shall be free from irregularities, dents, and sags.

CW-2.6.4 Storage of Materials

CW-2.6.4.1 Cement and Aggregates

All cement shall be stored, immediately upon delivery at the Site, in weatherproof building that will protect the cement from dampness. The floor shall be adequately raised from the ground and in buildings placed in the locations approved by NPC. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner that allows the earliest deliveries to be used first and to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity for storage of sufficient quantity of cement to allow sampling at least twelve (12) days before the cement is to be used. Bulk cement, if used, shall be transferred to elevated air tight and weatherproof bins. Stored cement shall meet the test requirements at any time after storage when NPC orders retest. At the time of use, all cement shall be free flowing and free of lumps.

Handling and storing of concrete aggregates shall be such that segregation or inclusion of foreign materials is sufficiently prevented. NPC may require that aggregates be stored on separate platforms at satisfactory locations.

In order to secure greater uniformity of concrete mix, NPC may require that the coarse aggregate be separated into two or more sizes. Different sizes of aggregates shall be stored in separate bins or in separate stockpiles and relatively away from each other to prevent the material at the edges of the piles from intermixing.

CW-2.6.4.2 Reinforcing Steel

Reinforcing steel shall be stored in accordance with the specifications for reinforcing steel.

CW-2.6.5 Concreting

CW-2.6.5.1 General

The written approval of the NPC shall be secured prior to any concreting work. All concrete shall be poured on dry and cleaned surfaces.

CW-2.6.5.2 Formwork Construction

Forms shall be installed mortar and watertight, true to the dimensions, lines and grades of the structure and with the sufficient strength, rigidity, shape and surface smoothness as to leave the finished works true to the

dimensions shown on the drawings or required by NPC and with the surface finish as specified.

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

Formwork for concrete placed underwater shall be watertight.

Forms shall be constructed so that the form surface of the concrete does not undulate excessively in any direction. Undulations exceeding either 2 mm or 1/270 of the center distance between studs, joints, form stiffeners, form fasteners, or wales will be considered to be excessive. Should any form of the forming system, even though previously approved for the use, produce a concrete surface with excessive undulations, its use shall be discontinued until modifications, satisfactory to NPC's Representative, have been made.

Portions of concrete structures with surface undulations in excess of the limits herein stated may be rejected by the NPC.

Form fasteners consisting of bolts, clamps or other devices shall be used as necessary to prevent spreading of the forms during concrete placement. The use of ties consisting of twisted wire loops to hold the forms in position will not be permitted.

All formworks shall be provided with adequate clean-out openings to permit inspection and easy cleaning after all reinforcement has been placed. Where forms for continuous surfaces are placed in successive units, the forms shall be fitted over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Panel forms shall be constructed so that they can be removed without damaging the concrete. All exposed joints, edges, and external corners shall be chamfered a minimum of 20 mm unless specified otherwise herein. Forms for heavy girders and similar members shall be constructed with a proper camber.

Coating: Before placing the concrete, the contact surface of forms shall be coated with a non-staining mineral oil or suitable non-staining form coating compound or shall be given two coats of nitrocellulose lacquer, except as specified otherwise. Mineral oil shall not be used on forms for surfaces, which are to be painted. For surfaces not exposed to view in the finished structure, sheathing may be wetted thoroughly with clean water. All excess coating shall be removed by wiping with cloths. Reused forms shall have the contact surfaces cleaned thoroughly. Those that have been coated shall be given an additional application of the coating. Plaster waste molds shall be layered with two coats of the thin shellac or lacquer and coated with soft or thinned non-staining grease.

Tolerance and Variations: The Contractor shall set and maintain concrete forms to ensure that, after removal of the forms and prior to patching and finishing, no portion of the concrete work will exceed any of the tolerances specified. Variations in floor levels shall be measured before removal of supporting shores. The Contractor shall make the necessary corrective measures for the variations resulting from deflection, or when the latter affects concrete quality or curing. The tolerances specified shall not exceed by any portion of the concrete surfaces; the specified variation for one element of the structure shall be considered unacceptable when it permits another element of the structure to exceed its allowable variations. Except as otherwise specified herein, tolerances shall conform to ACI 347.

CW-2.6.5.3 Placing Reinforcement

Reinforcing steel and embedded items shall be properly and securely installed prior to the placing of concrete.

In no case shall concreting start without prior inspection and approval by the NPC of the placed reinforcement and other embedded items.

CW-2.6.5.4 Mixing Concrete

Mixing of concrete shall conform to the requirements of ACI Code for Concrete Construction.

CW-2.6.5.5 Placing Concrete

Concrete shall be conveyed from mixers to the forms or to the place of deposit as rapidly as possible and by methods that will prevent segregation or loss of ingredients. There shall be no vertical drop greater than 1.5 meters except where suitable equipment like metal pipe or tremie is used. The pipe or tremie shall be kept full of concrete and its end shall be kept buried in the newly placed concrete. Chutes through which concrete is delivered to the structure in a thin, continuously exposed flow will not be permitted except for very limited or isolated sections of the work.

Earth surfaces, upon which concrete shall be placed, shall be cleaned, dry and thoroughly compacted before placing the concrete.

Rock surface, upon which concrete shall be placed, shall be thoroughly cleaned of loose or semi-detached or unsound rock particles. Before placing concrete, all surfaces shall be wetted thoroughly to keep them in a completely moist condition, after which leveling mortar of the same cement ratio as the concrete mix complete contact between concrete and the leveled surface.

CW-2.6.5.6 Finishing Concrete

After the concrete has been deposited, distributed and vibrated, the concrete shall be struck off and screened by mechanical means approved by the NPC. The finishing machine shall be of the screening and troweling type designed and operated both to strike off and to

consolidate. Hand finishing may be employed when suitable finishing machines are not available. Finishing of concrete shall be done, as directed, to the satisfaction of the NPC.

All finished surfaces shall be tested with 3 meters straight edge and any variation of the surface from the desired crown or cross section shall be properly corrected.

CW-2.6.5.7 Removal of Forms

Formwork shall not be removed without the permission of NPC; where such permission, however, shall not relieve the Contractor of its responsibility for the safety of the work. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.

Falsework removal for continuous structures shall be as directed by NPC but in which case shall be temporarily supported such that the structure is gradually subjected to its working stresses. False work shall not be released in any span until the strength specified hereunder is attained.

When concrete strength tests are to be used as basis for the removal of forms and supports, the compressive strength of concrete must meet the following minimum requirements:

	Min. Time	Min.% Strength
Centering under girders and beams	14 days	80%
Sides of beams and all vertical surfaces	1 day	70%
Floor Slabs	14 days	80%

The site shall be cleared of all debris and refuse resulting from work.

CW-2.6.5.8 Curing and Protection

Concrete shall be cured for a period of not less than fourteen (14) consecutive days by keeping the surfaces of concrete continuously (not periodically) wet. Where tongue and groove forms were used and left in place of curing, they shall be kept wet at all times prevent opening at the joints and drying out of the concrete.

CW-2.6.5.9 Sampling and Testing of Concrete

The Contractor shall furnish all materials, either separately or mixed, as required by NPC. Selection of materials and the making of test specimens shall be made under the supervision of NPC and delivered to NPC laboratory or any NPC-accredited testing agency at the Contractor's expense.

The expense of making and curing all concrete specimens including the materials comprising the concrete specimens shall be borne by the



Contractor. The cost of shipping and testing the concrete shall likewise be at the expense of the Contractor.

No concreting work on the project will be permitted to be done until NPC signifies in writing that, following the performance of the necessary tests, he gives his approval to the use of all materials involve in making the concrete.

As work progresses, test cylinders shall be fabricated from the concrete samples and tested in accordance with ASTM C31 and ASTM C39. At least one set of four (4) cylinders shall be made from each 10 cu.m of the concrete placed of each class. Also at least one set shall be made per day for each class of concrete placed each day.

Two (2) cylinders shall be tested at 28 days for specification compliance and one shall be tested at 7 and 14 days respectively for information. The acceptance test result shall be the average of the strength of the two cylinders tested at 28 days.

The compressive strength of the concrete shall be deemed acceptable if the average of any consecutive strength tests equals or exceeds the specified design strength (f_c'), provided no individual test falls below the f_c' by more than 3.50 MPa(500 psi) if f_c' is equal or less than 5,000psi (35Mpa); or by more than 0.10 f_c' , if f_c' is more than 5,000 psi (35Mpa).

Concrete deemed to be not acceptable using the above criteria maybe rejected unless the Contractor can provide evidence, by means of core tests, that the quality of concrete represented by the failed test result is acceptable in place. Three (3) cores shall be taken in accordance with ASTM C42 and soaked for 24 hours prior to testing. Concrete in the area represented by the cores will be deemed acceptable if the average strength of the cores is equal to at least 85% of and no single core is less than 75% of the specified strength.

CW-2.6.5.10 Tolerances and Repair for Concrete Construction

Concrete structures shall be constructed to the lines shown on the drawings or where so required to suit actual field requirements. Any structure that does not conform to such lines shall be repaired or removed and made anew by the Contractor at no additional cost to the Corporation.

Repairs shall be made at surface imperfections due to faulty placing of concrete and cuts on the structures due to the removal of excess concrete on the lines shown on the drawings. Such repairs shall be made immediately after early stripping of the forms, after the imperfections have been identified and the methods of repair appropriately established.

CW-2.6.5.11 Second Stage Concrete

The second stage of concrete finishing shall be done only after the final installation of all pertinent equipment, anchorages, pipings, conduits and other embedded items as may be required for all electromechanical works.

CW-2.6.6 Measurement and Payment

Measurement for payment for Concrete, except concreting works that are associated to various construction and/or installation/erection works (i.e. equipment foundation and pedestals, perimeter wall footing and posts, etc.) included in the Bill of Quantities under separate pay item, will be based on the volume of concrete placed and accepted within the neat lines of the structure as shown on the drawings or in accordance with the manner of measurement set forth in the various sections of the Technical Provisions. No deduction will be made for rounded or beveled edges or space occupied by the metal items 10 sq. cm. or less in cross section, embedded in concrete.

Payment will be made at the corresponding contract unit price for the various items of concrete shown in the Bill of Quantities. Payment shall cover all costs for furnishing all labor, materials, including equipment and tools required for concreting work. Payment shall also include non-shrink cementitious grout and epoxy grout inside foundation block out and above engine base plate and care of water.

No separate measurement for payment will be made for formworks of which the cost shall be included in concreting works.

Unless otherwise specified in the Bill of Quantities, no separate measurement and payment will be made for Concrete. Corresponding cost hereof shall be included in the unit bid price of relevant item(s) in the Bill of Quantities.

CW-2.7.0 REINFORCING STEEL**CW-2.7.1 Description**

This work shall consist of furnishing, fabricating, and placing of steel reinforcement of the type, size, shape and grade required in accordance with these specifications and in conformity with the requirements shown on the Drawings or as directed by the NPC.

CW-2.7.2 Material Requirement

All material shall conform to the requirements hereinafter given. Certified test reports (mill test or other) shall be submitted to the NPC for all reinforcement steel used. These tests shall show the results of all chemical and physical tests made.

CW-2.7.2.1 Bar Reinforcement

Reinforcement bars for concrete shall be hot-rolled, weld able, deformed billet-steel bars conforming to the requirements specified in ASTM A615 and PNS 49 unless shown on the Drawings or as required by the NPC. The use of the cold twisted bars is not permitted. Bar reinforcement shall be shipped in standard bundles, tagged and marked in accordance with the Code of Standard Practice of the Concrete Reinforcement Steel Institute.

CW-2.7.2.2 Sampling

The NPC's Representative will sample reinforcement bars at the source of supply or at the point of distribution, and the Contractor shall notify the NPC in sufficient time in advance to permit sampling and testing before shipment is made. Three (3) samples from each size shall be taken at random representing five (5) tons or fraction thereof of each size.

CW-2.7.3 Construction Requirement**CW-2.7.3.1 Order List for Bent Bars**

Before materials are ordered, the Contractor shall furnish all order lists and bending diagrams for the approval of the NPC. The approval of order lists and bending diagrams by the NPC shall in no way relieve the Contractor of responsibility for the correctness of such lists and such lists and diagrams. Any expenses incident to the revisions of materials furnished in accordance with such lists and diagrams to make them comply with the drawings shall be borne by the Contractor.

Shop Drawings for Reinforcing Steel (ACI 315): Indicate bending diagrams, assembly diagrams, splicing and laps of bars, shapes, dimensions and details of bar reinforcing, accessories and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing steel.

CW-2.7.3.2 Fabrication

Bent bar reinforcement shall be cold bent as shown on the drawings or as required by the NPC. Bars shall be bent around circular pin having the following diameters (D) in relation to the diameter of the bar (d):

Bars 6mm Φ to 20mm Φ inclusive	D=6d
Bars 25mm Φ and 28mm Φ	D=8d
Bars 32mm Φ and greater	D=10d

Bends and hooks in stirrups and lateral ties may be bent to the diameter of the principal bar enclosed therein.

CW-2.7.3.3 Protection of Material

Steel reinforcement shall be protected at all times from injury. When placed in the work, it shall be free from dirt, detrimental scale, paint, oil or other foreign matter. However, when steel has on its surface easily removable and detrimental rust, loose scale or dust, it shall be cleaned by a satisfactory method, approved by the NPC.

Store reinforcement of the different sizes in racks raised above the ground with accurate identification. Protect reinforcing steel from contaminants such as grease, oil and dirt.

CW-2.7.3.4 Placing and Fastening Reinforcement & Miscellaneous Material (ACI-301)

All reinforcement bars, stirrups, hanger bars, wire fabric, spirals and other reinforcing materials shall be provided as indicated in the drawing or required by the specification, together with all necessary wire ties, chairs, screws, supports, and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from rust, scale, oil, grease, clay, and other coatings, and foreign substances that would reduce or destroy the bond. Rusting of reinforcement shall not reduce the effective cross sectional area of the reinforcement to the extent that the strength is reduced beyond specified values. Heavy, thick rust or loose, flaky rust shall be removed by rubbing with burlap or other approved method, prior to placing. Reinforcement that has bends not shown on the project drawings or on approved shop drawings, or is reduced in section by rusting such that its weight is not within permissible ASTM tolerances, shall not be used. All reinforcement shall be supported and wired together to prevent displacement by construction loads or by the placing of concrete. Unless directed otherwise by the NPC, reinforcement shall not be bent after being partially embedded in hardened concrete. Detailing of reinforcing shall conform to ACI 315. Where cover over reinforcing steel is not specified or indicated, it shall be in accordance with ACI 318.

All steel reinforcement shall be accurately placed in position shown on the drawings or as required by the NPC and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 30 mm in each direction, when alternate intersections shall be tied. Ties shall fasten on the inside.

Distance from the forms shall be maintained by means of stays, blocks, hangers or other approved supports. Blocks for holding reinforcement from contact with the forms shall be pre-cast mortar blocks of approved shape and dimensions or approved chairs. Layers of bars shall, be separated by pre-cast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks or metal chairs shall not be permitted. Unless otherwise shown on the Drawings or required by the NPC, the minimum distance between bars shall be 40mm. Reinforcement in any member shall be placed and then inspected and approved by the NPC before the placing of concrete commences. Bundled bars shall be tied together at not more than 1.80 meters intervals.



Reinforcement shall be placed accurately and secured. It shall be supported by suitable chairs and spaces or by metal hangers. On the ground, and where otherwise subject to corrosion, concrete or other suitable non-corrodible material shall be used for supporting reinforcement. Where the concrete surface will be exposed to the weather in the finished structure or where rust would impair the appearance or finish of the structure, all reinforcement supports, within specified concrete cover, shall be galvanized or made of a suitable non-corrodible material.

All placement or movement of reinforcing steel after placement, to positions other than indicated or specified, shall be subject to the approval of the NPC.

Concrete protection for reinforcement shall be as indicated, or if not indicated, in accordance with ACI 318.

The minimum concrete cover for reinforcement specified in the bid documents shall take precedence over all permissible reinforcement placement variations; nothing in the variations listed below is to be construed as permitting violation or compromise thereof:

- | | |
|------------------------------------------|------------------|
| a. Height of bottom bars | ±6mm above form |
| b. Lengthwise positioning | ±50mm of bars |
| c. Spacing bars in walls and solid slabs | ±25mm |
| d. Spacing bars in beams and footings | ±6mm |
| e. Height of top bars | ±6mm |
| f. Stirrup spacing: | |
| (1) For any one stirrup | ±25mm |
| (2) For over-all group | ±25mm of stirrup |

Anchors and bolts; including but not limited to those for the machine and equipment bases: frames or edgings, hangers and inserts, door bucks, pipe supports, pipe sleeves, pipe passing through walls, metal ties, conduits, flashing reflects, drains and all other materials in connection with the concrete construction shall, where practicable be placed and secured in position when the concrete is placed. Anchor bolts for machines shall be set to templates, shall be plumbed carefully and checked for location and elevation with an instrument, and shall be held in position rigidly to prevent displacement while concrete is being placed.

CW-2.7.3.5 Splicing

Splicing of reinforcement shall be in accordance with ACI 318, except as indicated otherwise or modified herein. Where splices in addition to those indicated on the drawings are necessary, they shall be approved by the NPC prior to their use. Splices shall not be made in beams, girders, and slabs at points of maximum stress. Butt Splicing shall preferably be used over lapping for bar sizes larger than 32 mm Φ . Splices to be welded shall conform to AWS D1.4; certification of weld ability of the reinforcement by the manufacturer, shall be submitted to

the NPC. If the Contractor elects to use butt splicing of reinforcing, he shall submit complete details of the process to be used by the NPC. If the butt splices are used the Contractor shall ensure that the splice meets the requirements specified herein by performing at least three splices which shall be submitted for tests to a testing laboratory that has been approved for such testing by the NPC. The cost of these shall be borne by the Contractor.

All reinforcement shall be furnished in the full lengths indicated on the Drawings. Splicing of bars, except where shown on the Drawings will not be permitted without the written approval of the NPC. When allowed, splices shall be staggered as far as possible and with a minimum separation of not less than 40 bar diameters. Not more than one-third of the bars may be spliced in the same cross section, except where shown on the Drawings.

Unless otherwise shown on the Drawings, bars shall be lapped a minimum distance of:

<u>Splice Type</u>	<u>Grade 40 Min.Lap</u>	<u>But Not Less Than</u>
Tension	24d	300mm
Compression	20d	300mm

Where d is the diameter of the bar. In lapped splices, the bars shall be placed in contact and wired together. Lapped splices will not be permitted at locations where the concrete section is insufficient to provide a minimum clear distance of one and one-third the maximum size of coarse aggregate between the splice and the nearest adjacent bar. Welding of reinforcing steel shall only be done if detailed on the Drawings or if authorized by the NPC in writing. Spiral reinforcement shall be spliced by lapping at least one and half (1 1/2) turns or by butt-welding unless otherwise shown on the drawings.

CW-2.7.4 Measurement and Payment

The quantity to be paid for shall be the calculated theoretical number of kilograms of reinforcement steel bars as determined from the net length of the steel shown on the drawings, incorporated in the concrete and accepted.

The weight of deformed bars will be computed from the theoretical weight of the same nominal size as shown in the following tabulation:

<u>Designation</u>	<u>Size (mm)</u>	<u>Weight (kg/m)</u>
#2	6	0.222
#3	10	0.616
#4	12	0.888
#5	16	1.579
#6	20	2.468
#8	25	3.854
#9	28	4.833
#10	32	6.313
#11	36	7.991



Clips, ties, separators and other and related materials used for positioning and fastening the reinforcement in place as required by the NPC shall not be included in the weight-calculated payment under this item. If bars are substituted upon the Contractor's request and as a result, more steel is used than specified – only the amount specified shall be included.

When laps are made for splices, other than those shown on the drawings or required by the NPC and for the convenience of the Contractor, the extra steel shall not be measured nor paid for.

Unless otherwise specified in the Bill of Quantities, no separate measurement and payment will be made for Reinforcing Steel. Corresponding cost hereof shall be included in the unit bid price of relevant item(s) in the Bill of Quantities.

SECTION VI - TECHNICAL SPECIFICATIONS

ELECTRICAL WORKS

PART I - TECHNICAL SPECIFICATIONS

EW-2 DISTRIBUTION LINE

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PART I – TECHNICAL SPECIFICATIONS

ELECTRICAL WORKS

EW-2.0: DISTRIBUTION LINE

EW-2.1 GENERAL

This specification covers the furnishing of all labor, materials, equipment, tools and other incidentals for the execution of all electrical works enumerated hereunder, or as shown on the accompanying drawings or as otherwise directed by NPC. The works shall be performed and completed in a workmanship manner in accordance with generally accepted modern engineering practice in the supply, delivery, erection/installation, testing and commissioning 7.97/13.8kV distribution line system located at Lanawan, Tabuan Lasa, Basilan.

It is expected that after the completion of the project, more households, establishments, schools, and other recreational facilities will be served and benefitted from the electricity being generated from NPC's existing Diesel Power Plant.

The Contractor shall conduct check survey of the proposed tapping point and line route and shall establish the required staking, line materials, and any other contingencies liable to affect his tender price, as no claim for extra payment in this connection will be entertained for all sites.

Any discrepancy between the bidding/tentative plan and the actual survey conducted by the Contractor shall be reported to NPC for evaluation and appropriate action.

The Contractor will be required to perform the entire quantity of work necessary to complete the erection/installation of the new 7.97/13.8 kV distribution lines at the Contract Unit Price, be it more or less than the quantity herein estimated. No separate payment will be made to the Contractor for any major discrepancy arising from the work items in this contract.

EW-2.2 SCOPE OF WORK

In accordance with the specification contained in this section and as shown on the bid drawings, the scope of this contract shall include all engineering services such as supply, delivery, erection/installation, testing and commissioning of distribution line materials.

The works required under the contract are as follows:

1. Clearing of right-of-way (6 meters) wide from the entire route;
2. Final survey and staking of steel poles;

3. Supply, Delivery and Erection/Installation of Steel Poles, Line Hardware, Insulators, Primary and Neutral Conductors, etc.;
4. Dressing of Steel Poles, Guying and Ground wires;
5. Supply, Installation and Test of Distribution Transformers including its assemblies and accessories;
6. Supply, Installation and Test of Household Connection Materials;
7. Stringing of Overhead and Neutral Conductor including Racheting, Installation of Armor Rods, Armor Tapes, Tie-wires, etc.;
8. Stringing, installation, and test of secondary conductor including its assemblies' accessories;
9. Testing and Commissioning of the Distribution Line System;
10. Furnishing and Installation of Pole Numbering; and
11. Supply of Lineman's Basic Equipment and Tools to be supplied as accessories and cost thereof shall be included in the bid.

All other electrical equipment if specified shall be furnished and installed in accordance with relevant sections of this specification. The Contractor shall submit all related drawings and document deemed necessary, prior to the execution of the work, subject to the approval of NPC.

EW-2.2.1 Contract Duration

Contract duration: One Hundred Twenty (120) Calendar Days.

The contract period is inclusive of twenty (20) rainy/unworkable days, considered unfavorable for the execution of works at the site. The number of calendar days shall be counted from the date of effectivity of the Notice to Proceed.

EW-2.3 DISTRIBUTION TRANSFORMER

EW-2.3.1 General

This specification covers the technical and associated requirements for distribution transformer including accessories for use in 7.97/13.8kV distribution line.

The equipment furnished shall be in accordance with, but not limited to, the latest issues of the Applicable Codes and Standards, including all addenda, in effect at time of purchase order unless otherwise stated in this specification.

The equipment to be furnished shall be complete, with all parts in excellent working conditions, of new and high grade materials and produced with first class workmanlike manner. All materials though not expressly called for in this Specifications but which are necessary for the complete and proper operation of the distribution transformer shall be furnished by the Contractor at no additional cost to NPC.

EW-2.3.2 Technical Description

a. Construction	:	Completely self protected, pole mounted
b. Class	:	Outdoor use
c. Quantity, sets	:	Refer to Staking Sheets
d. Continuous rated output at 65°C temperature rise, kVA	:	5 & 15
e. Number of phase	:	1
f. Rated frequency, Hz	:	60
g. Type of cooling	:	OA
h. Impedance, %Z	:	2 ($\pm 10\%$ Tolerance)
i. Audible sound level, dB	:	≤ 48
j. Polarity	:	Additive
k. Number of primary bushing	:	1
l. Winding material	:	100% copper
m. Tap changer	:	Yes, No-Load
n. Taps:		
▪ H winding, kV	:	$\pm 2 \times 2.5\%$
▪ X winding, kV	:	N/A
o. Insulation level:		
Rated operating voltage, kV		
▪ H winding	:	15
▪ X winding	:	1.2
Nominal operating voltage, kV		
▪ H winding	:	7.62
▪ X winding	:	0.24
BIL, kV		
▪ H winding	:	95
▪ X winding	:	30

EW-2.3.3 Design Requirements

EW-2.3.3.1 Rating

The transformer rating shall be the basis of the Contractor's guarantee as to performance and temperature rise.

EW-2.3.3.2 Short Circuit Withstand Capability

The transformer shall be capable of withstanding, without damage, the effects of external short circuit, on either the high or low voltage terminals with rated voltage opposite terminals.

The transformer shall withstand the thermal effects of such short circuit current for three (3) seconds.

EW-2.3.3.3 Overload Capacity

The transformer/s shall be designed and manufactured with overload capacity in accordance with applicable ANSI/IEC/IEEE standards.

EW-2.3.3.4 Electrical Insulating Oil

The Contractor shall furnish oil with quality suitable as an insulant and coolant for transformers. The oil shall be new naphthenic based mineral oil. It shall be free from moisture, acid, alkali and sulfur compounds and shall not form a deposit at normal operating temperatures. Except for inhibitor no additives are permitted. It shall meet the requirements of ASTM standard.

The Contractor shall state the commercial name and specifications of the oil to be furnished. NPC reserves the right in the future to use any oil which meets the above specifications and the use of such oil shall not affect the Supplier's guarantee.

Insulating liquid must not contain more than 2PPM of Polychlorinated Biphenyl (PCB), classified as "PCB free". The Contractor shall also submit Certification from the Manufacturer of transformer that the transformer oil does not contain polychlorinated biphenyl (PCB), and to conduct laboratory analysis for PCB of the transformer oil by a DENR-accredited laboratory.

EW-2.3.3.5 Impedance and Reactance

The impedance and reactance shall be stated in the Proposal.

EW-2.3.3.6 Corona Level

The distribution transformer shall be free from corona when energized at 110% rated capacity.

EW-2.3.4 Design and Construction Features

EW-2.3.4.1 General

All transformers of the same design and rating shall be electrical duplicates, shall be mechanically interchangeable parts and shall be operable in parallel.

The transformer design, manufacture and assembly shall minimize vibration and shall prevent damage by inherent vibration and stress during operation, transportation and short circuits. Transformer construction shall include attached primary arrester, primary fuse and appropriate secondary over-load and short circuit protection

EW-2.3.4.2 Cores

Cores for the transformers shall be constructed of the highest quality, non-aging high permeability grain oriented silicon steel. The steel shall be in thin laminations, annealed after cutting and rolled to ensure smooth surface at the edges.

The laminations must be free from impurities and must receive stress relief treatment after punching. The laminations shall be accurately flattened, especially at the edges and insulated by suitable procedures with long life heat resistant insulating coat.

Both sides of each sheet shall be insulated with a durable, heat resistant insulation. The cores shall be held firmly by core clamp and brace to ensure adequate mechanical strength to support the winding and to withstand without damage or deformation, the forces, caused by short circuit stresses, transportation or handling to prevent shifting of the core laminations.

EW-2.3.4.3 Windings

Windings for transformer shall be of the best modern design of conductor having constant cross-section and uniform insulation or graded insulation as required. The coils shall be wound and supported in a manner to provide sufficient oil ducts which will be maintained without constriction.

End coils shall have extra insulation. Coils shall be made up, shaped and braced to provide for expansion and contraction due to temperature changes in order to avoid abrasion of insulation and provide rigidity to resist movement and distortion caused by abnormal operating conditions.

Adequate barriers shall be provided between windings and core and between high and low voltage windings. End coils shall have extra protection against abnormal line disturbances. Permanent current-carrying joint for splices shall be welded or brazed, properly formed and finished, and insulated to conform to the basic insulation.

The assembled core and coils shall be vacuum-dried, immediately impregnated and immersed in dry oil. They shall be adequately braced to withstand ocean shipment, short-circuit forces and earthquakes.

EW-2.3.4.4 Bushings

All porcelain used in bushing shall be wet process, homogenous and free from cavities or other flaws. The glazing shall be uniform in color free from blisters, burrs and other defects. All porcelain parts shall be one piece.

The bushings of the same rating shall be interchangeable. Bushing up to 110 kV shall be porcelain bulk. Bushing shall have the continuous current-carrying capacity necessary to carry the full 65°C temperature rise current and shall be in accordance with ANSI standard.

EW-2.3.4.5 Tanks

The transformers shall be housed in a steel tank with all permanent joints molded, backed up by a sturdy steel structure as required to obtain the desired rigidity and strength. The material shall be of high grade steel plate having good welding qualities. All seams, flanges, lifting and jacking lugs, braces and other parts attached to the tank shall be welded. No rivets shall be used. The cover shall be bolted type. The tank shall be able to withstand an internal pressure with oil at operating level.

All openings such as joint between the case and cover, bushings insulation mountings, etc., shall have welded on flanges to provide gaskets surfaces and allow for bolt holes. No bolts shall pass to the inside of the case and cover. Flanges shall have gaskets which will remain oil-tight and will not deteriorate under service conditions.

The transformer tank shall have solder-less type ground connector suitable for No. 8 to No. 2/0 AWG stranded conductor.

EW-2.3.5 Tolerances

The transformer/s shall be designed and manufactured with tolerances in accordance with applicable ANSI/IEEE or IEC standards.

EW-2.3.6 Accessories

EW-2.3.6.1 Lifting Lugs

Lugs shall be provided to lift the complete transformer by crane hooks. In addition, separate lugs shall be provided on all items which can be individually removed. Jacking lugs shall be provided to allow removal and rotation of wheels using the lifting jacks.

EW-2.3.6.2 Gaskets

Gaskets shall be rubberized cork of ¼" thick. A complete set of spare gaskets for every transformer shall be supplied.

EW-2.3.6.3 Transformer Mounting Bracket

Transformer Mounting Bracket for securing the transformer to its location to prevent movement in case of earthquake shall be furnished.

EW-2.3.7 Equipment and Marking

A stainless-steel rating plate shall be supplied for each transformer and shall be in accordance with ANSI standard. The diagram of connections shall show the tapping and polarity marking for instantaneous induced voltages for each transformer.

The minimum recommended dielectric strength of insulation oil for the transformer shall also be engraved on this plate. The rating plate and any other instructions or designations shall be in the English language.

EW-2.3.8 Spares and Spare Parts

The Contractor shall provide a list of recommended spares and consumables which shall be supplied for one (1) year operation period, identifying each one and the specific sub-assembly to which it applies. The cost of each spares and consumables to be supplied shall be submitted by the Contractor in his bid.

EW-2.3.9 Tests and Experience Requirements

The distribution transformer shall be completely assembled and adjusted at the factory after all the standard and routine shop tests, such as temperature rise test, impulse test and other supplemental tests as required by ANSI and/or IEC standards are performed.

Test report on design and routine tests performed shall be submitted to NPC for evaluation and approval.

Equipment and Manufacturer's Experience

- a. The Manufacturer should have been in the business of manufacturing the equipment of the same voltage level : 10
for not less than: years
- b. The same type of equipment being offered should have been in the : 5
actual service for not less than: years

NOTE: Experience less than what is required will be ground for rejection of equipment being offered.

The Contractor shall submit for approval the brochures and/or catalogues with complete technical specification of the distribution transformer to be supplied prior to fabrication and/or delivery at site.

EW-2.4 FUSE CUTOUT WITH LIGHTNING ARRESTER COMBINATION

This specification covers the supply and delivery of fuse cutout with lightning arrester combination for use in 7.97/13.8 kV distribution line.

The materials furnished shall be in accordance with, but not limited to, the latest issues of the Applicable Codes and Standards, including all addenda, in effect at time of purchase order unless otherwise stated herein.

EW-2.4.1 Technical Characteristics and Requirements

Fuse Cut-Out

- | | | |
|------------------------|---|---------------------------------------------|
| a. Type | : | Open drop out and
expulsion fuse cut out |
| b. Rated Voltage, kV | : | 15 |
| c. Rated Frequency, Hz | : | 60 |
| d. BIL, kV | : | 110 |

Fuse cutouts shall be satisfactory use in a tropical climate with high relative humidity. The cutouts will be mounted by means of steel brackets on steel poles cross arms.

The cutouts are intended for use with button head type fuse links and must be able to accommodate fuse links meeting the interchangeability requirements of ANSI standard.

The cutouts to be supplied shall include the following:

1. Fuse Support Assembly
2. Fuse Holder Assembly
3. Mounting Bracket
4. Lock Washers

Fuse Link

- | | | |
|---------------------------------|---|------------------------|
| a. Type | : | Universal button head |
| b. Rated Voltage, kV | : | 15 |
| c. Continuous current rating, A | : | Refer to Staking Sheet |

The fuse link to be supplied shall be universal button head type with tin fuse element suitable for 15 kV open type distribution cutout to be used in the overcurrent protection of circuits and are intended to coordinate with automatic circuit recloser and transformer protection equipment. The fuse link shall meet the electrical and mechanical interchangeability requirement in accordance with ANSI standard.

Lightning Arrester

- | | | |
|---------------------------|---|---------------------------------------------|
| a. Type | : | Metal oxide varistor
(MOV), gapless type |
| b. Duty cycle voltage, kV | : | 12 |

c. Maximum continuous operating voltage, kV phase to ground		10.2
d. Frequency, Hz	:	60
e. BIL, kV	:	110

Gapless arresters shall have elements fabricated from non-linear resistance metal oxide materials to perform both the surge discharge and power frequency reseal functions.

Arresters of this type shall be protected in a hermetically sealed wet-process porcelain jacket, which shall have a high creepage distance and a high dielectric strength.

Both line lead and isolator terminals shall accommodate 1/0 AWG to 2/0 AWG ACSR.

The arrester shall be supplied with a bracket suitable for the intended applications as shown in the Bid Drawings that conforms with the requirements of NEMA or with appropriate bracket as a cutout arrester combination on it.

All mounting bolts and conductor connection requires lock washer. Lock washers shall be fabricated from material that complies with the requirements as per ANSI standard.

All exposed steel or iron part of the arrester shall be hot-dipped galvanized in accordance with ASTM standard.

EW-2.4.2 Test and Experience Requirements

Test report on design and routine tests performed in accordance with ANSI and/or IEC standard shall be submitted to NPC for evaluation and approval.

Equipment and Manufacturer's Experience

- | | | |
|----------------------------------------------------------------------------------------------------------------------------------------|---|----|
| a. The Manufacturer should have been in the business of manufacturing the equipment of the same voltage level for not less than: years | : | 10 |
|----------------------------------------------------------------------------------------------------------------------------------------|---|----|

NOTE: Experience less than what is required will be ground for rejection of equipment being offered.

EW-2.5 LINE MATERIALS

EW-2.5.1 Scope

This section covers the line material specification for 7.97/13.8 kV distribution line in accordance with the requirements specified hereunder and as shown on the drawings.

EW-2.5.2 Line Materials Specifications

Describe herein is the general specification of the line materials and equipment to be supplied for this project.

EW-2.5.2.1 Cross arms

The cross arms to be supplied for this project shall be in accordance to ASCE manual 72 "Design of Steel Transmission Pole Structures". The materials shall meet ASTM A-570 specification (36 KSI min. steel strength) while the galvanizing shall be in accordance with ASTM A-123 specification.

EW-2.5.2.2 Conductors

The conductors to be furnished shall be in accordance with, but not limited to, the latest issues of approved standards for ACSR conductors.

EW-2.5.2.3 Insulators

Insulators to be utilized in the project shall be in accordance to ANSI Class 55-4 and 56-2 for pin, Class 52-1 for suspension, Class 53-2 and Class 53-4 for spool standard as to material, ultimate tensile strength, leakage, distance, etc.

EW-2.5.2.4 Line Hardware

Line hardware shall be made either of aluminum alloy, malleable iron or ductile iron with tensile strength in accordance with ANSI standard.

EW-2.5.2.5 Bolts

All bolts such as carriage, double arming, oval, machine, etc. shall be hot dip galvanized as per ASTM A-153.

EW-2.5.3 Tests

All materials to be supplied under this specification shall comply with test criteria and NPC's acceptance of the conductors, insulators, line hardware and accessories and its components and shall not relieve the Contractor of his responsibility for meeting all the requirements of this specification.

The Contractor shall carry out at his own expense all tests necessary to ensure the satisfactory design and manufacture of line transformer, line materials and its components in accordance with the applicable standards mentioned herein in the specification.

All tests required in the applicable standards for the equipment shall be witnessed by NPC representative unless otherwise waived. No line hardware and accessories shall be shipped until release for shipment by the NPC.

EW-2.5.3.1 Testing of Conductors

Power conductors or cables shall be subjected to factory routine tests in accordance with IEC 1089 or applicable standards.

EW-2.5.3.2 Testing of Insulators

Insulator units shall be subjected to factory routine test in accordance with ANSI Standards for wet process porcelain insulator.

EW-2.5.3.3 Testing of Line Hardware

Line hardware and accessories shall be subjected to factory routine tests in accordance with applicable ASTM or IEC Standards.

EW-2.5.4 Manufacturer's Experience

- a. The Manufacturer should have been in the business of manufacturing the equipment of the same voltage level for not less than: years : 10
- b. The same type of equipment being offered should have been in the actual service for not less than: years : 5

NOTE: Experience less than what is required will be ground for rejection of equipment being offered.

The Contractor shall submit for approval the brochures and/or catalogues with complete technical specification of the conductors, insulators, line hardware and accessories and its components to be supplied prior to fabrication and/or delivery at site.

EW-2.6 HOUSEHOLD CONNECTION MATERIALS

EW-2.6.1 Scope

This specification covers the technical and associated requirements for the complete household wiring materials and their associated materials and installation tools, for use in 7.97/13.8 kV distribution lines.

It is not NPC's intent to specify all technical requirements nor to set forth those requirements adequately covered by applicable codes and standards. Contractor shall furnish high quality materials meeting the requirements of this specification and industry standards.

The Contractor shall bear full responsibility that the power conductors have been designed and manufactured in accordance with all codes, standards and applicable governmental regulations and perform under the condition and to the standards specified herein.

The general electrical works i.e. dimensions, clearances and distances of conductors/wires must be maintained in accordance with the drawings and/or as per conditions set forth by the Philippine Electrical Code and its equivalent standards.

All materials to be used in the work shall be new, of high quality, free from all defects and of proven acceptability for the purpose of intended.

EW-2.6.2 Service Drop Wire

The service drop wire shall be of duplex type with one insulated phase conductor twisted around on a neutral conductor (ACSR). All wires of conductor shall be aluminum and concentrically stranded. Conductor insulation shall be of black polyethylene (PE) and is rated for 600V phase to phase.

The type and size of service drop wire to be supplied shall be as stated in the Technical Data Sheets and shall be manufactured according to applicable ASTM or equivalent IEC Standards

EW-2.6.3 Household Billing Meter

This specification covers the technical and associated requirements for the kilowatt-hour meter and accessories for the electricity billing requirement of each household.

The equipment to be furnished shall be in accordance with, but not limited to, the latest issues of the Applicable Codes and Standards, including all addenda, in effect at time of purchase order unless otherwise stated in this specification.

All materials and parts which are not specifically mentioned herein but are necessary for the proper installation and safe used of kilowatt-hour meter shall be furnished at no additional cost to NPC.

EW-2.6.3.1 Technical Characteristics and Requirements

a. Type	:	Electronic/Digital
b. Accuracy class	:	0.3 or better
c. Rated Voltage, V	:	240
d. Current range, A	:	10(30A)
e. Frequency, Hz	:	60
f. Phase / no of wire	:	1 / 2

The kilowatt-hour meter shall be furnished and installed by the Contractor as shown on the bid drawings complete with housing and mounting accessories for outdoor metering purposes. It shall be capable to measure the power consumed by the household.

The meter shall comply in all aspects with the specification for meters specified in the latest edition of ANSI and/or IEC Standard. The meter to be supplied shall be tamper-proof and provided with user-friendly interface. It shall be designed to operate continuously for the normal life of the meter in an outdoor tropical location exposed to the elements of rust, corrosion, or other damages which might adversely affect the meter's accuracy or reliability.

EW-2.6.3.2 Test and Experience Requirements

Test report on design and routine tests performed in accordance with ANSI and/or IEC standard shall be submitted to NPC for evaluation and approval.

Equipment and Manufacturer's Experience

- a. The Manufacturer should have been in the business of manufacturing the equipment of the same voltage level for not less than: years : 10
- b. The same type of equipment being offered should have been in the actual service for not less than: years : 5

NOTE: Experience less than what is required will be ground for rejection of equipment being offered.

The Contractor shall submit for approval the brochures and/or catalogues with complete technical specification of the kilowatt-hour meter including accessories to be supplied prior to fabrication and/or delivery at site.

EW-2.6.4 Overcurrent Protective Device

The enclosed overcurrent protective device (circuit breakers) to be supplied shall be rated 600V, 1-ph, 60Hz. Each circuit breaker shall be equipped with thermal-magnetic trip element.

EW-2.6.5 Lighting Fixtures, Luminaires and Accessories

Lighting Fixtures

All lighting fixtures to be supplied shall be free of leaks, warps, dents and other irregularities.

The hangers and brackets of all kinds for safe and proper installation of lighting fixtures shall be furnished by the Contractor at his own expense.

The housing of lighting fixture shall be fabricated of corrosion resistant material and shall provide good ventilation and easy installation.

All lighting fixtures, samples and catalogues shall be submitted for NPC's review and approval prior to the order.

Lighting fixtures shall be wired with approved fixture wire, 90°C insulation. Each fixture shall be wired to a single point with an adequate slack for proper connection. All lighting fixtures shall be protected from damage upon delivery. Any broken lighting fixtures, receptacles, stems and the like, shall be replaced with new parts, at no cost to NPC.

Lighting Luminaire(s)

a. Compact LED Bulb

The Compact LED Bulb to be supplied shall be rated 240V, 60Hz, 9 Watts, cool white or approved equivalent, classic globe shaped with E27 base and frosted finish complete with all the required mounting accessories.

EW-2.6.6 Household Wiring

Conductors to be supplied shall be a solid or stranded annealed copper conductor as stated in the Technical Data Sheets. The minimum size of conductor to be used shall be 3.5mm².

Insulation shall be suitable for wet and dry location, fungi resistant and ultra violet stable.

All conductors shall be moisture and heat resistant, flame retardant polyvinyl chloride insulation, chemical and abrasion resistant nylon sheath.

The conductor specification shall meet ASTM specification, PNS 35, UL standard 83 and requirements of PEC.

The contractor shall submit catalogues and/or brochures showing details of insulation and ampacity ratings of all types of conductors to be supplied for approval of NPC.

EW-2.6.7 Junction/ Utility and Pull Boxes

Junction / Utility Boxes

All junction/utility boxes for concealed work shall be of hot dip galvanized steel or un-plasticized polyvinyl Chloride.

Utility boxes shall be firmly anchored in place and where required provided with fixture supports.

Pull Boxes

Pull boxes shall be supplied to prevent damage to the insulation or other damage that might result from pulling resistance or for other reasons related to improper installation. All pull boxes shall be made of galvanized sheet steel not less than 2mm or un-plasticized polyvinyl chloride. Where pull boxes are used in connection with exposed conduits, plain covers attached to the pull box with a suitable number of countersunk flathead machine screws may be used.

Boxes and fitting required for the lighting and power system including all necessary hardware and accessories such as screws, bolts, concrete inserts, clamps, locknuts, couplings shall be furnished by the Contractor. The required quantities of various items and associated materials shall be furnished in accordance with the NPC requirements.

EW-2.7 POLE ERECTION AND LINE MATERIAL INSTALLATION

EW-2.7.1 Scope

The general outline of the pole structures are those indicated on the attached drawings of the Specification. The general dimensions, clearances and distances of conductors/wires must be maintained in accordance with the drawings.

If poles are stored after delivery, it shall be arranged with care and shall be placed so that no pole will come in contact with water on the ground. The Contractor shall use standard and accepted practice and method of erecting the poles depending on their location. Insofar as practicable, the poles shall be selected and matched so that the poles in each structure will be of equal cross-section. Except as otherwise provided in this paragraph or drawings, or otherwise directed by NPC, all poles shall be set in accordance with the following table:

Length of Poles		Depth of Pole Setting			
		In Earth		In Rock	
<u>Meter</u>	<u>Feet</u>	<u>Meter</u>	<u>Feet</u>	<u>Meter</u>	<u>Feet</u>
7.62	25	1.37	4.5	1.22	4.0
9.15	30	1.52	5.0	1.22	4.0
10.67	35	1.68	5.5	1.22	4.0
12.19	40	1.83	6.0	1.22	4.0
13.72	45	1.98	6.5	1.37	4.5
15.24	50	2.13	7.0	1.52	5.0

The Contractor shall excavate holes for pole setting to a depth indicated in table above. The diameter of the holes shall be 20 cm larger than the pole diameter at ground level. Poles set in holes partly in earth and rock shall be set to a depth shown for earth. Poles at angle and dead end points and at the other points of unbalanced stress shall be set at six (6) inches deeper than shown above, and poles with extra large diameters shall be used at these points whenever possible. Pole structures located in steeply sloping ground shall have their depth of setting measured on the downhill sides and shall be at least as deep as shown in the above tabulation. All poles shall be set to within three (3) inches of the specified setting. All holes shall be dug in the correct locations and shall be large enough to provide for the use of tamping bars all around the poles to the full depth of the holes.

All poles shall be set truly vertical and exact in alignment.



After the poles have been set and aligned properly, the holes shall be backfilled with materials consisting of 80% gravel whose sizes ranges from 7.6 cm to 10 cm diameter and 20% sand whose sizes ranges from 3 mm to 8 mm by volume. The gravel and sand material shall be filled around the holes and compacted thoroughly at 30 cm (12 inches) layer by tamping tools before placing the next 30 cm layer of gravel and sand, until the backfill material reaches the ground surface level. Materials from the excavated holes shall be placed and tamped around the poles to a height of 30 cm. (12 inches) above ground line and shall be spread sloping radially outward until it intersects with the ground surface. In cases where the poles are located/erected in the rice field areas, excavated materials shall be spread and leveled evenly over the site, subject to the approval of NPC. No spreading and tamping of excavated materials shall be done unless cleared by the inspector or representatives of NPC.

In section of the line where the soil bearing capacity is reduced or where special conditions so require, the Contractor shall furnish and place concrete foundation subject to the approval of NPC.

EW-2.7.1.1 Pole Numbering

The Contractor shall number each structure for ground patrol with the numbering indicated on the plan and profile drawings (staking sheets) or as instructed. Numbers shall be printed in 100 mm (4") black letters on a yellow background on the pole surface. The reflectorized paint shall be weather resistant approved by NPC. The numbers shall be painted approximately 3.0 meters from the ground vertically on the flat surface of the poles.

The cost of labor shall be included in the unit bid price for the supply, delivery and erection of different length of poles.

EW-2.7.2 Structure Dressings / Insulator Assemblies

The cross-arms and hardware shall be assembled and installed properly in accordance with the drawings. All nuts and locknuts shall be adequately tightened.

Braces such as flat braces, x-braces, shall be attached where required. The poles and braces shall be bored as required and shall be attached by the Contractor in accordance with the drawings. All nuts shall be tightened adequately.

The Contractor shall assemble and install the insulator assemblies as shown in the drawing.

The number of suspension insulators to be used for a single string of strain assembly shall be as indicated in the drawing.

EW-2.7.3 Guy and Anchor Assemblies

Guy and anchor assemblies shall be installed where required in accordance with the details shown in the drawings. However, NPC reserves the right to direct the Contractor to change the location of the guy and anchor assemblies

as may be found desirable in the field. The guy assemblies shall be log type. Installing a guy assembly shall consist of excavating earth to a depth of at least 5'-0", installing anchor log in position, backfilling and compacting the backfill and installing the guy wire. The anchor rod shall protrude six (6) inches vertically or diagonally above the ground line when installed. The guy wire loop end shall be protected by a serving sleeves for holding down the loose end of guy strand beyond the guy clamp.

EW-2.7.4 Conductors (including Compression Joints, Armor Rods, Repair Sleeves and Jumpers) Requirement

The Contractor shall install, join, string and sag the conductor in accordance with the drawings.

EW-2.7.4.1 Tools and Special Equipment

The Contractor shall furnish all tools and special equipment necessary to install, join, string and sag the conductor in accordance with the best modern practices. NPC reserves the right to approve the tools and equipment to be used by the Contractor.

EW-2.7.4.2 Compression Joints

All joints in the conductors shall be in accordance with the recommendations of the conductor manufacturer unless otherwise specified by NPC. All splices in conductors shall be made at least fifty (50) feet (15.24 m.) away from the structure and no joints will be permitted in spans crossing over existing transmission lines or other public utility lines, unless approved by NPC. River crossing spans shall also be free from joints.

The Contractor shall furnish all necessary accessories, special tools, compressors, etc., required for making conductor splices.

The Contractor shall furnish filler paste for all compression joint consisting of seventy percent (70%) zinc chromate and thirty percent (30%) raw linseed oil by weight. The paste shall be applied in the manner recommended by the manufacturer of the compression joints.

EW-2.7.4.3 Armor Rods

The Contractor shall install Armor rods where required at points in accordance with manufacturer's recommendations and as shown on the drawings. Where it becomes necessary to shift the point of attachment after the armor rods are installed, such shift shall not exceed two and a half (2-1/2) feet (63.5 mm.) either way from the center. If the required shift exceeds this limit, the Contractor without additional cost shall reinstall the preformed armor rods.

EW-2.7.4.4 Equipment Stringing

The stringing operation shall be conducted using method which will not injure the conductor. Particular care shall be exercised to ensure that the conductor is not twisted in any manner. NPC reserves the right to approve the stringing method used by the Contractor. Where the conductor has been damaged as a

result of negligence on the part of the Contractor, the Contractor shall repair or remove the damage section including, if necessary, furnishing additional material without additional cost.

EW-2.7.4.5 Sagging

General

All distribution line conductors shall be sagged in accordance with the sag and tension chart for specific type of cable. These sag and tension are in accordance with the recommendation of the conductor manufacturer. The loading of the conductor shall be such that the design loadings of the structure shall not be exceeded during stringing.

Check

a) Tension

As required by NPC to avoid over-stressing the conductor while stringing, the conductor tension shall be measured by dynamometer to be furnished by the Contractor. The dynamometers used shall be frequently calibrated in order to ensure their accuracy.

b) Sags

All sags shall be measured by the line of sight method. While the sag in all conductors shall be in accordance with the stringing sags specified, maximum increase of five percent (5%) will be acceptable provided the five percent does not exceed six (6) inches (152 mm) and provided that all conductors in the same span assume the same sag and the necessary ground clearance is obtained. In any span where five percent (5%) of the specified sag is less than two (2) inches (51mm), a maximum increase of two inches will be acceptable. A telescope shall be used for the line-of-sight sagging. The Contractor shall furnish the necessary men for signaling and climbing purposes. The methods for checking sag and the points at which the checks are to be made shall be agreed upon between NPC and the Contractor. It is the intent of these specifications that NPC shall be assured, by means of sufficient and reasonable number of checks and the ground clearances as tabulated in the pertinent drawings are obtain at all points, that the tensions are obtain and the general appearances of the line will be satisfactory.

c) Sagging Information

The Contractor shall submit to NPC, on approved form, the following information concerning the sagging of the conductor and shield wire:

1. Date
2. Type of conductor or shield wire sagged
3. Span sagged
4. Measured sag, in meters
5. Temperature in °C or °F
6. Relative elevations of point of supports.

EW-2.7.4.6 Jumper Connection

At all dead-end structures or angle structures, where required, the jumper connections shall be formed in a neat and workmanlike manner.

EW-2.7.4.7 Repair Sleeves

Compression type repair sleeves may be used to repair minor damage to the conductor. Provided that:

- 1) At the location of the damage on the conductor to be repaired not more than one third (1/3) of the outer aluminum strands are damaged over a length of not more than four (4) inches
- 2) Not more than two (2) strands in the outer layer are broken, no strands in the inner layer of aluminum strands are broken, and the cross-sectional area of the damage strands is not reduced by more than twenty five percent (25%)

EW-2.8 FACTORY ASSEMBLY AND TESTS

EW-2.8.1 General

The Contractor shall carry out at his own expense, all tests necessary to ensure the satisfactory design and manufacture of all equipment in accordance with relevant ANSI and IEC standard.

All parts shall be properly marked for ease of assembly in the field. Test report on design and routine tests performed in accordance with ANSI or IEC standard shall be submitted to NPC for evaluation and approval.

The test equipment, test method, measurements and computations shall be in accordance with the latest applicable requirements of ANSI and IEC standard.

EW-2.8.2 Shop Test

Routine, design, quality and conformance test and other necessary tests shall be performed in accordance with ANSI Standard or equivalent IEC Standard. Design tests is required if the equipment is manufacturer's new design or previous design with significant design changes. In this case, certified test report of duplicated production type is acceptable.

The Contractor shall make all preparation for tests and provide the required test apparatus and personnel and shall notify NPC in advance of the test schedule.

The test methods, measurements and computation shall be in accordance with the latest applicable requirements of ANSI and IEC standard and shall be submitted for NPC's approval.

EW-2.8.3 Field and Acceptance Test

Field tests and acceptance tests shall be performed by the Contractor to be witnessed by NPC on the various components of the distribution line to determine whether requirements of the specification have been fulfilled. The Contractor shall provide instructions and acceptance criteria for field testing and commissioning for NPC's reference and application for the distribution line system.

Four (4) certified copies of the reports of all routine tests mentioned herein based on specification standard shall be furnished to NPC immediately within a maximum of fifteen (15) days following the completion of the tests. For equipment and materials which had the required type test already, the type test certificates shall be submitted by the Contractor together with his proposal.

If however, NPC opted not to witness the Factory Acceptance Tests, NPC will issue a Certificate of Waiver of Tests Witnessing/Inspection for the equipment and materials. In such case, the Contractor shall proceed with the Factory Tests in accordance with the requirement of the specification and the manufacturer's test specification as approved by NPC.

If any of the distribution line component i.e. steel poles, insulators, conductors, etc. fail to pass any test, NPC may, at his own judgment, direct the Contractor to make any necessary corrections or alterations to it for minor defects or to replace it forthwith for major defects. Any and all expenses that might result by the supply and installations of new parts or by modification of existing parts and any and all expenses resulting in additional tests made necessary by failure of the distribution line component to meet the guarantees and other requirements of the specification shall be borne by the Contractor. The costs of witnessing the Factory Acceptance Tests by NPC or his representative(s) as a result of re-test to be conducted on the equipment shall also be borne by the Contractor.

EW-2.8.4 Final Completion of Work

After all the conductors and neutral wires are completely strung, Contractor and NPC shall conduct a joint final inspection from tapping point to receiving end of the line. The Contractor must satisfy NPC that all minimum requirements indicated on the General Design Data for 7.97/13.8 kV, Single Circuit, Steel Pole Distribution Line had been met, especially the minimum clearance to ground of the conductor. A continuity test of the line from the tapping point to the receiving end must also be conducted in order to ensure that the entire line is continuous. The decision made by NPC in any defect as found by him shall be final and all the requirements must be complied by the contractor after receipt of official written communication before a Certificate of Final Completion of work is to be provided.

EW-2.9 MEASUREMENT OF PAYMENT

EW-2.9.1 Steel Poles

Measurement of payment for the supply and erection of steel poles shall be based on the length and type of poles erected including the following:

1. Pit excavation
2. Furnishing, backfilling and compacting of gravel and sand materials
3. Installation of structure grounding

Payment will be made at the contract unit price for the corresponding item under each length and type of poles in the Bill of Quantities. Payment thereof shall constitute the full compensation for furnishing all poles and labor necessary to complete the work.

EW-2.9.2 Structure Dressing

Measurement of payment for the supply and installation of structure dressings will be based on the quantity and type of structure dressing supplied and installed as shown on the bid drawings. Payment will be made at the unit bid price for corresponding items under each type of structure dressing supplied and installed as specified in the Bill of Quantities.

EW-2.9.3 Transformer Assemblies

Measurement of payment for the supply, installation and test of transformer assemblies will be based on the number and type of transformer assemblies supplied and installed as shown on the bid drawings. Payment will be made at the unit bid price for corresponding items under each type of transformer assembly supplied, installed and tested as specified in the Bill of Quantities.

EW-2.9.4 Guy and Anchor Assemblies

Measurement of payment for the supply and installation of guy and anchor assemblies will be based on the number of each type of assembly supplied and installed as shown on the bid drawings. Payment will be made at the unit bid price for each type of guy and anchor assembly supplied and installed as specified in the Bill of Quantities.

EW-2.9.5 Secondary and Miscellaneous Assemblies

Measurement of payment for the supply and installation of secondary and miscellaneous assemblies will be based on the number of each type of assembly supplied and installed as shown on the bid drawings. Payment will be made at the unit bid price for each type of secondary and miscellaneous assembly supplied and installed as specified in the Bill of Quantities.

EW-2.9.6 Conductors

Measurement of payment for the supply, installation and test of conductor will be based on the linear kilometer of conductor supplied and installed as shown on the bid drawings or as otherwise directed. Payment will be made at the unit

bid price for each type of conductor supplied, installed and tested as specified in the Bill of Quantities. No separate payment for compression joints, allowances for increased length due to sags or difference of elevation of wire supports, and the cost thereof shall be included in the unit bid price per kilometer of conductor installed.

EW-2.9.7 Household Connection Materials

Measurement of payment for the supply, installation and test of Household Connection Materials will be based on the quantity of each material supplied, installed and tested as shown in the bid drawings or as otherwise directed. Payment will be made at the unit bid price for each item under Household Connection Materials in the Bill of Quantities.

PART II – TECHNICAL DATA SHEETS

ELECTRICAL WORKS

EW-2: DISTRIBUTION LINE

A. General

The Bidder is required to provide all the information required under the Column "Contractor's Data". Although not given by NPC, the Contractor's Data shall be based on the International Standards

NPC requirements are indicated below. The Contractor shall indicate their data corresponding to the said NPC requirements to facilitate evaluation of Contractor's compliance to the specifications.

Non compliance to the technical requirements including manufacturer's experience less than what is required shall be ground for disqualification

B. Technical Data and Requirements

B.1 Distribution Transformer

	NPC Requirements	Contractor's Data
1. Manufacturer	By Contractor	_____
2. Place of manufacture	By Contractor	_____
3. Type	Completely self-protected pole mounted transformer	_____
4. Continuous rated output at 65°C temperature rise, kVA	15 & 5	_____
5. Number of phase	1	_____
6. Rated operating frequency, Hz	60	_____
7. Type of cooling	OA	_____
8. Insulation	Mineral Oil with its electrical and chemical characteristics is Polychlorinated Biphenyls (PCB) free	_____

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	NPC Requirements	Contractor's Data
9. Impedance, %Z	2, ±10%	
10. Audible sound level, dB	< 48	
11. Bushing material	Porcelain	
12. Number of primary bushing	1	
13. Winding material	100% copper	
14. Polarity	Additive	
15. Insulation level:		
a. Rated operating voltage, kV:		
▪ H-winding	15	
▪ X-winding	1.2	
b. Nominal operating voltage, kV:		
▪ H-winding	7.62	
▪ X-winding	0.24	
c. Basic insulation level (BIL), kV:		
▪ H-winding	95	
▪ X-winding	30	
16. Taps changer	Yes, no-load	
17. Taps:		
▪ H-winding	±2x2.5%	
▪ X-winding	N/A	
18. No-load and load losses	Not more than 10% of the manufacturer's specified value	
19. Total losses	Not more than 6% of the manufacturer's specified value	

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	NPC Requirements	Contractor's Data
20. Test requirement:		
a. Design and Routine Test Reports	Yes	
21. Transformer oil analysis /certification to be provided before shipping (yes, no)	Yes	
22. Manufacturer's experience		
a. The manufacturer should have been in the business of manufacturing the conductor for not less than: years	10	
b. The materials offered should have been in the actual service for not less than: years	5	
23. Total weight, kg	By Contractor	
24. Weight of oil, kg	By Contractor	
25. Accessories as specified in EW-2.3.6	To be provided	

B.2 Fuse cutouts with Lightning Arrester Combination

	NPC Requirements	Contractor's Data
1. Manufacturer	By Contractor	
2. Place of manufacture	By Contractor	
3. Fuse cutout type	Open drop-out and expulsion fuse cut out	
4. Rated operating voltage, kV	15	
5. Nominal operating voltage, kV	13.8	
6. Rated frequency, Hz	60	
7. Basic insulation level (BIL), kV	110	

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	NPC Requirements	Contractor's Data
8. Fuse link		
a. Type	Universal button-head, type k	
b. Continuous rating, A	Refer to staking sheets	
c. Interrupting rating, kA	8	
9. Lightning arrester:		
a. Type	Metal oxide varistor, gap less	
b. Material	Porcelain	
c. Creepage length, mm	≥465	
d. Duty cycle voltage rating, kV	12	
e. Maximum continuous operation voltage (MCOV), kV	10.2	
f. Basic insulation level (BIL), kV	110	
10. Mounting brackets, connectors, bolts, nuts, and other accessories	Included	
B.3 Primary Conductor		
1. Manufacturer	By Contractor	
2. Place of Manufacture	By Contractor	
3. Type	1/0 AWG ACSR	
4. Code Word	"Raven"	
5. Total Cross-sectional area, mm ²	62.44 (approx.)	
6. Outer Layers:		
a. Material	Aluminium	

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	NPC Requirements	Contractor's Data
b. Cross sectional area, mm ²	53.52	
c. Stranding No./dia., mm	6 / 3.37	
7. Core:		
a. Material	Steel	
b. Cross sectional area, mm ²	8.92 (approx.)	
c. Stranding No./dia., mm	1 / 3.37	
8. Conductor overall diameter, mm	9.35 (approx.)	
9. Ultimate Breaking Strength, kN	19.04 (approx.)	
10. Rated DC Resistance at 20°, Ω/km	0.5343 (approx.)	
11. Weight of Conductor, kg/m	0.216 (approx.)	
12. Test Requirements:		
a. Stress –Strain Test and Report Required	Yes	
b. Breaking Strength test and Report Required	Yes	
c. Certified Stress-Strain Test Reports on a Cable identical to the specified conductor are acceptable	Yes	
13. Manufacturer's Experience:		
a. The manufacturer should have been in the business of manufacturing the conductor for not less than: years	10	
b. The materials offered should have been in the actual service for not less than: years	5	

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B.6 Household Connection Materials

	NPC Requirements	Contractor's Data
B.6.1. Service Drop Wire		
1. Manufacturer	By Contractor	
2. Place of Manufacture	By Contractor	
3. Type	#6 AWG Duplex	
4. Phase conductor		
a. Material	Aluminium	
b. Stranding no.	7 Al	
c. Insulation	Yes, black polyethylene (PE)	
5. Bare Neutral Messenger		
a. Material		
▪ Outer layers	Aluminium	
▪ Inner core	Steel	
b. Size AWG	2	
c. Stranding no.	6-Al / 1-Steel	
d. Breaking strength, lbs	≥2835	

B.6.2. Kilowatt-hour Demand Meter

	NPC Requirements	Contractor's Data
1. Manufacturer	By Contractor	
2. Place of Manufacture	By Contractor	
3. Accuracy Class	0.3 or better	
4. No. of Phase / Wire	1 / 2	
5. Voltage, V	230	
6. Current Range	10 (30)	

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7. Frequency, Hz	60	
8. Enclosure degree of protection	IP54	
9. Cable entrance	Bottom	
10. Tamper proof	Yes	
11. Access for maintenance testing	Front access	
12. LCD display	kWh, kW, current, voltage	
13. The Kilowatt-hour meter to be provided is certified and approved by ERC	Yes	

B.6.3. Overcurrent Protective Device

	NPC Requirements	Contractor's Data
1. Manufacturer	By Contractor	
2. Place of Manufacture	By Contractor	
3. Type	Enclosed Circuit Breaker	
4. Rated voltage, V	600	
5. No of phase	1	
6. Ampere trip rating	20AT	
7. Interrupting capacity, kA	10	

B.6.4. Lighting fixtures/luminaires

1. Manufacturer	By Contractor	
2. Place of Manufacture	By Contractor	
3. Type	Compact LED lamp	
4. Wattage, W	9	
5. Color	Cool white	
6. Efficacy, lm/W	60 - 92	

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7. Lumens, lm	<u>≥850</u>	
8. Socket base	<u>E27</u>	

B.6.5. Household Wirings

	NPC Requirements	Contractor's Data
1. Manufacturer	<u>By Contractor</u>	
2. Place of Manufacture	<u>By Contractor</u>	
3. Feeder conductor		
▪ Type	<u>THHN / THWN-2</u>	
▪ Size, mm ²	<u>8.0</u>	
▪ Operating temperature, °C	<u>90</u>	
▪ Ampacity	<u>By Contractor</u>	
▪ Material	<u>Stranded Copper</u>	
4. Branch circuit conductor		
▪ Type	<u>PDX</u>	
▪ Size, mm ²	<u>3.5</u>	
▪ Operating temperature, °C	<u>90</u>	
▪ Ampacity	<u>By Contractor</u>	
▪ Material	<u>Stranded Copper</u>	

B.7 Steel Pole

	NPC Requirements	Contractor's Data
1. Structural grade of steel used	<u>ASTM A572 grade 50ksi (345 MPa)</u>	
2. Number of pole sections	<u>1 (not segmented)</u>	
3. Pole shape	<u>Octagonal</u>	

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	NPC Requirements	Contractor's Data
4. Welding method of processing steel pole	Submerged-Arc Welding and Automatic Shielded Inert Gas Metal- Arched Welding (SIGMA)	_____
5. Pole marking	According to CW-2.1.3.9	_____
6. Test requirements:		
a. According to CW-2.1.4.4	Yes	_____
b. Steel Pole Full Scale Test required in the presence of NPC Design Engineers	Yes	_____
c. Required number of NPC's personnel to witness tests.	Three (3)	_____
7. Manufacturer's Experience:		
a. Name of manufacturer	By Contractor	_____
b. Country of origin	By Contractor	_____
c. Manufacturing experience of similar Steel Poles for not less than: years	5	_____

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SECTION VII

BILL OF QUANTITIES



SECTION VII - BILL OF QUANTITIES

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**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.1	7.97/13.8KV DISTRIBUTION LINE						
1.1.1	Right of Way	Clearing & Grubbing	NPC Tech Specs & Drawings	mtrs	1400	(P _____)	(P _____)
1.2	7.97/13.8KV STEEL POLES WITH UNIVERSAL HOLES, GROUNDING CLAMP, AND GUYING ATTACHMENT FOR DIFFERENT TYPE OF STRUCTURES						
1.2.1	25 Footer Secondary Steel Poles						
	Type "Qs"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	2	(P _____)	(P _____)
1.2.2	35 Footer Single Phase Steel Poles						
	Type "QNA"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	4	(P _____)	(P _____)
1.2.3	30 Footer Single Phase Steel Poles						
	Type "QNA"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	pole	1	(P _____)	(P _____)
	Type "RNA"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	pole	1	(P _____)	(P _____)
1.2.4	40 Footer Two or V Phase Steel Poles						
	Type "QNB"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	2	(P _____)	(P _____)
	Type "RNB"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	2	(P _____)	(P _____)

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SECTION VII - BILL OF QUANTITIES

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**PART VII - BILL OF QUANTITIES
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Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price In Pesos (Words and Figures)	Total Amount (In Figures)
1.2.5	35 Footer Two or V Phase Steel Poles						
	Type "QNB"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	2	(P _____)	(P _____)
	Type "RNB"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	pole	1	(P _____)	(P _____)
1.2.6	35 Footer Three Phase Steel Poles						
	Type "QNC"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	2	(P _____)	(P _____)
	Type "RNC"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	7	(P _____)	(P _____)
1.2.7	40 Footer Three Phase Steel Poles						
	Type "QNC"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	3	(P _____)	(P _____)
	Type "TNC"	Supply, Delivery & Erection	NPC Tech Specs & Drawings	poles	1	(P _____)	(P _____)
1.3	STEEL POLE STRUCTURE DRESSING						
1.3.1	Type "NA1 (A1)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structures	5	(P _____)	(P _____)
1.3.2	Type "NA2 (A2)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structures	1	(P _____)	(P _____)
1.3.3	Type "NB1 (B1)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structures	4	(P _____)	(P _____)

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**PART VII - BILL OF QUANTITIES
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Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price In Pesos (Words and Figures)	Total Amount (In Figures)
1.3.4	Type "NB2 (B2)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structure	3	(P_____)	(P_____)
1.3.5	Type "NB7 (B7)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structure	1	(P_____)	(P_____)
1.3.6	Type "NC1 (C1)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structures	4	(P_____)	(P_____)
1.3.7	Type "NC2 (C2)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structures	7	(P_____)	(P_____)
1.3.8	Type "NC7 (C7)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structure	1	(P_____)	(P_____)
1.3.9	Type "NC7-2 (C7-2)"	Supply, Delivery & Installation	NPC Tech Specs & Drawings	structure	1	(P_____)	(P_____)
1.4	GUYING, ANCHOR, TRANSFORMER, SECONDARY AND MISCELLANEOUS ASSEMBLY						
1.4.1	Type "NE1-2A (E1-2A)" Guying Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	12	(P_____)	(P_____)
1.4.2	Type "NF2-2A (F2-2A)" Anchor Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	12	(P_____)	(P_____)
1.4.3	Type "NG12-1 (G12-1)" 5kVA Transformer Assembly	Supply, Delivery, Installation & Test	NPC Tech Specs & Drawings	assy	1	(P_____)	(P_____)
1.4.4	Type "NG12-2 (G12-2)" 15kVA Transformer Assembly	Supply, Delivery, Installation & Test	NPC Tech Specs & Drawings	assy	1	(P_____)	(P_____)

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**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.4.5	Type "NG12-3 (G12-3)" 15kVA Transformer Assembly	Supply, Delivery, Installation & Test	NPC Tech Specs & Drawings	assy	1	(P_____)	(P_____)
1.4.6	Type "NJ5 (J5)" Secondary Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	11	(P_____)	(P_____)
1.4.7	Type "NJ10 (J10)" Secondary Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	4	(P_____)	(P_____)
1.4.8	Type "NJ15A (J15A)" Secondary Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	3	(P_____)	(P_____)
1.4.9	Type "NM2-11 (M2-11)" Miscellaneous Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	3	(P_____)	(P_____)
1.4.10	Type "NM2-11A (M2-11A)" Miscellaneous Assembly	Supply, Delivery & Installation	NPC Tech Specs & Drawings	assy	13	(P_____)	(P_____)
1.5	PRIMARY CONDUCTOR, #1/0 AWG ACSR, 6-AI./1-Stl. STANDING, 0.398" DIA. 4280 LBS (UTS)	Supply, Delivery, String & Test	NPC Tech Specs & Drawings	mtrs	2500	(P_____)	(P_____)
1.6	NEUTRAL CONDUCTOR, #1/0 AWG ACSR, 6-AI./1-Stl. STANDING, 0.398" DIA. 4280 LBS (UTS)	Supply, Delivery, String & Test	NPC Tech Specs & Drawings	mtrs	1100	(P_____)	(P_____)
1.7	DUPLEX WIRE, 600V, #2 AWG, 7-AI. & 6-AI./1-Stl. STRANDING	Supply, Delivery, String & Test	NPC Tech Specs & Drawings	mtrs	1150	(P_____)	(P_____)
1.8	COMPRESSION CONNECTOR FOR PRIMARY CONDUCTOR	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	10	(P_____)	(P_____)
1.9	COMPRESSION CONNECTOR FOR NEUTRAL/SECONDARY CONDUCTOR	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	10	(P_____)	(P_____)

Name of Firm

Name and Signature of Authorized Representative

Designation

SECTION VII - BILL OF QUANTITIES

MinP21Z1354Sdg

**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.10	FUSE LINKS FOR FUSE CUTOUTS						
1.10.1	Fuse link, 6 Amps	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	2	(P_____)	(P_____)
1.10.2	Fuse link, 2 Amps	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	1	(P_____)	(P_____)
1.11	HOUSEHOLD CONNECTION MATERIALS						
1.11.1	Electronic/Digital Kilowatt-Hour Meter, Outdoor Type, 1-Phase, 230V, 10(30)AT with ERC Approval	Supply, Delivery, Installation & Test	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)
1.11.2	Duplex Wire, #6 AWG, 7-Al. & 6-Al/1-Stl. Stranding	Supply, Delivery, Installation & Test	NPC Tech Specs & Drawings	mtrs	6250	(P_____)	(P_____)
1.11.3	Service Entrance Cap, Weather-Proof Type, 3/4" Diameter with Locknut and Bushings	Supply, Delivery, & Installation	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)
1.11.4	Rigid Steel Conduit (RSC), 3/4" Diameter x 10' long with eigth (8) Pieces C-Clamp (Galvanized Iron with Screw), Locknut, Elbow, and Bushings	Supply, Delivery, & Installation	NPC Tech Specs & Drawings	sets	250	(P_____)	(P_____)
1.11.5	8mm² 600V THHN/THWN-2 Copper Wire For Service Entrance	Supply & Delivery & Lay	NPC Tech Specs & Drawings	mtrs	1750	(P_____)	(P_____)
1.11.6	3.5mm² (#12) PDX Wire For Household Wiring	Supply & Delivery & Lay	NPC Tech Specs & Drawings	mtrs	7500	(P_____)	(P_____)
1.11.7	20AT, 2-Pole, Single-Phase Miniature Circuit Breaker (MCB) with Enclosure	Supply, Delivery Installation & Test	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)
1.11.8	Wire Holder, Universal Service Type No. 22	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)

Name of Firm

Name and Signature of Authorized Representative

Designation

SECTION VII - BILL OF QUANTITIES

MinP21Z1354Sdg

**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.11.9	Tapping Connector, Compression-Type for No. #2 AWG to #6 AWG	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	500	(P_____)	(P_____)
1.11.10	Electrical Tape, Big	Supply & Delivery	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)
1.11.11	9Watts Cool White LED Bulb, E27 Basem complete with the required accessories	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	500	(P_____)	(P_____)
1.11.12	Surface Mounted Outlet, Duplex, 240V, 1-phase	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	250	(P_____)	(P_____)
1.11.13	Surface Mounted 1 Gang Switch, 240V, 1-phase	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	500	(P_____)	(P_____)
1.11.14	PVC Octagonal utility box complete with the required mounting accessories, cover, etc.	Supply, Delivery & Installation	NPC Tech Specs & Drawings	pcs	500	(P_____)	(P_____)
1.11.15	Insulated Staple Wire	Supply & Delivery	NPC Tech Specs & Drawings	box (100 pcs.)	125	(P_____)	(P_____)
1.12	LINEMAN'S TOOLS						
1.12.1	Climber Set, Complete With Post Belt and Body Belt	Supply & Delivery	NPC's Technical specifications	set	1	(P_____)	(P_____)
1.12.2	Disconnect Tools (Hot Stick), 20 kV, Telescopic, Heavy Duty, 30' Extended Length	Supply & Delivery	NPC's Technical specifications	pc	1	(P_____)	(P_____)
1.12.3	Lineman's Gloves, Pair, Insulated	Supply & Delivery	NPC's Technical specifications	pairs	2	(P_____)	(P_____)
1.12.4	Pliers, Heavy Duty, Electrical, 10" long	Supply & Delivery	NPC's Technical specifications	pc	1	(P_____)	(P_____)

Name of Firm

Name and Signature of Authorized Representative

Designation

SECTION VII - BILL OF QUANTITIES

MinP21Z1354Sdg

**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.12.5	Compression Connector Tools, Burndy	Supply & Delivery	NPC's Technical specifications	set	1	(P _____)	(P _____)
1.12.6	Wrench, Adjustable, 12"	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.7	Coffing Hoist, Ratchet Type, 1.5 tons	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.8	Sledge hammer, 10 lbs.	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.9	Hammer, Claw, Heavy Duty	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.10	Cutter, Bolt, Heavy Duty, 36"	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.11	Wire Grip, Suitable for #2 AWG ACSR to 4/0 AWG ACSR	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.12	Shotgun Stick 20 kV, 10' Long	Supply & Delivery	NPC's Technical specifications	pc	1	(P _____)	(P _____)
1.12.13	Pulley with Rope, Plastic, 1/2" x 75'	Supply & Delivery	NPC's Technical specifications	set	1	(P _____)	(P _____)
1.12.14	Double Pulley with Rope, Plastic	Supply & Delivery	NPC's Technical specifications	set	1	(P _____)	(P _____)
1.12.15	Sling, Webbing, 2" Width, 6' Length, Return Eye, Type (Eye Length: 4" Approx.)	Supply & Delivery	NPC's Technical specifications	set	1	(P _____)	(P _____)
1.12.16	Clampstick, Grip-all, Hinged Style, Folded: 8' 4", Extended: 1-1/4 x 16'6"	Supply & Delivery	NPC's Technical specifications	set	1	(P _____)	(P _____)

Name of Firm

Name and Signature of Authorized Representative

Designation

**PART VII - BILL OF QUANTITIES
LANAWAN, TABUAN LASA, BASILAN**

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price In Pesos (Words and Figures)	Total Amount (In Figures)
1.12.17	Cluster, Grounding, C-type Grounding Clamps, Aluminum Body, Smooth Jaw, Bronze Eye-Screw with ACME Thread, 1/0 Copper Ground Cable, 6'	Supply & Delivery	NPC's Technical specifications	set	1	(P_____)	(P_____)
1.12.18	Cluster, Grounding, C-type Grounding Clamps, Aluminum Body, Smooth Jaw, Bronze Eye-Screw with ACME Thread, 1/0 Copper Ground Cable, 10'	Supply & Delivery	NPC's Technical specifications	set	1	(P_____)	(P_____)
1.12.19	Fuse link, 6 Amps (Spare)	Supply & Delivery	NPC Tech Specs & Drawings	pcs	2	(P_____)	(P_____)
1.12.20	Fuse link, 2 Amps (Spare)	Supply & Delivery	NPC Tech Specs & Drawings	pcs	1	(P_____)	(P_____)
2.1	STEEL POLE CONCRETE ENCASEMENT						
2.1.1	Structural Excavation	excavate, stockpile & dispose	Refer to NPC TS & Drawing	cu.m.	84	(P_____)	(P_____)
2.1.2	Sand and Gravel Bedding	furnish, palce & spread	Refer to NPC TS & Drawing	cu.m.	5	(P_____)	(P_____)
2.1.3	Concrete 3000psi (20.7 Mpa)	furnish, place & vibrate	Refer to NPC TS & Drawing	cu.m.	84	(P_____)	(P_____)
2.1.4	Reinforcing Steel Bars (Gr. 275)	furnish, cut, bend, schedule & install	Refer to NPC TS & Drawing	kg.	1612	(P_____)	(P_____)
	TOTAL AMOUNT OF BID					(P_____)	(P_____)

Name of Firm

Name and Signature of Authorized Representative

Designation

SECTION VIII

BIDDING FORMS



SECTION VIII – BIDDING FORMS

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NPCSF-INFR-12	-	List of Equipment, Owned or Leased and/or under Purchase Agreement, Pledged to the Proposed Project
NPCSF-INFR-13	-	Bid Letter
NPCSF-INFR-14	-	Detailed Cost Estimate Form
NPCSF-INFR-15	-	Summary Sheets of Materials Prices, Labor Rates and Equipment Rental Rates

Standard Form No: NPCSF-INFR-01

Checklist of Technical & Financial Envelope Requirements for Bidders**A. THE 1ST ENVELOPE (TECHNICAL COMPONENT) SHALL CONTAIN THE FOLLOWING:****1. ELIGIBILITY DOCUMENTS****a. (CLASS A)**

➤ Any of the following:

- PhilGEPS Certificate of Registration and Membership under Platinum Category in accordance with Section 8.5.2 of the IRR;

OR:

- The following updated and valid Class "A" eligibility documents enumerated under "Annex A" of the Platinum Membership:

- Registration Certificate from the Securities and Exchange Commission (SEC) for corporations, Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives;
- Mayor's/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.

In cases of recently expired Mayor's/Business permits, it shall be accepted together with the official receipt as proof that the bidder has applied for renewal within the period prescribed by the concerned local government unit, provided that the renewed permit shall be submitted as a post qualification requirement in accordance with Section 34.2 of the Revised IRR of RA 9184.

- 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.
- Tax clearance per Executive Order 398, Series of 2005, as finally reviewed and approved by the BIR;
- Valid Philippine Contractors Accreditation Board (PCAB) license and registration for the type and cost of the contract for this Project or Special PCAB License in case of Joint Ventures.

OR:

- A combination thereof.

➤ Statement of all its ongoing government and private contracts if any, whether similar or not similar in nature and complexity to the contract to be bid (*NPCSF-INFR-02*)➤ The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, and whose value, adjusted to current prices using the Philippine Statistics Authority (PSA) consumer price index, must be at least 50% of the ABC (*NPCSF-INFR-03*) complete with the following supporting documents:

- Contract
- Owner's Certificate of Final Acceptance issued by the project owner other than the contractor or a final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES). In case of contracts with the private sector, an equivalent document (Ex. Official Receipt or Sales Invoice) shall be submitted

SECTION VIII – BIDDING FORMS

Standard Form No: NPCSF-INFR-01
Page 2 of 3

(The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process.

It shall be a ground for disqualification, if verification and validation cannot be conducted due to inaccessibility of the site for whatever reason or fault of the bidder.)

- Special PCAB License in case of Joint Ventures
- Duly signed computation of its Net Financial Contracting Capacity (NFCC) at least equal to the ABC (NPCSF-INFR-04);

b. (CLASS B)

- Valid Joint Venture Agreement, if applicable (NPCSF-INFR-05)

2. Technical Documents

- Bid Security, any one of the following:
 - Bid Securing Declaration (NPCSF-INFR-06c)
OR
 - Cash or Cashier's/Manager's check issued by a Universal or Commercial Bank – 2% of ABC;
OR
 - Bank draft/guarantee or irrevocable letter of credit issued by a Universal or Commercial Bank: (NPCSF-INFR-06a) - 2% of ABC;
OR
 - Surety Bond callable upon demand issued by a reputable surety or insurance company (NPCSF-INFR-06b) - 5% of ABC, with
 - Certification from the Insurance Commission as authorized company to issue surety
- Duly signed, completely filled-out and notarized Omnibus Sworn statement (Revised) (NPCSF-INFR-07), complete with the following attachments:
 - For Sole Proprietorship:
 - Special Power of Attorney
 - For Partnership/Corporation/Cooperative/Joint Venture:
 - Document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)
- Organization Chart for the project (NPCSF-INFR-08)
- Duly Signed List of Contractor's Key Personnel (based on the minimum key personnel) with complete supporting documents (NPCSF-INFR-09, 10a, 10b & 11)
- Duly Signed List of Contractor's Equipment (owned, leased or under purchase agreement (NPCSF-INFR-12), with
 - Proof of ownership and/or certificate of availability issued by Equipment Lessors

SECTION VIII – BIDDING FORMS

Standard Form No: NPCSF-INFR-01
Page 3 of 3

- Documents to be submitted with the Bid Proposal as specified in Clause CW-2.1.5 of Section VI – Civil Works (CW)
- Complete eligibility documents of proposed sub-contractor, if applicable

B. THE 2ND ENVELOPE (FINANCIAL COMPONENT) SHALL CONTAIN THE FOLLOWING:

- Duly signed Bid Letter indicating the total bid amount in accordance with the prescribed form (NPCSF-INFR-13)
- Duly signed and completely filled-out Bill of Quantities (Section VII) indicating the unit and total prices per item and the total amount in the prescribed Bill of Quantities form.
- Duly Signed Detailed Estimates for each items of work showing the computations in arriving at each item's unit prices used in coming up with the bid (NPCSF-INFR-14)
- Summary sheets indicating the direct unit prices of construction materials, labor rates and equipment rental rates used in coming up with the bid (NPCSF-INFR-15)

CONDITIONS:

1. *Each Bidder shall submit one copy of the first and second components of its Bid. NPC 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.*
2. *A Bidder not submitting bid for reason that his cost estimate is higher than the ABC, is required to submit his letter of non-participation/regret supported by corresponding detailed estimates. Failure to submit the two (2) documents shall be understood as acts that tend to defeat the purpose of public bidding without valid reason as stated under Section 69.1.(i) of the revised IRR of R.A. 9184.*

Standard Form Number: NPCSF-INFR-03

The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid

Business Name : _____
Business Address : _____

Name of Contract	a. Owner's Name b. Address c. Telephone Nos.	Nature of Work	Contractor's Role		a. Amount at Award b. Amount at Completion c. Duration	a. Date Awarded b. Contract Effectivity c. Date Completed
			Description	%		

- Notes: 1. The bidder must state only one (1) Single Largest Completed Contract (SLCC) similar to the contract to be bid.
2. Supporting documents such as Contract/Purchase Order and any of the following: Owner's Certificate of Final Acceptance issued by the project owner other than the contractor; or A final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES); or Official Receipt (O.R); or Sales Invoice for the contract stated above shall be submitted during Bid Opening.

Submitted by _____
(Printed Name & Signature)
Designation : _____
Date : _____

Standard Form Number: NPCSF-INFR-04

NET FINANCIAL CONTRACTING CAPACITY (NFCC)

A. Summary of the Bidder's/Contractor's assets and liabilities on the basis of the income tax return and audited financial statement for the immediately preceding calendar year are:

		Year 20__
1.	Total Assets	
2.	Current Assets	
3.	Total Liabilities	
4.	Current Liabilities	
5.	Net Worth (1-3)	
6.	Net Working Capital (2-4)	

B. The Net Financial Contracting Capacity (NFCC) based on the above data is computed as follows:

NFCC = [(Current assets minus current liabilities) x 15] minus the value of all outstanding or uncompleted portions of the projects under ongoing contracts, including awarded contracts yet to be started coinciding with the contract for this Project.

NFCC = P _____

Herewith attached is certified true copy of the audited financial statement, stamped "RECEIVED" by the BIR or BIR authorized collecting agent for the immediately preceding calendar year.

Submitted by:

Name of Bidder/Contractor

Signature of Authorized Representative

Date : _____

Standard Form Number: NPCSF-INFR-05

JOINT VENTURE AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

That this JOINT VENTURE AGREEMENT is entered into by and between: _____, of legal age, *(civil status)* _____, authorized representative of _____ and a resident of _____.

- and -

_____ of legal age, *(civil status)* _____, authorized representative of _____ a resident of _____.

That both parties agree to join together their capital, manpower, equipment, and other resources and efforts to enable the Joint Venture to participate in the Bidding and Undertaking of the hereunder stated Contract of the **National Power Corporation**.

NAME OF PROJECT

CONTRACT AMOUNT

That the capital contribution of each member firm:

NAME OF FIRM	CAPITAL CONTRIBUTION
1.	P
2.	P

That both parties agree to be jointly and severally liable for their participation in the Bidding and Undertaking of the said contract.

That both parties agree that _____ and/or _____ shall be the Official Representative/s of the Joint Venture, and are granted full power and authority to do, execute and perform any and all acts necessary and/or to represent the Joint Venture in the Bidding and Undertaking of the said contract, as fully and effectively and the Joint Venture may do and if personally present with full power of substitution and revocation.

That this Joint Venture Agreement shall remain in effect only for the above stated Contract until terminated by both parties.

Name & Signature of Authorized Representative

Official Designation

Name of Firm

Name & Signature of Authorized Representative

Official Designation

Name of Firm

Witnesses

1. _____ 2. _____

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

Standard Form Number: NPCSF-INFR-06a

FORM OF BID SECURITY (BANK GUARANTEE)

WHEREAS, (Name of Bidder) (hereinafter called "the Bidder") has submitted his bid dated (Date) for the [name of project] (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We (Name of Bank) of (Name of Country) having our registered office at _____ (hereinafter called "the Bank" are bound unto National Power Corporation (hereinafter called "the Entity") in the sum of [amount in words & figures as prescribed in the bidding documents] for which payment well and truly to be made to the said Entity the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20____.

THE CONDITIONS of this obligation are that:

- 1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or
- 2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or
- 3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or
- 4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:
 - a) fails or refuses to execute the Contract; or
 - b) fails or refuses to submit the required valid JVA, if applicable; or
 - c) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

we undertake to pay to the Entity up to the above amount upon receipt of his first written demand, without the Entity having to substantiate its demand, provided that in his demand the Entity will note that the amount claimed by it is due to the occurrence of any one or combination of the four (4) conditions stated above.

The Guarantee will remain in force up to 120 days after the opening of bids or as it may be extended by the Entity, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

(Signature, Name and Address)

Standard Form Number: NPCSF-INFR-06b

FORM OF BID SECURITY (SURETY BOND)

BOND NO.: _____ DATE BOND EXECUTED: _____

By this bond, We (*Name of Bidder*) _____ (hereinafter called "the Principal") and (*Name of Surety*) _____ of (*Name of Country of Surety*) _____, authorized to transact business in the Philippines (hereinafter called "the Surety") are held and firmly bound unto National Power Corporation (hereinafter called "the Employer") as Obligee, in the sum of (*amount in words & figures as prescribed in the bidding documents*), callable on demand, for the payment of which sum, well and truly to be made, we, the said Principal and Surety bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

SEALED with our seals and dated this _____ day of _____ 20 _____

WHEREAS, the Principal has submitted a written Bid to the Employer dated the _____ day of _____ 20 _____, for the _____ (hereinafter called "the Bid").

NOW, THEREFORE, the conditions of this obligation are:

- 1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or
- 2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or
- 3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or
- 4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:
 - d) fails or refuses to execute the Contract; or
 - e) fails or refuses to submit the required valid JVA, if applicable; or
 - f) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

then this obligation shall remain in full force and effect, otherwise it shall be null and void.

PROVIDED HOWEVER, that the Surety shall not be:

- a) liable for a greater sum than the specified penalty of this bond, nor
- b) liable for a greater sum than the difference between the amount of the said Principal's Bid and the amount of the Bid that is accepted by the Employer.

Standard Form Number: NPCSF-INFR-06b
Page 2 of 2

This Surety executing this instrument hereby agrees that its obligation shall be valid for 120 calendar days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived.

PRINCIPAL _____ SURETY _____

SIGNATURE(S) _____ SIGNATURES(S) _____

NAME(S) AND TITLE(S) _____ NAME(S) _____

SEAL _____ SEAL _____

Standard Form No: NPCSF-INFR-06c

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

BID-SECURING DECLARATION
SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF
7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN-LASA, BASILAN (REV. 01)
MinP21Z1354Sdg

To: **National Power Corporation**
 BIR Road cor. Quezon Ave.
 Diliman, Quezon City

I/We¹, 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 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 R.A. 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;
 - (c) I am/we are declared as the bidder with the Lowest Calculated and Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/we have hereunto set my hand this ____ day of ____
 20____ at _____, Philippines.

*[Name and Signature of Bidder's Representative/
 Authorized Signatory] [Signatory's legal capacity]*
 Affiant

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

¹ Select one and delete the other. Adopt same instruction for similar terms throughout the document.

Standard Form No: NPCSF-INFR-07b

Omnibus Sworn Statement (Revised)**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

[Juraf]

[Format shall be based on the latest Rules on Notarial Practice]

Standard Form Number: NPCSF-INFR-08

CONTRACTOR'S ORGANIZATIONAL CHART FOR THE CONTRACT

Submit Copy of the Organizational Chart that the Contractor intends to use to execute the Contract if awarded to him. Indicate in the chart the names of the Project Manager, Project Engineer, Foreman and other Key Engineering Personnel.

Attach the required Proposed Organizational Chart for the Contract as stated above

NOTES:

1. *This organization chart should represent the "Contractor's Organization" required for the Project, and not the organizational chart of the entire firm.*
2. *Each such nominated engineer/key personnel shall comply with and submit duly accomplished forms NPCSF-INFR-10a, NPCSF-INFR-10b and NPCSF-INFR-11.*
3. *All these are required to be in the Technical Envelope of the Bidder.*

Standard Form Number: NPCSF-INFR-09

LIST OF KEY PERSONNEL PROPOSED TO BE ASSIGNED TO THE CONTRACT
(Based on the Minimum Key Personnel Required in the Bidding Documents)

Business Name: _____
Business: _____

	DESIGNATION				
1 Name					
2 Address					
3 Date of Birth					
4 Employed Since					
5 Experience					
6 Previous Employment					
7 Education					
8 PRC License					

Required Attachments:

1. Certificate of Employment, Bio Data and Construction Safety and Health Training Certificate of the Safety Officer
2. Certificate of Employment, Bio Data and valid PRC License of the (professional) personnel

Submitted by: _____
(Printed Name & Signature)

Designation: _____

Date: _____

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (based on the minimum key personnel required in the bidding documents) to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-10a

KEY PERSONNEL'S CERTIFICATE OF EMPLOYMENT (PROFESSIONAL PERSONNEL)

Issuance Date

THE PRESIDENT National Power Corporation BIR Road cor. Quezon Ave. Diliman, Quezon City

Dear Sir:

I am (Name of Nominee) a Licensed Engineer with Professional License No. issued on (date of issuance) at (place of issuance)

I hereby certify that (Name of Bidder) has engaged my services as (Designation) for the (Name of Project), if awarded to it.

As (Designation), I supervised the following completed projects similar to the contract under bidding:

Table with 4 columns: NAME OF PROJECT, OWNER, COST, DATE COMPLETED

At present, I am supervising the following projects:

Table with 4 columns: NAME OF PROJECT, OWNER, COST, DATE COMPLETED

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the National Power Corporation at least twenty one (21) days before the effective date of my separation.

As (Designation), I know I will have to stay in the job site all the time to supervise and manage the Contract works to the best of my ability, and aware that I am authorized to handle only one (1) contract at a time.

I do not allow the use of my name for the purpose of enabling the above-mentioned Contractor to qualify for the Contract without any firm commitment on my part to assume the post of (Designation) therefor, if the contract is awarded to him since I understand that to do so will be a sufficient ground for my disqualification as (Designation) in any future National Power Corporation bidding or employment with any Contractor doing business with the National Power Corporation.

(Name and Signature) AFFIANT

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-10b

**KEY PERSONNEL'S CERTIFICATE OF EMPLOYMENT
(CONSTRUCTION SAFETY AND HEALTH OFFICER)**

Issuance Date

THE PRESIDENT

National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

Dear Sir:

I am (Name of Nominee) an Construction Safety & Health Officer with Certificate No. _____ issued on (date of issuance) at (place of issuance).

I hereby certify that (Name of Bidder) has engaged my services as Construction Safety & Health Officer for the (Name of Project), if awarded to it.

I am the Construction Safety & Health Officer of the following completed projects similar to the contract under bidding:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED
_____	_____	_____	_____

At present, I am the Construction Safety & Health Officer of the following projects:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED
_____	_____	_____	_____

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the National Power Corporation at least twenty one (21) days before the effective date of my separation.

As Construction Safety & Health Officer, I know I will have to stay in the job site all the time and aware that I am authorized to handle only one (1) contract at a time.

I do not allow the use of my name for the purpose of enabling the above-mentioned Contractor to qualify for the Contract without any firm commitment on my part to assume the post of Construction Safety & Health Officer, if the contract is awarded to him since I understand that to do so will be a sufficient ground for my disqualification as Construction Safety & Health Officer in any future National Power Corporation bidding or employment with any Contractor doing business with the National Power Corporation.

(Name and Signature)
AFFIANT

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-11

**KEY PERSONNEL
(FORMAT OF BIO-DATA)**

Give the detailed information of the following personnel who are scheduled to be assigned as full-time field staff for the project. Fill up a form for each person.

- 1. Name : _____
- 2. Date of Birth : _____
- 3. Nationality : _____
- 4. Education and Degrees : _____
- 5. Specialty : _____
- 6. Registration : _____
- 7. Length of Service with the Firm : _____ Year from _____ (months) _____ (year)
To _____ (months) _____ (year)
- 8. Years of Experience : _____

9. If Item 7 is less than ten (10) years, give name and length of service with previous employers for a ten (10)-year period (attached additional sheet/s), if necessary:

<u>Name and Address of Employer</u>	<u>Length of Service</u>
_____	_____ year(s) from _____ to _____
_____	_____ year(s) from _____ to _____
_____	_____ year(s) from _____ to _____

10. Experience:

This should cover the past ten (10) years of experience. (Attached as many pages as necessary to show involvement of personnel in projects using the format below).

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-11
Page 2 of 2

- 1. Name : _____
- 2. Name and Address of Owner : _____
- 3. Name and Address of the Owner's Engineer (Consultant) : _____
- 4. Indicate the Features of Project (particulars of the project components and any other particular interest connected with the project): _____
- 5. Contract Amount Expressed in Philippine Currency : _____
- 6. Position : _____
- 7. Structures for which the employee was responsible : _____
- 8. Assignment Period : from _____ (months) _____ (years)
to _____ (months) _____ (years)

Name and Signature of Employee

It is hereby certified that the above personnel can be assigned to this project, if the contract is awarded to our company.

(Place and Date)

(The Authorized Representative)

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-12

LIST OF EQUIPMENT, OWNED OR LEASED AND/OR UNDER PURCHASE AGREEMENTS
(Based on the Minimum Equipment Required in the Bidding Documents)

Business Name: _____
Business: _____

Description	Model/Year	Capacity / Performance / Size	Plate No.	Motor No. / Body No.	Location	Condition	Proof of Ownership / Lessor or Vendor
A. Owned							
i.							
ii.							
iii.							
iv.							
v.							
B. Leased							
i.							
ii.							
iii.							
iv.							
v.							
C. Under Purchase Agreements							
i.							
ii.							
iii.							
iv.							
v.							

Submitted by: _____
(Printed Name & Signature)

Designation: _____

Date: _____

One of the requirements from the bidder to be included in its Technical Envelope is the list of its equipment units pledged for the contract to be bid, based on minimum equipment required in the bidding docs. which are owned (supported by proofs of ownership), leased, and/or under purchase agreements (with corresponding engine numbers, chassis numbers and/or serial numbers), supported by certification of availability of equipment from the equipment lessor/vendor for the duration of the project

Standard Form No. : NPCSF-INFR-13

BID LETTER

Date: _____

To: **THE PRESIDENT**
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

We, the undersigned, declare that:

(a) We have examined and have no reservation to the Bidding Documents, including Addenda, for the Contract **SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN-LASA, BASILAN (REV. 01) (MinP21Z1354Sdg)**.

(b) We offer to execute the Works for this Contract in accordance with the Bid Documents, Technical Specifications, General and Special Conditions of Contract accompanying this Bid;

The total price of our Bid, excluding any discounts offered below is: insert information _____;

The discounts offered and the methodology for their application are: insert information _____;

(c) Our Bid shall be valid for a period of insert number _____ days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) 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;

(e) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from the following eligible countries: insert information _____;

(f) 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;

(g) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the Funding Source;

(h) 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

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

- (j) 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 **SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN-LASA, BASILAN (REV. 01) (MinP21Z1354Sdg)** of the National Power Corporation.

- (k) We acknowledge that failure to sign each and every page of this Bid Letter, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____

In the capacity of: _____

Signed: _____

Duly authorized to sign the Bid for and on behalf of: _____

Date: _____

Standard Form No. : NPCSF-INFR-15

SUMMARY SHEETS OF MATERIALS PRICES, LABOR RATES AND EQUIPMENT RENTAL RATES

Name of Bidder : _____

I. Unit Prices of Materials

Materials Description	Unit	Unit Price
1.		
2.		
3.		
4.		
5.		
6.		
7.		

II. Manpower Hourly Rates

Designation	Rate/Hr.
1.	
2.	
3.	
4.	
5.	
6.	
7.	

III. Equipment Hourly Rental Rates

Equipment Description	Rental Rate/Hr.
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Name, Signature of Authorized Representative

Designation

SECTION IX

BID DRAWINGS



SECTION IX–BID DRAWINGS**EW– ELECTRICAL WORKS**

<u>DRAWING NO.</u>	<u>TITLE</u>
LanDL-BDE-04.001	Proposed Distribution Line Plan (1/4)
LanDL-BDE-04.002	Proposed Distribution Line Plan (2/4)
LanDL-BDE-04.003	Proposed Distribution Line Plan (3/4)
LanDL-BDE-04.004	Proposed Distribution Line Plan (4/4)
LanDL-BDE-04.005	7.97/13.8kV Distribution Line "Steel Pole" General Design Data
LanDL-BDE-04.006	7.97/13.8kV Distribution Line "Steel Pole" Standard Hole Location
LanDL-BDE-04.007	7.97/13.8kV Distribution Line "Steel Pole" Single Phase (A1 & A2)
LanDL-BDE-04.008	7.97/13.8kV Distribution Line "Steel Pole" Single Phase (A5, A5-2 & A5-3)
LanDL-BDE-04.009	7.97/13.8kV Distribution Line "Steel Pole" Three Phase (C1 & C2)
LanDL-BDE-04.010	7.97/13.8kV Distribution Line "Steel Pole" Three Phase (C7)
LanDL-BDE-04.011	7.97/13.8kV Distribution Line "Steel Pole" Three Phase (C7-2)
LanDL-BDE-04.012	7.97/13.8kv Distribution Line "Steel Pole" Two Phase (B1)
LanDL-BDE-04.013	7.97/13.8kv Distribution Line "Steel Pole" Two Phase (B2)



SECTION IX-BID DRAWINGS**EW- ELECTRICAL WORKS**

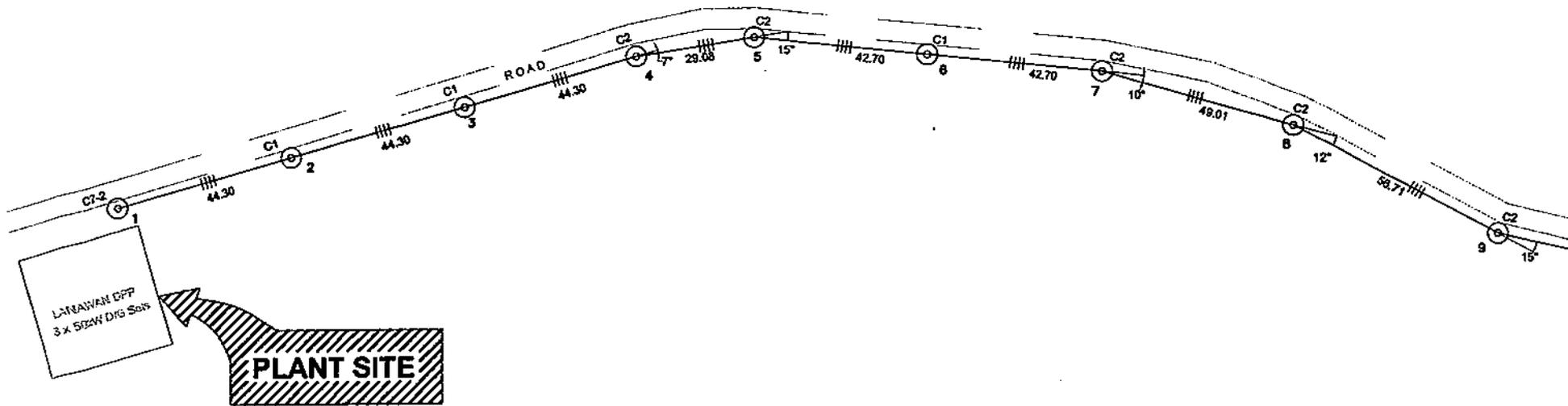
<u>DRAWING NO.</u>	<u>TITLE</u>
LanDL-BDE-04.014	7.97/13.8kv Distribution Line "Steel Pole" Two Phase (B7)
LanDL-BDE-04.015	7.97/13.8kV Distribution Line Truss Guy & Anchor Log Detail (E1-2A & F2-2A)
LanDL-BDE-04.016	7.97/13.8kV Distribution Line Miscellaneous Primary Assemblies (M5-1,M5-2,M5-5,M5-8,M5-10)
LanDL-BDE-04.017	7.97/13.8kV Distribution Line Miscellaneous Primary Assemblies (M5-2,M5-5,M5-11,M5-23)
LanDL-BDE-04.018	7.97/13.8kV Distribution Line Grounding Assembly (M2-11 & M2-11A)
LanDL-BDE-04.019	7.97/13.8kV Distribution Line Secondary Assemblies (J5, J7, J10, J15, J15A)
LanDL-BDE-04.020	7.97/13.8kV Distribution Line Single Phase Transformer (G12-1)
LanDL-BDE-04.021	7.97/13.8kV Distribution Line Single Phase Transformer (G12-2)
LanDL-BDE-04.022	7.97/13.8kV Distribution Line Single Phase Transformer (G12-3)
LanDL-BDE-04.023	7.97/13.8kV Distribution Line Material Specifications and Drawings (1/2)
LanDL-BDE-04.024	7.97/13.8kV Distribution Line Material Specifications and Drawings (2/2)



SECTION IX–BID DRAWINGS**EW– ELECTRICAL WORKS**

<u>DRAWING NO.</u>	<u>TITLE</u>
LanDL-BDE-04.025	7.97/13.8kV Distribution Line Tap Assembly Guide for ACSR Conductor
LanDL-BDE-04.026	7.97/13.8kV Distribution Line Preformed Armor Rods ACSR Conductors
LanDL-BDE-04.027	7.97/13.8kV Distribution Line Tying Guide, Single Insulator, Aluminum Alloy or Aluminum Tie Wire, ACSR Aluminum Alloy, Straight or Preformed Armor Rods (1/2)
LanDL-BDE-04.028	7.97/13.8kV Distribution Line Tying Guide, Single Insulator, Aluminum Alloy or Aluminum Tie Wire, ACSR Aluminum Alloy, Straight or Preformed Armor Rods (2/2)
LanDL-BDE-04.029	7.97/13.8kV Distribution Line Crossarm Drilling Guide
LanDL-BDE-04.030	7.97/13.8kV Distribution Line Typical Connection Diagram
LanDL-BDE-04.031	7.97/13.8kV Distribution Line Typical Service Drop Elevation and Details





NOTES:

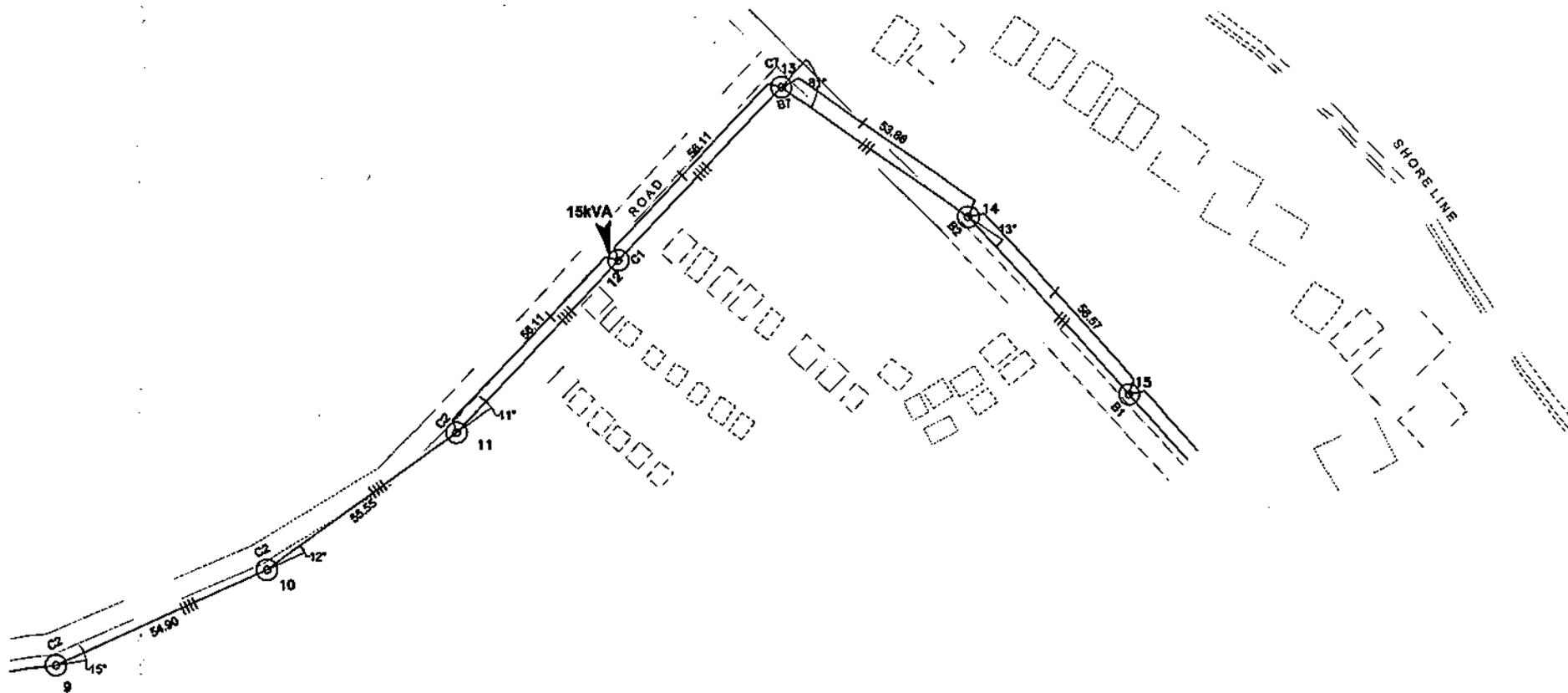
1. ALL DIMENSIONS/CLEARANCES AS SHOWN ARE IN METERS UNLESS OTHERWISE SPECIFIED
2. THE SUPPLIER SHALL BE REQUIRED TO CONDUCT AN ACTUAL SITE INSPECTION/SURVEY TO DETERMINE THE FULL EXTENT OF THE PROJECT
3. LOCATION OF DISTRIBUTION TRANSFORMERS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. ACTUAL LOCATIONS AND PHASE CONNECTION FOR LOAD BALANCING SHALL BE DETERMINED BY THE SUPPLIER OR AS PER INSTRUCTED/DIRECTED BY NPC'S FIELD REPRESENTATIVE TO SUIT ACTUAL SYSTEM REQUIREMENTS
4. NECESSARY CALCULATION SUCH AS LOAD BALANCING, VOLTAGE DROP, CONDUCTOR SAG, ETC. SHALL BE DONE BY THE SUPPLIER SUBJECT TO NPC'S REVIEW AND APPROVAL
5. POLE DESIGNATIONS/NUMBERINGS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. NEW POLE DESIGNATION/NUMBERING SHALL BE CONSISTENT WITH THE EXISTING POLE DESIGNATION/NUMBERING (IF ANY) OR AS PER DIRECTED/INSTRUCTED BY THE DISTRIBUTION LINE SYSTEM END-USER
6. ONLY THE SECTION OR SEGMENT OF THE LINE IDENTIFIED WITH UNDERBUILD AND OPEN-SECONDARY SHALL BE PROVIDED WITH 1-#2AWG INSULATED CABLE TO BE WRAPPED AROUND WITH THE PRIMARY NEUTRAL CONDUCTOR. ACTUAL LINE LENGTH OF THE SECONDARY CONDUCTOR SHALL BE DETERMINED AT SITE BASED ON THE ACTUAL SITE REQUIREMENTS. SEE ALSO "TYPICAL PRIMARY CONNECTION DRAWING FOR FURTHER REFERENCE"
7. SEE ALSO STAKING SHEET AND BILL OF QUANTITIES FOR FURTHER REFERENCE

LEGENDS:

- — POLE / NUMBER
- ∠ — DEFLECTION ANGLE
- THREE PHASE DISTRIBUTION LINE
- V-PHASE DISTRIBUTION LINE
- SINGLE PHASE DISTRIBUTION LINE
- |— UNDERBUILD
- |— OPEN SECONDARY
- ▶ — DISTRIBUTION TRANSFORMER
- — HOUSEHOLD
- ⊙ — EXISTING POLE STRUCTURE

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.27/12.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BAZILAN (Rev. 01)			
LOCATION: Lananan, Tabuan Lasa, Basilan			
TITLE:		PROPOSED DISTRIBUTION LINE PLAN (1/4)	
DESIGNED	BY	CHKD	DATE
DRAWN	LOG		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CHALKING			
ELEC.			
MECH.			
SUBMITTED:		 B. M. AGULA Electrical Engineer / E.E.C.C.	
RECOMMENDED:		 C. C. TUBOD JR. Electrical E.E.C.C.	
APPROVED:		 R. O. SOLIMAN Electrical E.E.C.C.	
DWG. NO. LanDL-BDE-04.001		SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS		BID DRAWING	
REV. 0			

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.



NOTES:

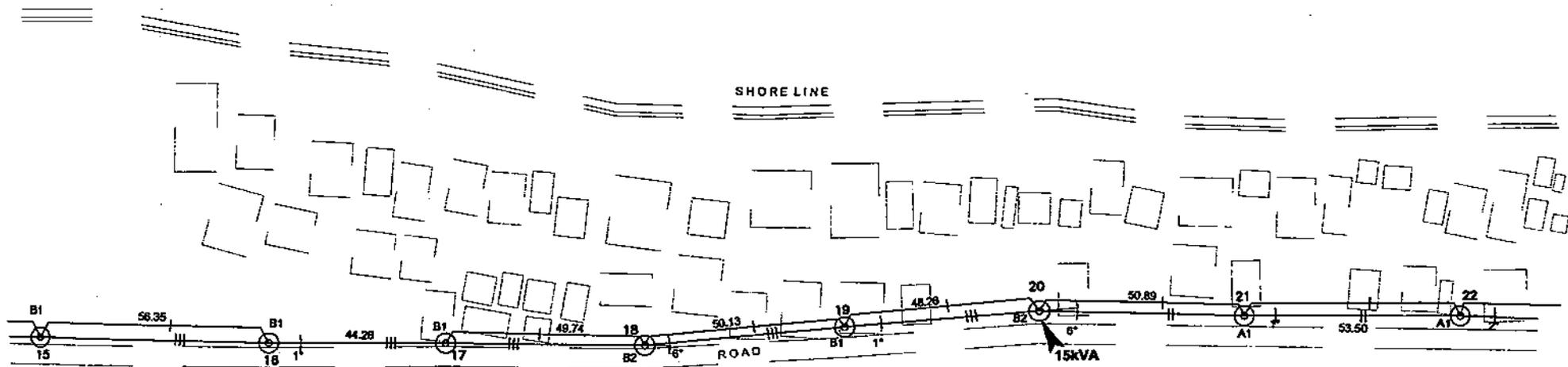
1. ALL DIMENSIONS/CLEARANCES AS SHOWN ARE IN METERS UNLESS OTHERWISE SPECIFIED
2. THE SUPPLIER SHALL BE REQUIRED TO CONDUCT AN ACTUAL SITE INSPECTION/SURVEY TO DETERMINE THE FULL EXTENT OF THE PROJECT
3. LOCATION OF DISTRIBUTION TRANSFORMERS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. ACTUAL LOCATIONS AND PHASE CONNECTION FOR LOAD BALANCING SHALL BE DETERMINED BY THE SUPPLIER OR AS PER INSTRUCTED/DIRECTED BY NPC'S FIELD REPRESENTATIVE TO SUIT ACTUAL SYSTEM REQUIREMENTS
4. NECESSARY CALCULATION SUCH AS LOAD BALANCING, VOLTAGE DROP, CONDUCTOR SAC, ETC. SHALL BE DONE BY THE SUPPLIER SUBJECT TO NPC'S REVIEW AND APPROVAL
5. POLE DESIGNATIONS/NUMBERINGS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. NEW POLE DESIGNATION/NUMBERING SHALL BE CONSISTENT WITH THE EXISTING POLE DESIGNATION/NUMBERING (IF ANY) OR AS PER DIRECTED/INSTRUCTED BY THE DISTRIBUTION LINE SYSTEM END-USER
6. ONLY THE SECTION OR SEGMENT OF THE LINE IDENTIFIED WITH UNDERBUILD AND OPEN-SECONDARY SHALL BE PROVIDED WITH 1-#2AWG INSULATED CABLE TO BE WRAPPED AROUND WITH THE PRIMARY NEUTRAL CONDUCTOR. ACTUAL LINE LENGTH OF THE SECONDARY CONDUCTOR SHALL BE DETERMINED AT SITE BASED ON THE ACTUAL SITE REQUIREMENTS. SEE ALSO "TYPICAL PRIMARY CONNECTION DRAWING FOR FURTHER REFERENCE"
7. SEE ALSO STAKING SHEET AND BILL OF QUANTITIES FOR FURTHER REFERENCE

LEGENDS:

- — POLE / NUMBER
- ∠ — DEFLECTION ANGLE
- THREE PHASE DISTRIBUTION LINE
- V-PHASE DISTRIBUTION LINE
- SINGLE PHASE DISTRIBUTION LINE
- |— UNDERBUILD
- |— OPEN SECONDARY
- ▶ — DISTRIBUTION TRANSFORMER
- — HOUSEHOLD
- ⊙ — EXISTING POLE STRUCTURE

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / RESTALLATION, TESTING AND COMMISSIONING OF 7.97/11.8KV DISTRIBUTION LINE AT LANAKAN, TABUAM LASA, BASSALAN (Rm. 61) LOCATION: Lamnan, Tabuam Lasa, Basalan	
TITLE: PROPOSED DISTRIBUTION LINE PLAN (2/4)	
DESIGNED: DRAWN: <i>198</i> REVIEWED: CIVIL/ARCHT: ELEC: MECH:	BY: CHKD: RECD: APPR:
SUBMITTER: <i>S. N. AGUILA</i> RECOMMENDER: <i>C. Z. C. LUGOD, JR.</i> APPROVED: <i>N. G. SORIANO</i> <small>Manager, E&C</small>	
DWG. NO. LanDL-BDE-04.002 SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS BID DRAWING REV. 0	



NOTES:

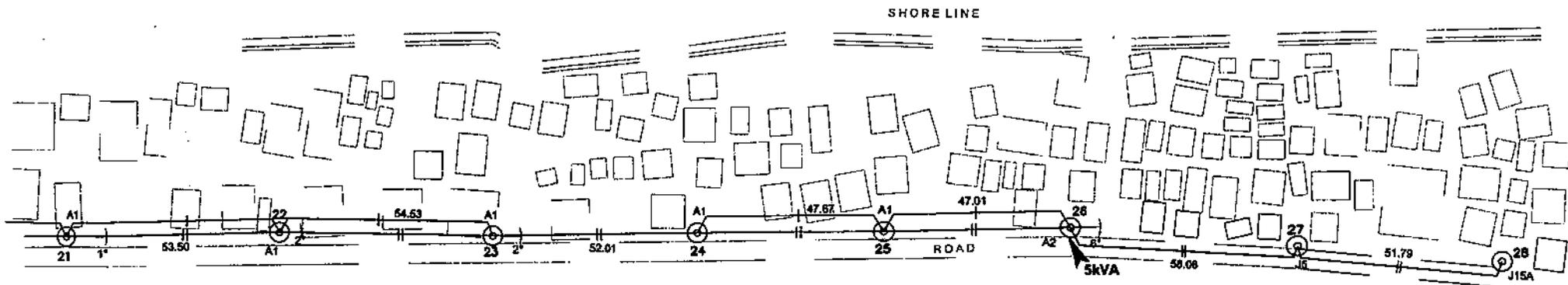
1. ALL DIMENSIONS/CLEARANCES AS SHOWN ARE IN METERS UNLESS OTHERWISE SPECIFIED
2. THE SUPPLIER SHALL BE REQUIRED TO CONDUCT AN ACTUAL SITE INSPECTION/SURVEY TO DETERMINE THE FULL EXTENT OF THE PROJECT
3. LOCATION OF DISTRIBUTION TRANSFORMERS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. ACTUAL LOCATIONS AND PHASE CONNECTION FOR LOAD BALANCING SHALL BE DETERMINED BY THE SUPPLIER OR AS PER INSTRUCTED/DIRECTED BY NPC'S FIELD REPRESENTATIVE TO SUIT ACTUAL SYSTEM REQUIREMENTS
4. NECESSARY CALCULATION SUCH AS LOAD BALANCING, VOLTAGE DROP, CONDUCTOR SAG, ETC. SHALL BE DONE BY THE SUPPLIER SUBJECT TO NPC'S REVIEW AND APPROVAL
5. POLE DESIGNATIONS/NUMBERINGS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. NEW POLE DESIGNATION/NUMBERING SHALL BE CONSISTENT WITH THE EXISTING POLE DESIGNATION/NUMBERING (IF ANY) OR AS PER DIRECTED/INSTRUCTED BY THE DISTRIBUTION LINE SYSTEM END-USER
6. ONLY THE SECTION OR SEGMENT OF THE LINE IDENTIFIED WITH UNDERBUILD AND OPEN-SECONDARY SHALL BE PROVIDED WITH 1-#2AWG INSULATED CABLE TO BE WRAPPED AROUND WITH THE PRIMARY NEUTRAL CONDUCTOR. ACTUAL LINE LENGTH OF THE SECONDARY CONDUCTOR SHALL BE DETERMINED AT SITE BASED ON THE ACTUAL SITE REQUIREMENTS. SEE ALSO TYPICAL PRIMARY CONNECTION DRAWING FOR FURTHER REFERENCE
7. SEE ALSO STAKING SHEET AND BILL OF QUANTITIES FOR FURTHER REFERENCE

LEGENDS:

- — POLE / NUMBER
- ∠ — DEFLECTION ANGLE
- THREE PHASE DISTRIBUTION LINE
- V-PHASE DISTRIBUTION LINE
- |—|— SINGLE PHASE DISTRIBUTION LINE
- |—|— UNDERBUILD
- |—|— OPEN SECONDARY
- ▶ — DISTRIBUTION TRANSFORMER
- — HOUSEHOLD
- ⊙ — EXISTING POLE STRUCTURE

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LAKAWAN, TABUAN LASA, BARILAN (Rev. 01)			
LOCATION: Lakawan, Tabuan Lasa, Barilan			
TITLE:		PROPOSED DISTRIBUTION LINE PLAN (3/4)	
DESIGNED	BY	CHKD.	DATE
DRAWN	6/7/16		
REVIEWED	PRINCIPAL ENGR./ ARCHT.	RECOMMENDED	
ENLARGED			
BLC.		APPROVED:	
BECL.			
DWG. NO. L&nDL-BDE-04.003		SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS		BID DRAWING REV. 0	



NOTES:

1. ALL DIMENSIONS/CLEARANCES AS SHOWN ARE IN METERS UNLESS OTHERWISE SPECIFIED
2. THE SUPPLIER SHALL BE REQUIRED TO CONDUCT AN ACTUAL SITE INSPECTION/SURVEY TO DETERMINE THE FULL EXTENT OF THE PROJECT
3. LOCATION OF DISTRIBUTION TRANSFORMERS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. ACTUAL LOCATIONS AND PHASE CONNECTION FOR LOAD BALANCING SHALL BE DETERMINED BY THE SUPPLIER OR AS PER INSTRUCTED/DIRECTED BY NPC'S FIELD REPRESENTATIVE TO SUIT ACTUAL SYSTEM REQUIREMENTS
4. NECESSARY CALCULATION SUCH AS LOAD BALANCING, VOLTAGE DROP, CONDUCTOR SAG, ETC. SHALL BE DONE BY THE SUPPLIER SUBJECT TO NPC'S REVIEW AND APPROVAL
5. POLE DESIGNATIONS/NUMBERINGS AS SHOWN ARE TENTATIVE AND FOR BIDDING PURPOSES ONLY. NEW POLE DESIGNATION/NUMBERING SHALL BE CONSISTENT WITH THE EXISTING POLE DESIGNATION/NUMBERING (IF ANY) OR AS PER DIRECTED/INSTRUCTED BY THE DISTRIBUTION LINE SYSTEM END-USER
6. ONLY THE SECTION OR SEGMENT OF THE LINE IDENTIFIED WITH UNDERBUILD AND OPEN-SECONDARY SHALL BE PROVIDED WITH 1-#2AWG INSULATED CABLE TO BE WRAPPED AROUND WITH THE PRIMARY NEUTRAL CONDUCTOR. ACTUAL LINE LENGTH OF THE SECONDARY CONDUCTOR SHALL BE DETERMINED AT SITE BASED ON THE ACTUAL SITE REQUIREMENTS. SEE ALSO "TYPICAL PRIMARY CONNECTION DRAWING FOR FURTHER REFERENCE"
7. SEE ALSO STAKING SHEET AND BILL OF QUANTITIES FOR FURTHER REFERENCE

LEGENDS:

- — POLE / NUMBER
- ∠ — DEFLECTION ANGLE
- THREE PHASE DISTRIBUTION LINE
- V-PHASE DISTRIBUTION LINE
- SINGLE PHASE DISTRIBUTION LINE
- U — UNDERBUILD
- O — OPEN SECONDARY
- ▴ — DISTRIBUTION TRANSFORMER
- — HOUSEHOLD
- ⊙ — EXISTING POLE STRUCTURE

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

OWNER:  NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 13.8KV DISTRIBUTION LINE AT LAKAWAN, TABUAN LABA, BABLAN (Rev. 01) LOCATION: Lakawan, Tabuan Laba, Bablán	
TITLE: PROPOSED DISTRIBUTION LINE PLAN (4/4)	
DESIGNED: DRAWN: <i>SP</i> REVIEWED: <i>SP</i> CHECKED: ELEC: MECH:	BY: CHKD: DATE: SUBMITTED: <i>B. M. AGUILA</i> RECOMMENDED: <i>C. C. LUGO JR.</i> APPROVER: <i>H. O. BONGBONG</i>
DWG. NO. LanDL-BDE-04.004	SPEC. NO. MInP21Z1354Sdg
SCALE: NTS	BID DRAWING
REV. 0	

GENERAL DESIGN DATA

SINGLE POLE

1. Nominal Voltage 13.8 kV

2. Conductors and Wires

CONDUCTORS AND WIRES	PRIMARY & NEUTRAL CONDUCTOR	SECONDARY CONDUCTOR	GUY WIRE		
Type and Size	ACSR, 1/0 AWG	DUPLEX TYPE, #2 AWG	3/8" High Strength Grade Steel Galvanized		
Stranding	6/1	7 AL & 6/1	7-strand		
Outside Diameter	18.11 mm 0.713 in.	2.474 & 2.672 mm 0.097 & 0.1053 in.	8.53 mm.	8.375 in.	
Area	62.48 mm ² 0.0047 in. ²	—	51.19 mm.	0.9792 in.	
Weight	216.3 Kg/m 4.146 lbs.	288 Kg/m 6.190 lbs/l.	6.496 Kg/m.	0.273 lbs/l.	
Ultimate Strength	1,950 Kg. 4,360 lbs	1,266 Kg. 2,790 lbs	4,800 Kg.	10,800 lbs	

3. Maximum Loading:
Temperature 7.22 °C (45 °F)
Wind Velocity 270 KPH

4. Tension Limits (Percentage of Ultimate Tensile Strength):

	Unloaded		Loaded	
	Final @ 7.22 °C (45 °F)		Final @ 7.22 °C (45 °F)	
Conductor	20		40	
Neutral Wire	20		40	
Insulator Assembly	40 M and E			

5. Span Limitations (Meters):

	Structure Type	Maximum Span	Deflection Angle	
Single Pole, Secondary	NJ5 (J5)	50 m	0° - 5°	
	NJ10 (J10)	50 m	5° - 30°	
	NJ7 (J7)	50 m	30° - 60°	
	NJ15 (J15)	50 m		
	NJ15A (J15A)	50 m		
Single Pole, Single Phase	NA1 (A1)	50 m 100 m	0° - 5°	
	NA2 (A2)	50 m 100 m	5° - 30°	
	NA3 (A3)	50 m 100 m	30° - 60°	
	NA4 (A4)	50 m 100 m	60° - 90°	
	NA5 (A5)	50 m 100 m		
	NAS-1 (AS-1)	50 m 100 m		
	NAS-2 (AS-2)	50 m 100 m		
	NAS-3 (AS-3)	50 m 100 m		
	NAS-4 (AS-4)	50 m 100 m		
	NA6 (A6)	50 m 100 m		
	NA14 (A14)	50 m 100 m		
	NA15 (A15)	50 m 100 m		
	Single Pole, Two Phase	NB1 (B1)	50 m 100 m	0° - 5°
		NB2 (B2)	50 m 100 m	5° - 30°
		NB3 (B3)	50 m 100 m	30° - 60°
NB4-1 (B4-1)		50 m 100 m	60° - 90°	
NBS-1 (BS-1)		50 m 100 m		
NB7 (B7)		50 m 100 m		
NB8 (B8)		50 m 100 m		
NB14 (B14)		50 m 100 m		
NB15 (B15)		50 m 100 m		
Single Pole, Three Phase	NC1 (C1)	50 m 100 m	0° - 5°	
	NC2 (C2)	50 m 100 m	5° - 30°	
	NC3 (C3)	50 m 100 m	30° - 60°	
	NC4-1 (C4-1)	50 m 100 m	60° - 90°	
	NC5-1 (C5-1)	50 m 100 m		
	NC7 (C7)	50 m 100 m		
	NC8 (C8)	50 m 100 m		
	NC14 (C14)	50 m 100 m		
	NC15 (C15)	50 m 100 m		

7. Clearances, Values Strictly Minimum:

Crossing Over @ 48.8 °C (120°F), No Wind, Final Sag	Clearance	
Track Rails of Railroads	18.00 m.	32.80 ft.
Public Street and Highways	7.60 m.	24.93 ft.
Rural Road	8.70 m.	21.98 ft.
Cultivated Fields, Area Accessible only to Pedestrians	5.80 m.	19.02 ft.
Conductor Clearance to Support	Refer to Drawing	
Conductor Clearance to Guy	Refer to Drawing	

8. Guy: Maximum Working Load on 1.5 m. (5') Log Anchor 4,550 Kgs. (10,000 lbs.)
Guy Slope (L/H) 0.8 to 1.0
Maximum Design Tension in Guy Wire 3,300 Kgs. (7,250 lbs.)

9. Crossarms and Braces Material Galvanized Steel
Galvanizing According to: ASTM A123

10. Steel Pole Data Refer to Civil Drawings

11. Pole Setting

Length of Pole		Depth of Pole Setting			
		In Earth		In Rock	
Meter	Feet	Meter	Feet	Meter	Feet
8.14	30	1.82	5.0	1.22	4.0
10.67	35	1.68	5.5	1.22	4.0
12.19	40	1.83	6.0	1.22	4.0
13.71	45	1.98	6.5	1.37	4.5
15.24	50	2.13	7.0	1.52	5.0

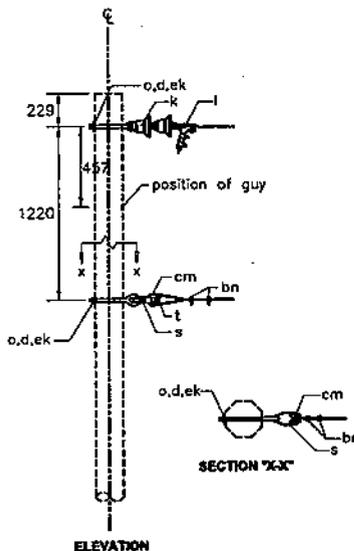
 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (Rev. 01) LOCATION: Lanawan, Tabuan Lasa, Basilan	
TITLE: 7.97/13.8KV DISTRIBUTION LINE "STEEL POLE" GENERAL DESIGN DATA	
DESIGNED: DRAWN: REVISION: CHECKED: ELEC: RECD:	BY: CHKD: DATE: SUBMITTED: RECOMMENDED: APPROVED:
DWG. NO. LanDL-BDE-04.005 SPEC. NO. MinP2121354Sdg	
SCALE: NTS	BID DRAWING
REV. 0	REV. 0

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

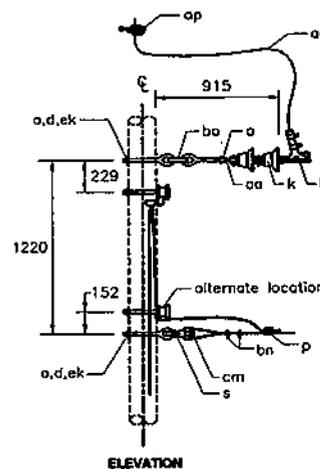
BILL OF MATERIALS		
DESCRIPTION		
ITEM	Single Phase, Single Dead-End Type NA5 (A5)	QTY
o	Bolt, Eye, 16 x 229 (5/8" x 9"), thread 5" from tip	2
l	Clamp, Deadend Strain	1
bn	Clamp, Loop Deadend	2
s	Clevis, Secondary, Swinging	1
cm	Insulator, Spool, 44 (1-3/4") dia. Groove, ANSI Class 53 - 2	1
k	Insulator, Suspension, 152 (6") Clevis type, ANSI Class 52 - 1	2
ak	Locknut, 16 (5/8")	2
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") HD	2
t	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	1
Single Phase, Primary Tap Type NA5-2 (A5-2)		
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") HD	2
k	Insulator, Suspension, 152 (6") Clevis type, ANSI Class 52 - 1	2
o	Bolt, Eye, 16 x 254 (5/8" x 10"), thread 5" from tip	2
p	Connector, Compression, Neutral (#2 AWG run to #2 AWG)	2
aa	Nut, Eye, 16 (5/8") Conventional	1
bo	Shackle, Anchor, Forged Steel, Galvanized	1
by	Preformed, Rod, Tapping	1
ek	Locknut, 16 (5/8")	2
ap	Clamp, Hotline, #1/0 AWG ACSR to #1/0 AWG ACSR	1
l	Clamp, Deadend Strain	1
s	Clevis, Secondary, Swinging	1
cm	Insulator, Spool, 44 (1-3/4") dia. Groove, ANSI Class 53 - 2	1
bn	Clamp, Loop Deadend	2
t	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	1
aq	Jumpers, as required	
Single Phase, Double Tap Type NA5-3 (A5-3)		
l	Clamp, Deadend Strain	1
bn	Clamp, Loop Deadend	2
s	Clevis, Secondary, Swinging	1
cm	Insulator, Spool, 44 (1-3/4") dia. Groove, ANSI Class 53 - 2	1
k	Insulator, Suspension, 152 (6") Clevis type, ANSI Class 52 - 1	2
t	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	1
aa	Nut, Eye, 16 (5/8") Conventional	2
aq	Preformed, Rod, Tapping	1
ap	Clamp, Hotline, #1/0 AWG ACSR to #1/0 AWG ACSR	1
p	Connector, Compression, Neutral (#2 AWG run to #2 AWG)	1
aq	Jumpers, as required	

NOTES:

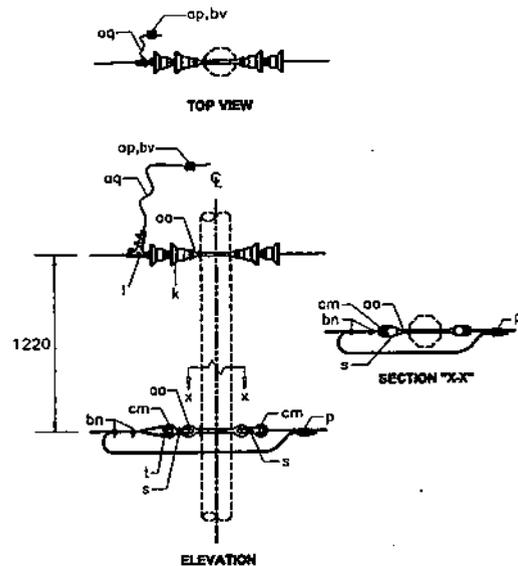
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- REFER TO BILL OF QUANTITIES FOR THE ACTUAL TYPE OF POLE STRUCTURE TO BE USED.
- FOR TYPE NA5 (A5), ALL END WIRES MUST BE PROPERLY WRAPPED 2" MINIMUM LENGTH.
- FOR TYPE NA5 (A5), PRIMARY INSULATOR SHALL BE ANSI CLASS 52-2.
- TYPE NA5-2 (A5-2) DRAWING MAY BE USED WITH DRAWINGS SUCH AS NB1, NB1-1, NB2, NC1, NC1-2, NC1-3, NC1-4, NC2-1, NC2-2.
- TYPE NA-3 (A5-3) DRAWING MAY BE USED WITH DRAWINGS SUCH AS NA4, NB4, NB4-1, NC4, NC4-1.
- THIS DRAWING SHALL BE WORK WITH CAD DRAWING.



TYPE NA5 (A5)
SCALE NTS



TYPE NA5-2 (A5-2)
SCALE NTS



TYPE NA5-3 (A5-3)
SCALE NTS

		NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAMAN, TABUAN LABA, BASILAN (Rev. 01) LOCATION: Lanaman, Tabuan Laba, Basilan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE "STEEL POLE" SINGLE PHASE (A5, A5-2 & A5-3)			
DESIGNED BY	CHKD	DATE	SUBMITTED BY
DRAWN			<i>B. M. ASUILA</i> Principal Engineer & RECD
REVIEWED	PRINCIPAL ENGR./ARCHT.		RECOMMENDED BY
CHECKED			<i>E. Z. C. LUGOS, JR.</i> Principal Engineer
ELEC.			APPROVED BY
MECH.			<i>N. G. SORIANO</i> Principal Engineer
DWG. NO. LanDL-BDE-04.008		SPEC. NO. MinP21Z13545dg	
SCALE: NTS		BID DRAWING	
REV. DATE		NATURE OF REVISION	
BY	CHKD	RECD	APPLD
		REV. 0	

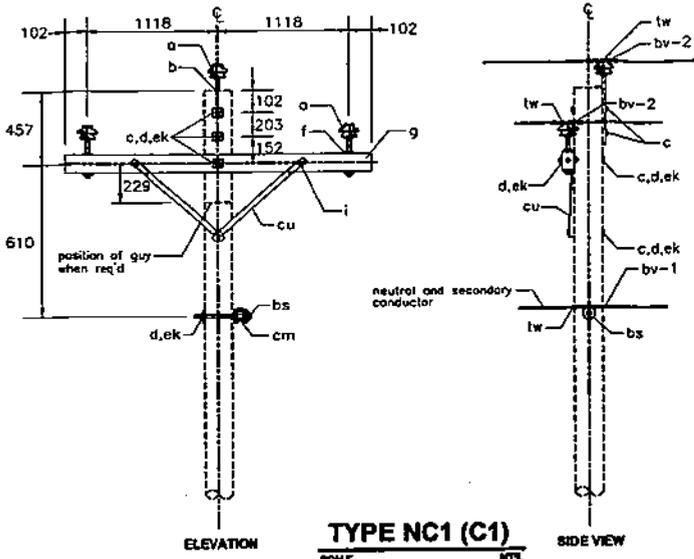
BILL OF MATERIALS

Three Phase Crossarm Const Single Support Type NC1 (C1)- 60°-90° Angle

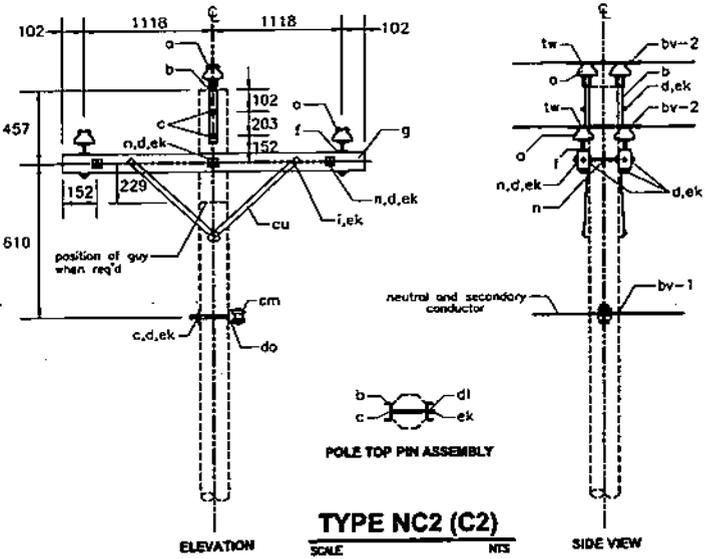
ITEM	DESCRIPTION	QTY
i	Bolt, Carriage, 10 x 114 (3/8" x 4-1/2"), thread 3" from tip	2
c	Bolt, Machine, 13 x 254 (1/2" x 10"), thread 5" from tip	1
c	Bolt, Machine, 16 x 254 (5/8" x 10"), thread 5" from tip	2
c	Bolt, Machine, 16 x 258 (5/8" x 14"), thread 8" from tip	1
ts	Bolt, Single Upsat, 16 x 254 (5/8" x 10"), thread 5" from tip	1
cu	Brace, Steel Crossarm, Standard 711 (28')	2
g	Crossarm, 89 x 114 x 2440 (3-1/2" x 4-1/2" x 8'-0")	1
a	Insulator, Pin Type, ANSI Class 55-2	3
am	Insulator, Spool, 44 (1-3/4" dia Groove, ANSI Class 53-2)	1
ek	Locknut, 10 (3/8")	2
ek	Locknut, 16 (5/8")	3
ek	Locknut, 13 (1/2")	1
f	Pin, Crossarm, Steel, 16 x 273 (5/8" x 10-3/4")	2
bs	Pin, Pole Top, 508 (20")	1
bv-1	Rod, Armor (Single Support), primary	3
bv-1	Rod, Armor (Single Support), neutral	1
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") HD	6
tw	Tie Wire	32
d	Washer, 51 x 51 x 3 (2" x 2" x 1/8"), 14 (9/16") HD	1
d	Washer, Round, 32 (1-1/4") OD, 11 (7/16") HD	2

Three Phase Crossarm Const Double Support Type NC2 (C2)- 5°-30° Angle

i	Bolt, Carriage, 10 x 114 (3/8" x 4-1/2"), thread 3" from tip	4
n	Bolt, Double Arming, 16 x 559 (5/8" x 22")	3
c	Bolt, Machine, 16 x 305 (5/8" x 12"), thread 5" from tip	1
c	Bolt, Machine, 16 x 254 (5/8" x 10"), thread 5" from tip	2
c	Bolt, Machine, 13 x 254 (1/2" x 10"), thread 5" from tip	1
cu	Brace, Steel Crossarm, Standard 711 (28')	4
da	Bracket, Rigid clevis	1
g	Crossarm, 89 x 114 x 2440 (3-1/2" x 4-1/2" x 8'-0")	2
am	Spool, Insulator, 78 (3") dia Groove, Class 53-4	1
a	Insulator, Pin Type, ANSI Class 55-2	6
ek	Locknut, 16 (5/8")	13
ek	Locknut, 10 (3/8")	4
ek	Locknut, 13 (1/2")	1
d	Pipe, Spacer, 19 (3/4" dia x 38 (1-1/2"))	2
b	Pin, Pole Top, 508 (20")	2
f	Pin, Crossarm, Steel, 16 x 273 (5/8" x 10-3/4")	4
bv-1	Rod, Armor (Single Support), neutral	1
bv-2	Rod, Armor (Double Support), primary	3
tw	Tie Wire	66
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") HD	13
d	Washer, 51 x 51 x 3 (2" x 2" x 1/8"), 14 (9/16") HD	1
d	Washer, Round, 32 (1-1/4") OD, 11 (7/16") HD	4



TYPE NC1 (C1)
SCALE NTS



TYPE NC2 (C2)
SCALE NTS

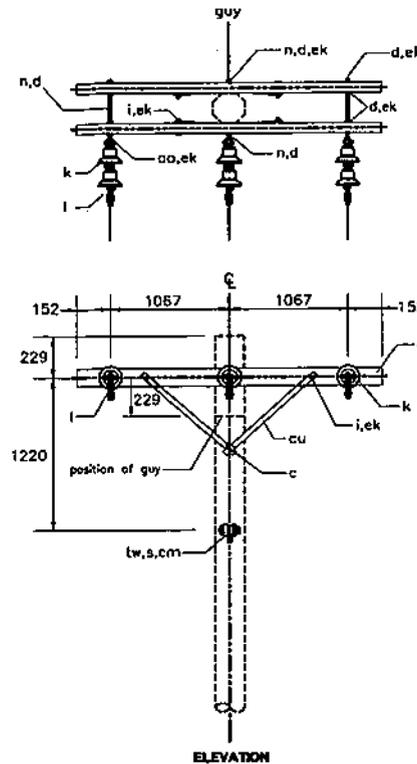
- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 2. REFER TO BILL OF QUANTITIES FOR THE ACTUAL TYPE OF POLE STRUCTURE TO BE USED.
 3. THIS DRAWING SHALL BE WORK WITH CAD DRAWING.
 4. * CONDUCTOR ACCESSORIES.

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT:		SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.9713.8KV DISTRIBUTION LINE AT LAKAWAN, TABUAN LASA, BASLAM (Rev. 01)	
LOCATION:		Lakawan, Tabuan Lasa, Baslam	
TITLE:		7.9713.8KV DISTRIBUTION LINE "STEEL POLE" THREE PHASE (C1 & C2)	
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	BY	CHKD	DATE
ENLARGED	BY	CHKD	DATE
ELEC.	BY	CHKD	DATE
MECH.	BY	CHKD	DATE
SUBMITTED:		 B. M. MAGULA Electrical Engineer III, ESEC	
RECOMMENDED:		 C. C. LUGOD Electrical Engineer III, ESEC	
APPROVED:		 N. G. SERRANO Electrical Engineer III, ESEC	
OWC NO.	LanDL-BDE-04.009	SPEC. NO.	MinP21Z13545dg
REV.	DATE	NATURE OF REVISION	BY
SCALE:	NTS	BID DRAWING	
			REV. 0

BILL OF MATERIALS		
Three Phase Crossarm Cons't Single Dead-End Type NC7 (C7)		
ITEM	DESCRIPTION	QTY
cu	Brace, Steel Crossarm, Standard 711 (28")	4
i	Bolt, Carriage, 10 x 114 (3/8" x 4-1/2"), thread 3" from tip	4
n	Bolt, Double Arming, 16 x 559 (5/8" x 22")	3
o	Bolt, Eye, 16 x 305 (5/8" x 12"), thread 5" from tip	1
c	Bolt, Machine, 16 x 254 (5/8" x 10"), thread 5" from tip	7
f	Clamp, Deadend Strain	3
bn	Clamp, Loop Deadend	2
s	Clevis, Secondary, Swinging	1
g	Crossarm, 89 x 114 x 2440 (3-1/2" x 4-1/2" x 8'-0")	2
cm	Spool, Insulator, 76 (3") dia. Groove, Class 53 - 4	1
k	Insulator, Suspension, 152 (6") Clevis type, ANSI Class 52 - 1	6
ek	Locknut, 10 (3/8")	4
ek	Locknut, 16 (5/8")	11
ek	Locknut, 13 (1/2")	1
ea	Nut, Eye, 16 (5/8") Conventional	3
tw	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	1'
d	Washer, 57 x 57 x 5 (2 1/2" x 2 1/2" x 3/16"), 21 (13/16") HD	11
d	Washer, 51 x 51 x 3 (2" x 2" x 1/8"), 14 (9/16") HD	1
d	Washer, Round, 32 (1-1/4") OD, 11 (7/16") HD	4

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. REFER TO BILL OF QUANTITIES FOR THE ACTUAL TYPE OF POLE STRUCTURE TO BE USED.
3. ALL END OF WIRES MUST BE PROPERLY WRAP 5 (2") MINIMUM LENGTH.
4. THIS DRAWING SHALL BE WORK WITH CEAD DRAWING.



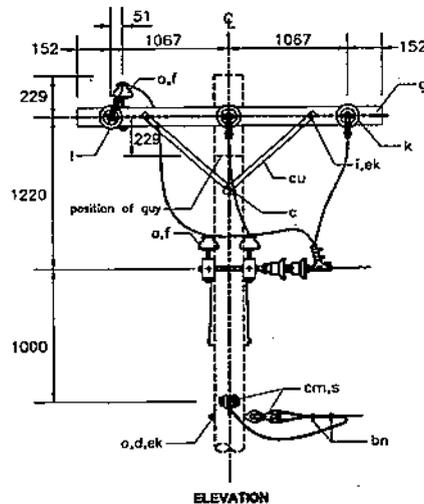
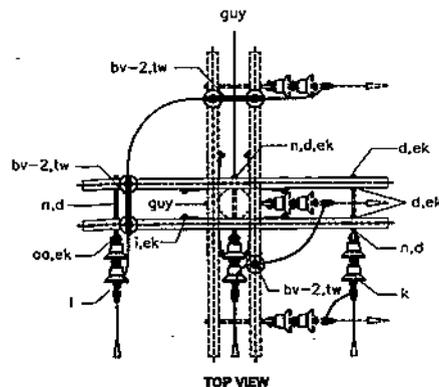
TYPE NC7 (C7)
SCALE: 1/8" = 1'-0"

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY															
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASHLAN (Rev. 01) LOCATION: Lomas, Tabuan Las, Section															
TITLE: 7.97/13.8KV DISTRIBUTION LINE "STEEL POLE" THREE PHASE (C7)															
DESIGNED: DRAWN: <i>lax</i> REVIEWED: PRINCIPAL ENGR. / ARCHT. CHLARCHT: ELEC: MECH:	SUBMITTED: <i>B. M. AGUILA</i> RECOMMENDED: <i>C. C. LUGOS JR.</i> APPROVED: <i>N. G. DOMINGORA</i>														
DWG. NO. LanDL-BDE-04.010	SPEC. NO. MinP21Z13548dg														
<table border="1"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>NATURE OF REVISION</th> <th>BY</th> <th>CHKD.</th> <th>RECD.</th> <th>APPR.</th> </tr> </thead> <tbody> <tr> <td> </td> </tr> </tbody> </table>	REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.								SCALE: NTS BID DRAWING REV. 0
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.									

BILL OF MATERIALS		
Three Phase Crossarm Const Single Dead-End Type NC7-2 (C7-2)		
ITEM	DESCRIPTION	QTY
cu	Brace, Steel Crossarm, Standard 711 (28")	8
i	Bolt, Carriage, 10 x 114 (3/8" x 4-1/2"), thread 3" from tip	8
n	Bolt, Double Arming, 16 x 559 (5/8" x 22")	6
o	Bolt, Eye, 16 x 305 (5/8" x 12"), thread 5" from tip	2
c	Bolt, Machine, 16 x 254 (5/8" x 10"), thread 5" from tip	12
l	Clamp, Deadend Strain	6
bn	Clamp, Loop Deadend	4
s	Clevis, Secondary, Swinging	2
g	Crossarm, 89 x 114 x 2440 (3-1/2" x 4-1/2" x 8'-0")	4
cm	Spool, Insulator, 76 (3") dia. Groove, Class 53 - 4	2
k	Insulator, Suspension, 152 (6") Clevis type, ANSI Class 52 - 1	12
ek	Locknut, 10 (3/8")	8
ek	Locknut, 16 (5/8")	14
ek	Locknut, 13 (1/2")	2
aa	Nut, Eye, 16 (5/8") Conventional	6
tw	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	3'
bv-2	Rod, Armor (Double Support), primary	3
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") HD	14
d	Washer, 51 x 51 x 3 (2" x 2" x 1/8"), 14 (9/16") HD	2
d	Washer, Round, 32 (1-1/4" OD), 11 (7/16") HD	8
p	Connector, Compression, Primary (1/0 AWG run to 1/0 AWG)	As Req'd

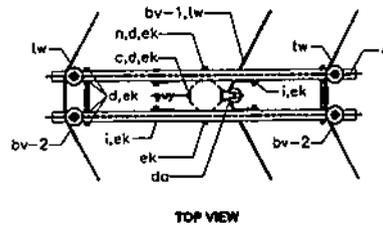
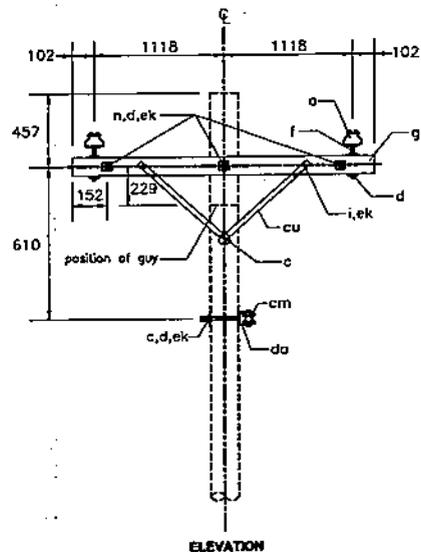
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. REFER TO BILL OF MATERIALS FOR THE ACTUAL TYPE OF POLE STRUCTURE TO BE USED.
3. FINAL CONFIGURATION/DIRECTIONS SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE ACTUAL FIELD CONDITIONS.
4. ALL END OF WIRES MUST BE PROPERLY WRAP 5 (2") MINIMUM LENGTH.
5. THIS DRAWING SHALL BE WORK WITH CEAD DRAWING.



TYPE NC7-2 (C7-2)
SCALE: NTS

OWNER:  NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY							
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (Rev. 01)							
LOCATION: Lanawan, Tabuan Lasa, Basilan							
TITLE: 7.97/13.8KV DISTRIBUTION LINE "STEEL POLE" THREE PHASE (C7-2)							
DESIGNED: [Signature]	SUBMITTED: [Signature]						
DRAWN: [Signature]	RECOMMENDED: [Signature]						
REVIEWED: PRINCIPAL ENGR. J. ARCT.	APPROVED: [Signature]						
CYCLARIGHT: [Signature]	MECH. [Signature]						
ELEC. [Signature]							
DRW. NO. LanDL-BDE-04.011	SPEC. NO. MinP21Z1354Sdg						
SCALE: NTS	BID DRAWING						
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.	REV. 0



TYPE NB2 (B2)
SCALE NTS

BILL OF MATERIALS

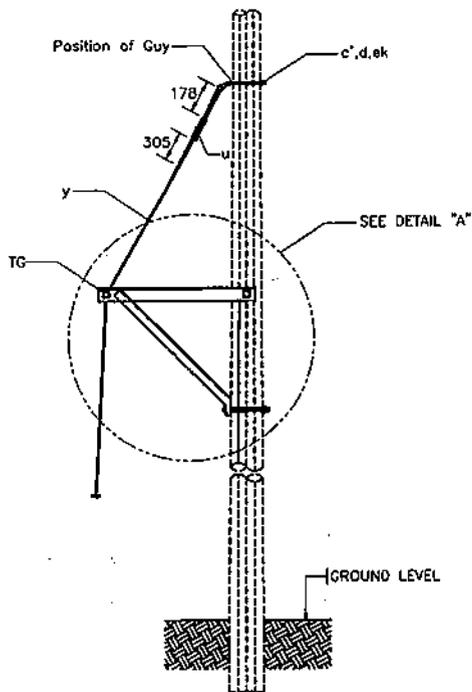
Two Phase Cross arm Cons'l Double Support Type NB2 (B2) - 5'-30" Angle

ITEM	DESCRIPTION	QTY
i	Bolt, Carriage, 10 x 114 (3/8" x 4-1/2"), thread 3" from tip	4
n	Bolt, Double Arming, 16 x 508 (5/8" x 20")	3
c	Bolt, Machine, 16 x 254 (5/8" x 10"), thread 5" from tip	1
c	Bolt, Machine, 13 x 254 (1/2" x 10"), thread 5" from tip	1
cu	Brace, Steel Crossarm, Standard 7 11 (28")	4
da	Bracket, Rigid clevis	1
g	Crossarm, 89 x 114 x 2440 (3-1/2" x 4-1/2" x 8'-0")	2
a	Insulator, Pin Type, ANSI Class 55-4	4
cm	Insulator, Spool, 44 (1-3/4" dia. Groove, ANSI Class 53 - 2	1
ek	Locknut, 10 (3/8")	4
ek	Locknut, 16 (5/8")	11
ek	Locknut, 13 (1/2")	1
f	Pin, Crossarm, Steel, 16 x 273 (5/8" x 10-3/4")	4
bv-1	Rod, Armor (Single Support), neutral	1
bv-2	Rod, Armor (Double Support), primary	2
d	Washer, 57 x 57 x 5 (2 1/2" x 2 1/2" x 3/16"), 21 (13/16") HD	11
tw	Wire, Tire, Al. Alloy, Soft, #4 AWG	40'
d	Washer, 51 x 51 x 5 (2" x 2" x 1/8"), 11 (7/16") HD	1
d	Washer, Round, 32 (1-1/4") OD, 11 (7/16") HD	1

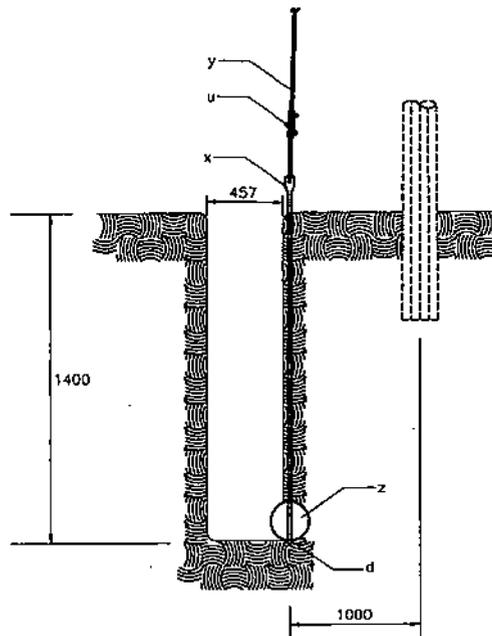
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THIS DRAWING SHALL BE WORK WITH CAD DRAWING.

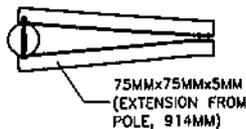
OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION, INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LAMARAN, TARIAN LAGA, SABLAN (PAC-01)			
LOCATION: Lamaran, Tarian Laga, Sablán			
TITLE: 7.97/13.8KV DISTRIBUTION LINE "STEEL POLE" TWO PHASE (B2)			
DESIGNED	BY	CHKD	DATE
DRAWN	1996		
REVIEWED	PRINCIPAL ENGR. / ARCHT.	RECOMMENDED	BY: R. C. LUGO, JR.
CIVIL/ARCHT		APPROVED	BY: W. G. ...
ELEC.			
MECH.			
CHG. NO.	LanDt-BDE-04.013	SPEC. NO.	MInP21Z13545dg
REV.	DATE	NATURE OF REVISION	BY
SCALE	NTS	BID DRAWING	
			REV. 0



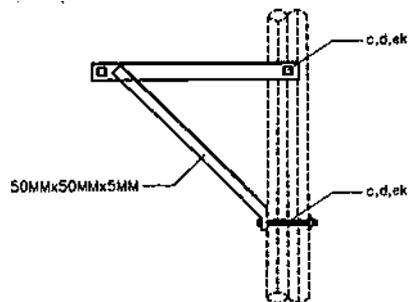
E1-2A
SCALE NTS



F2-2A
SCALE NTS



PLAN



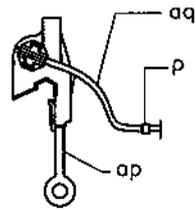
DETAIL "A"

BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
E1-2A (Truss Guy Detail)		
c'	Bolt, Thimble Eye, 5/8" x 10", angle type (thread 5" from tip)	1
u	Clamp, Guy Straight, 3 Bolt Heavy Duty, Steel	2
ek	Locknut, 5/8"	1
ek	Locknut, 3/4"	1
ek	Locknut, 1/2"	1
d	Washer, 2 1/2" x 2 1/2" x 3/16", 13/16" hole	3
y	Wire, Guy, Steel, 3/8", 7 Strand	50'
TG	Truss guy	1
e	Bolt, Machine, 3/4" x 12"	1
e	Bolt, Machine, 1/2" x 12"	1
F2-2A (Anchor Log Detail)		
z	Anchor Log, 9" dia. x 4' - 6"	1
x	rod, Anchor, Threaded, Thimble Eye, 3/4" x 8' with locknut	1
d	Washer, 13/16 hole, Type 4" x 4" x 1/2"	1
Holding Power in Ordinary Soil (10,000 lb)		

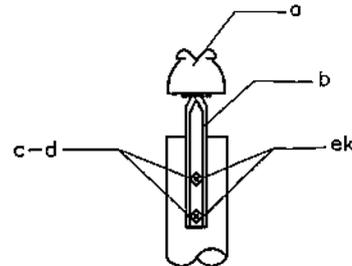
NOTES:

1. ALL DIMENSIONS/CLEARANCES AS SHOWN ARE IN METER UNLESS OTHERWISE INDICATED.
2. FOR BIDDING PURPOSES ONLY. NECESSARY ADJUSTMENT INCLUDING ALL NECESSARY MATERIALS TO FUNCTION AS INTENDED SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE ACTUAL REQUIREMENTS.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

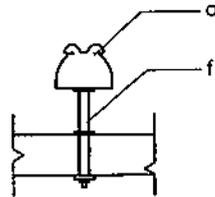
OWNER:				NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LABA, BARELAN (Rev. 01)					
LOCATION: Lanawan, Tabuan Laba, Barelan					
TITLE: 7.97/13.8KV DISTRIBUTION LINE TRUSS GUY & ANCHOR LOG DETAIL (E1-2A & F2-2A)					
DESIGNED	BY	CHKD	DATE	SUBMITTED:	<i>B. M. AGUILA</i>
DRAWN	<i>Log</i>			RECOMMENDED:	<i>C. C. LUGOD, JR.</i>
REVIEWED	PRINCIPAL ENGR. / ARCHT.			APPROVED:	<i>N. G. SOMBUERRA</i>
CIVIL/ARCHT					
ELEC.					
MECH.					
DWG. NO. LanDL-BDE-04.015			SPEC. NO. MinP21Z1354Sdg		
REV.		DATE	NATURE OF REVISION	BY	CHKD
SCALE NTS		BID DRAWING		REV. 0	



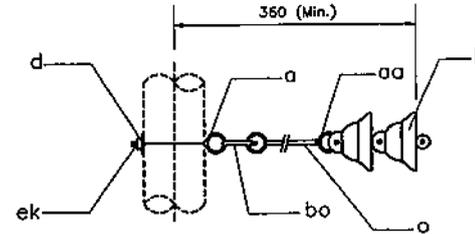
M5-1



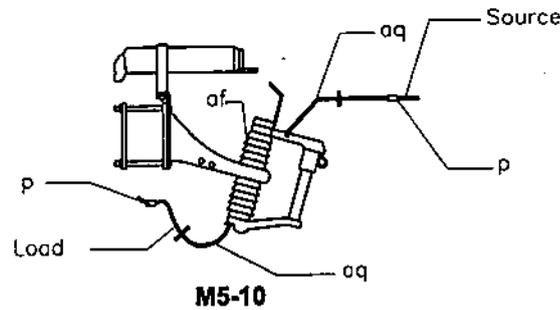
M5-2



M5-5



M5-8



M5-10

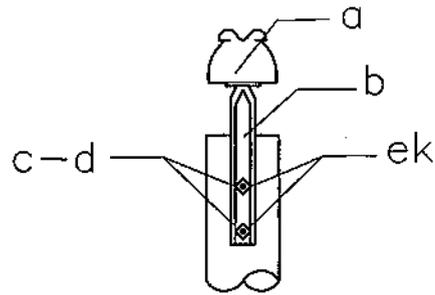
BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
M5-1		
p	Connector, Compression	1
ap	Clamp, Hot Line	1
aq	Jumper	1
av	Rod, Armer Topping	1
M5-2		
c	Bolt, Machine, 5/8" x 10"	2
a	Insulator, Pin Type	1
ek	Locknut, 5/8"	2
b	Pin, Pole Top, 20"	1
d	Washer 2 1/2" x 2 1/2" x 3/16", 3/16" H.D.	2
M5-5		
a	Insulator, Pin Type	1
f	Pin, Crossarm, Steel, 5/8" x 10 3/4" w/ nut, locknut and washers	1
M5-8		
e	Bolt, Eye, 5/8" x 10" (Thread 5" from tip)	1
e	Bolt, Eye, 5/8" x 18", locknut 5/8" - 2, (thread 8" from tip)	1
k	Insulator, Suspension	2
aa	Nut, Eye, 5/8"	1
bo	Shock, Anchor	1
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	1
ek	Locknut, 5/8"	2
M5-10		
p	Connector, Compression	2
aq	Jumper	2
ax	Outlet and Arrester combination	1

NOTES:

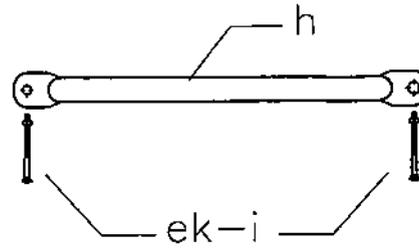
- ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LAHAWAN, TABUAN LABA, BARILAN (Rev. 01)			
LOCATION: Laruan, Tabuan Laba, Basilan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE MISCELLANEOUS PRIMARY ASSEMBLIES (M5-1, M5-2, M5-5, M5-8, M5-10)			
DESIGNED	BY	CHKD	DATE
DRAWN	af		
REVIEWED	PRINCIPAL ENGR. / ARCHT.	RECOMMENDED	
CHECKED		APPROVED	
ELC.			
MCH.			
DWG. NO. LenDL-BDE-04.016		SPEC. NO. MinP21Z13549dg	
SCALE: NTS		BID DRAWING	
REV. DATE		BY CHKD RECD APPD	

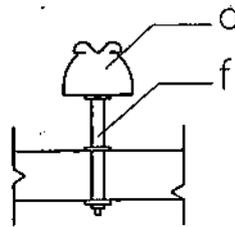
REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPD



M5-2



M5-11



M5-5



M5-23

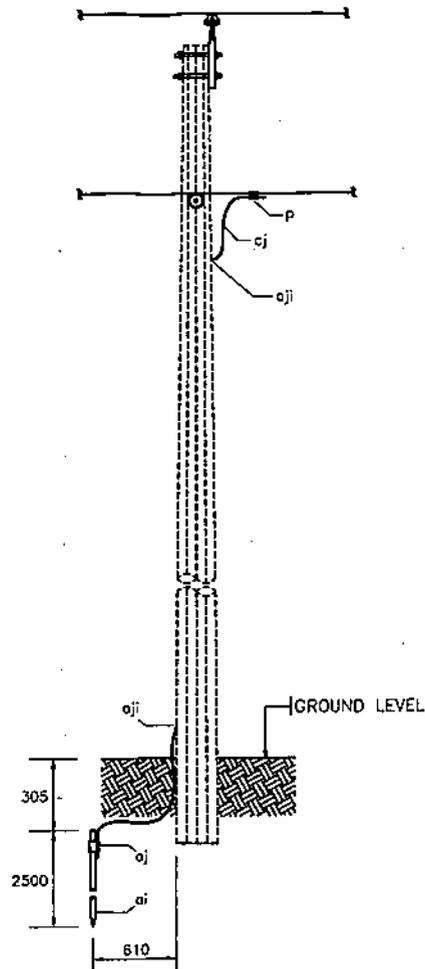
BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
M5-2		
c	Bolt, Machine, 5/8" x 10"	2
a	Insulator, Pin Type	1
ek	Locknut, 5/8"	2
b	Pin, Pole Top, 20°	1
d	Washer 2 1/2" x 2 1/2" x 3/16", 3/16" H.D.	2
M5-5		
e	Insulator, Pin Type	1
f	Pin, Crossarm, Steel, 5/8" x 10 3/4" w/ nut, locknut and washers	1
M5-11		
ek	Locknut, 5/8"	4
h	Brace Flit, 1-1/4" x 1-1/4" x 28	1
i	Bolt, carriage, 3/8" x 4-1/2"	1
M5-23		
l	Clamp, Deadend Strain	1

NOTES:

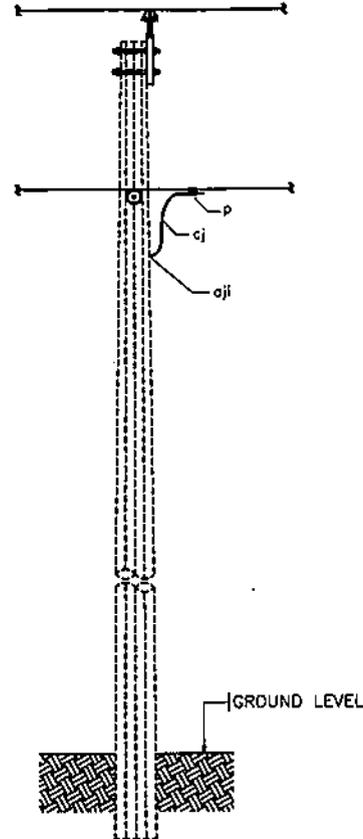
1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABIAN LARA, BALELAN (Rev. 01) LOCATION: Lanawan, Tabian Lara, Balelan	
TITLE: 7.97/13.8KV DISTRIBUTION LINE MISCELLANEOUS PRIMARY ASSEMBLIES (M5-2, M5-5, M5-11, M5-23)	
DESIGNED BY: <i>[Signature]</i> DRAWN BY: <i>[Signature]</i> REVIEWED BY: <i>[Signature]</i> CIVIL/ARCHT: <i>[Signature]</i> ELEC: <i>[Signature]</i> MECH: <i>[Signature]</i>	SUBMITTED BY: <i>[Signature]</i> RECOMMENDED BY: <i>[Signature]</i> APPROVED BY: <i>[Signature]</i>
DWG. NO. LanDL-BDE-04.017 SPEC. NO. MinP21Z1354Sdg	SCALE: NTS BID DRAWING REV. 0

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



M2-11



M2-11A

BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
M2-11		
ej	ground rod, clamp	1
ei	Rod, ground 5/8" x 8' steel	1
cj	Ground wire, # 4AWG 3 strands al. alloy	3
P	Connector, Compression	1
oji	Ground, clamp	2
M2-11A		
cj	Ground wire, # 4AWG 3 strands al. alloy	3
P	Connector, Compression	1
oji	Ground, clamp	2

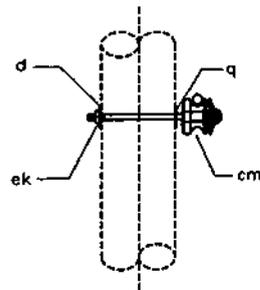
NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL END OF WIRES MUST BE PROPERLY WRAPPED SO (2") MINIMUM LENGTH.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

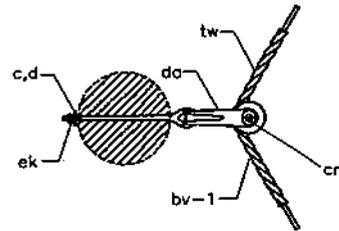
OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUJAN LASA, BABLAN (Rev. 01)			
LOCATION: Lanawan, Tabujan Lasa, Bablan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE GROUNDING ASSEMBLY (M2-11 & M2-11A)			
DESIGNED	BY	CHKD	DATE
DRAWN	by		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		RECOMMENDED
CHECKED			
ELEC.			
MECH.			
DWG. NO. LanDL-BDE-04.018		SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS		BID DRAWING REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

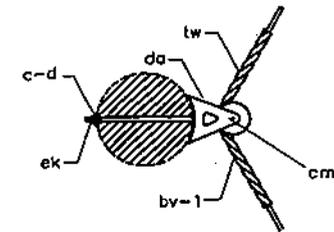
BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
J5		
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" Hole	1
ek	Locknut, 5/8"	1
q	Bolt, double upset, 5/8"x10"	1
cm	Insulator, Spool, 1 3/4" dia. Groove, Class 53 - 2	1
tw	Wire, Tie	8'
J7		
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" Hole	1
ek	Locknut, 5/8"	1
e	Bolt, eye 5/8" x 10"	1
cm	Insulator, Spool, 1-3/4" dia. Groove	1
a	Clevis, secondary, swinging insulator	1
br-1	Rod, Armor, Single Support, Neutral	1
tw	Wire, Tie	8'
J10		
e	Bolt, machine, 5/8" x 10"	1
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" Hole	1
ek	Locknut, 5/8"	1
cm	Insulator, Spool, 3" dia. Groove	1
da	Bracket	1
br-1	Rod, Armor, Single Support, Neutral	1
tw	Wire, Tie	8'
J15		
bn	Clamp, Loop, Deadend	1
a	Clevis, Secondary, Swinging	1
k	Insulator, Suspension, 6" Clevis type, Class 52 - 1	1
t	Wire, Tape, Armor, Al Alloy 0.5" x 0.3"	1
e	Bolt, eye 5/8" x 10"	1
cm	Insulator, Spool, 3" dia. Groove	1
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" Hole	1
ek	Locknut, 5/8"	1
J15A		
bn	Clamp, Loop, Deadend	1
a	Clevis, Secondary, Swinging	1
k	Insulator, Suspension, 6" Clevis type, Class 52 - 1	1
t	Wire, Tape, Armor, Al Alloy 0.5" x 0.3"	1
ca	Nut, eye 5/8"	1
cm	Insulator, Spool, 3" dia. Groove	1
ek	Locknut, 5/8"	1



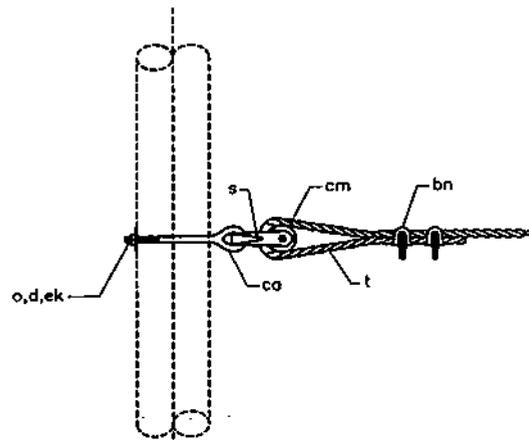
J5
(0°-5° Angle)



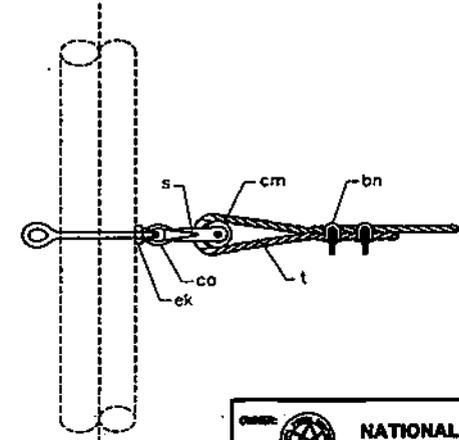
J7
(30°-60° Angle)



J10
(5°-30° Angle)



J15



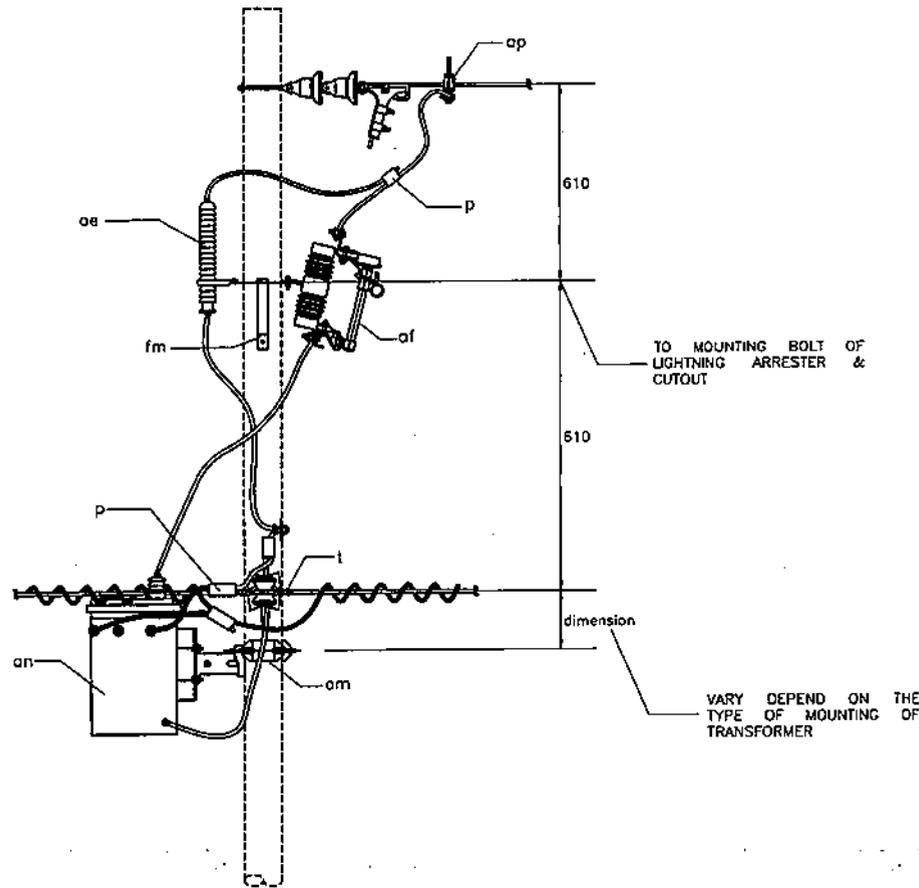
J15A

NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. ALL END OF WIRES MUST BE PROPERLY WRAPPED 50 (2") MINIMUM LENGTH.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAMAN, TABLARAN LASA, BASILAN (Rev. 01) LOCATION: Luzon, Tabaran Line, Basilan	
TITLE 7.97/13.8KV DISTRIBUTION LINE SECONDARY ASSEMBLIES (J5, J7, J10, J15, J15A)	
DESIGNED: DRAWN: REVISION: CHECKED: P.I.C. INCH	BY: CHECKED: DATE: SUBMITTED: RECORDED: APPROVED:
ENG. NO. LanDL-BDE-04-019 SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS BID DRAWING REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHECKED	RECD.	APP.



TRANSFORMER LAYOUT
SCALE NTS

BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
oa	Arrester, Lightning	1
c	Bolt, Machine, 5/8" x 10" (Thread 5" from tip)	2
fm	Bracket, Combination Cutout and Arrester	1
ap	Clamp, Holline, #1/0 ACSR to #4 ACSR	1
p	Connector, Compression for #2 run to #2	2
p	Connector, Compression for #4 run to #4	1
af	Cutout, Fuse	1
an	Transformer, Completely Self Protected, Pole type	1
aq	Wire, Jumper, #4 for (10KVA), #2 for (15KVA)	10'
t	Wire, Tape, Armor, AL Alloy 0.5" x 0.3"	1'
am	Bracket, Standard 6" Cluster-segment type, Transformer Mount	1

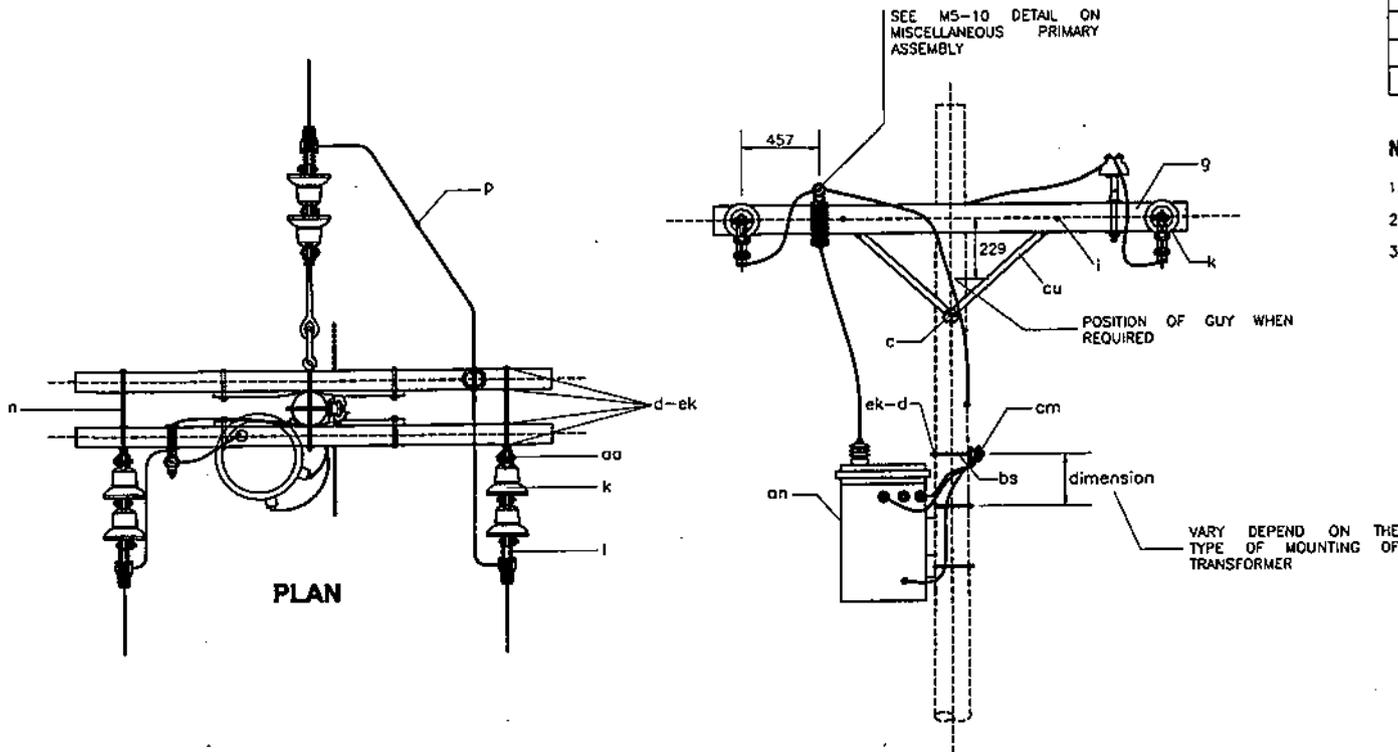
NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. TRANSFORMER CAPACITY RATING SHALL BE REFERRED TO THE TECHNICAL DATA SHEETS.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAM LASA, BULACAN (Rev. 011)			
LOCATION: Lanawan, Tabuam Lasa, Bulacan			
TITLE:		7.97/13.8KV DISTRIBUTION LINE SINGLE PHASE TRANSFORMER (G12-1)	
DESIGNED	BY	CHKD	DATE
DRAWN	kyk		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		RECOMMENDED
CYCLARCHT			
E.I.C.			APPROVED:
MECH.			
DWG. NO. LenDL-BDE-04.020		SPEC. NO. MinP21Z1354Sdg	
REV.	DATE	NATURE OF REVISION	BY
SCALE: NTS		BID DRAWING	
		REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	REGL.	APPD.

BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
ae	Arrestor, Lightning	1
c	Bolt, Machine, 16 x 254 (5/8" x 10") (thread 127 (5") from tip)	2
ap	Clamp, Hollow, for #1/0 ACSR to #4 ACSR	1
p	Connector, Compression, for #2ACSR to #2ACSR	2
af	Cutout, Fused	1
ek	Locknut, 5/8"	3
an	Transformer, Completely Self Protected, Pole type	1
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/8" x 3/16"), 21 (13/16") hole	2
aq	Wire, Jumper, #4 ACSR (10KVA), #2ACSR (15KVA)	10'
Y	Wire, Tape, Armor, Al Alloy, 13 x 8 (0.5" x 0.3")	1'
P	Connector, Compression #4 ACSR to #4 ACSR (10KVA)	1



NOTES:

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2. TRANSFORMER CAPACITY RATING SHALL BE REFERRED TO THE TECHNICAL DATA SHEETS.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

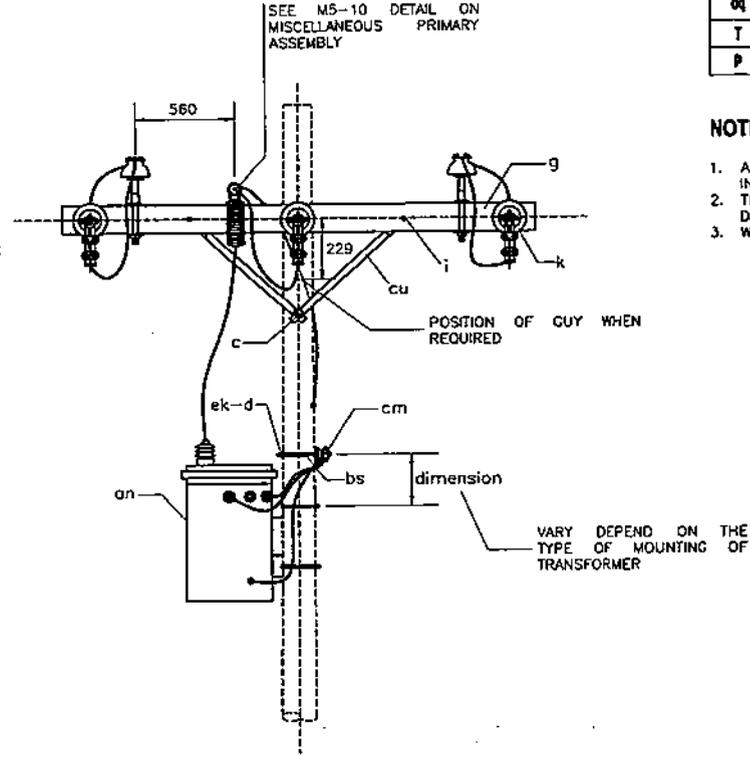
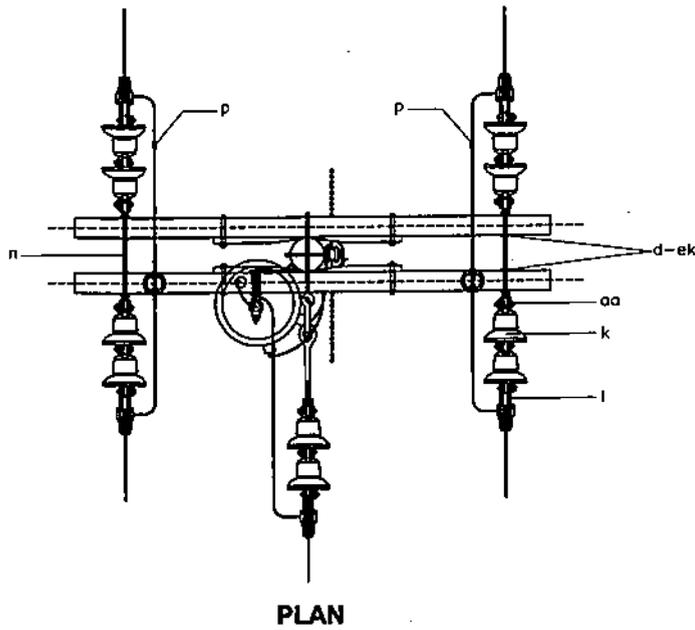
TRANSFORMER LAYOUT

SCALE: NTS 7/8

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LAHARAN, TABUAN LASA, BARILAN (Dist. B)			
LOCATION: Laharan, Tabuan Lasa, Barilan			
TITLE:		7.97/13.8KV DISTRIBUTION LINE SINGLE PHASE TRANSFORMER (012-2)	
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	MUNICIPAL ENGR. (ANCY)		RECOMMENDED
CIVIL/ARCHT			APPROVED
ELEC.			
MECH.			
DWS. NO. LanDL-BDE-04.021		SPEC. NO. MinP21Z1354Sdy	
REV. DATE		NATURE OF REVISION	
BY	CHKD	RECD	APPL
SCALE: NTS		BID DRAWING rev. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPL
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BILL OF MATERIALS		
ITEM	DESCRIPTION	QTY.
ae	Arrestor, Lightning	1
c	Bolt, Machine, 16 x 254 (5/8" X 10") (thread 127 (5") from tip)	2
op	Clamp, Holline, for #1/0 ACSR to #4 ACSR	1
p	Connector, Compression, for #2 ACSR to #2 ACSR	2
af	Cutoff, Fused	1
ek	Locknut, 5/8"	2
an	Transformer, Completely Self Protected, Pole type	1
d	Washer, 57 x 57 x 5 (2 1/4" x 2 1/4" x 3/16"), 21 (13/16") hole	2
oq	Wire, Jumper, #4 ACSR (10KVA), #2ACSR (15KVA)	10'
T	Wire, Tape, Armor, Al. Alloy, 13 x 8 (0.5" x 0.3")	1'
p	Connector, Compression for #4 ACSR to #4 ACSR	1



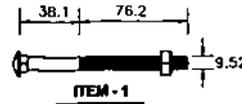
NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. TRANSFORMER CAPACITY RATING SHALL BE REFERRED TO THE TECHNICAL DATA SHEETS.
3. WORK THIS DRAWING WITH CEAD DRAWINGS.

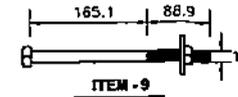
OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABLAN LASA, BARLAN (Rev. 01)			
LOCATION: Lanawan, Tablan Lasa, Barlan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE SINGLE PHASE TRANSFORMER (012-3)			
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	PRINCIPAL ENGR. / ARCHT.		RECOMMENDED
CHECKED			APPROVED
ELEC.			
MECH.			
DWG. NO. LanDL-BDE-04.022		SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS		BID DRAWING	
REV. 0		REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

ITEM	MATERIALS DESCRIPTION/SPECIFICATIONS
1	BOLT, CARRIAGE 10 X 114 (5/8" X 4-1/2") THREADED WITH AT LEAST 76 (3") FROM TOP WITH LOCKWASHER AND WASHER. HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK, STEEL AS PER ASTM A-307.
2	BOLT, DOUBLE ARMING 16 X 508 (5/8" X 20") FULL THREAD WITH AT LEAST 4 SETS OF NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
3	BOLT, DOUBLE ARMING 16 X 508 (5/8" X 22") FULL THREAD WITH AT LEAST 4 SETS OF NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
4	BOLT, OVAL EYE, 16 X 254 (5/8" X 10") FULL THREAD WITH AT LEAST 80 (3.15") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
5	BOLT, OVAL EYE, 16 X 305 (5/8" X 12") FULL THREAD WITH AT LEAST 140 (5.5") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
6	BOLT, OVAL EYE, 16 X 457 (5/8" X 18") FULL THREAD WITH AT LEAST 203 (8") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
7	BOLT, THIMBLE EYE, 16 X 254 (5/8" X 10") FULL THREAD WITH AT LEAST 80 (3.15") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307, HOT DIP GALVANIZED PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
8	BOLT, MACHINE, 13 X 254 (1/2" X 10") THREADED WITH AT LEAST 80 (3.15") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK, BOLTS STARTING FROM 150 (6") LENGTH MUST BE FURNISHED WITH BUFFER POINT (1/2 OF BOLT LENGTH), BOLT LENGTH DOES NOT INCLUDE BUFFER POINT.
9	BOLT, MACHINE, 16 X 254 (5/8" X 10") THREADED WITH AT LEAST 80 (3.15") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK, BOLTS STARTING FROM 150 (6") LENGTH MUST BE FURNISHED WITH BUFFER POINT (1/2 OF BOLT LENGTH), BOLT LENGTH DOES NOT INCLUDE BUFFER POINT.
10	BOLT, MACHINE, 16 X 254 (5/8" X 10") THREADED WITH AT LEAST 140 (5.5") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK, BOLTS STARTING FROM 150 (6") LENGTH MUST BE FURNISHED WITH BUFFER POINT (1/2 OF BOLT LENGTH), BOLT LENGTH DOES NOT INCLUDE BUFFER POINT.
11	BOLT, MACHINE, 16 X 356 (5/8" X 14") THREADED WITH AT LEAST 152 (6") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK, BOLTS STARTING FROM 150 (6") LENGTH MUST BE FURNISHED WITH BUFFER POINT (1/2 OF BOLT LENGTH), BOLT LENGTH DOES NOT INCLUDE BUFFER POINT.
12	BOLT, SINGLE UPSET, 16 X 254 (5/8" X 10") THREADED WITH AT LEAST 80 (3.15") FROM TOP WITH NUT, LOCKWASHER AND WASHER - 57 X 57 X 5 (2 1/4" X 2 1/4" X 3/16"), 21 (13/16") HOLE DIAMETER, STEEL PER ASTM A-307 CSR SHIFTING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.
13	BRACE, CROSSBAR, 711 (28") STEEL, STEEL PER ASTM A36 - 77 A, HOT DIP GALVANIZED AS PER ASTM A123-70, MINIMUM COATING 702 G/M ² OF SURFACE OR 0.001MM THICK.
14	BRACKET, CLEANS DEPENDS WITHOUT SPOOL, FLAT STEEL PER ASTM A36, HOT DIP GALVANIZED PER ASTM A123
15	CLAMP, HOT LINE, #2/D ACSR WITH TO #4.
16	CLAMP, HOT LINE, #2/D ACSR WITH TO #2/L.
17	CLAMP, LOOP DEPENDS STRAIN #4 HIGH STRENGTH ALUMINUM CASTING WITH GALVANIZED STEEL U-BOLT, EXTRA LONG SOFT ALUMINUM SPACER AND CAPS THAT CONFINE STRANDS. HOLDING STRENGTH USING TWO DEPENDS CLAMPS EXCEEDS RATED BREAKING STRENGTH OF CONDUCTORS.
18	CLAMP, DEPENDS, STRAIN #4 - 4/D ACSR, CLAMP BODIES AND KEEPER PIECES ARE CAST IN HIGH STRENGTH ALUMINUM ALLOY THAT IS HIGH COPPER BEARING, U BOLTS, CLEANS PIN AND ASSOCIATED COMPONENT ARE STEEL. OUTER STEEL ARE STAINLESS STEEL. BALL CLEANS IS DROP FORCE STEEL SHANK DIAMETER OF ANSI CLASS 52-3 AND 52-5 PIN IS CONSISTENT WITH ANSI INSULATOR W R E. STRENGTH RATING OF 15000 AND 25000 LBS RESPECTIVELY.
19	CLAMP, GUY STRANCH, THREE BOLT HEAVY DUTY STEEL. CLAMP STEEL AS PER ASTM A 36, BOLT AND NUT AS PER ASTM A 307, HOT DIP GALVANIZED AS PER ASTM A 153 MINIMUM COATING 301 G/M ² OF SURFACE OR 0.054MM THICK.



ITEM - 1



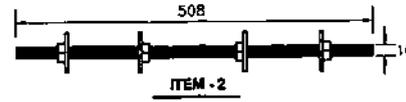
ITEM - 9



ITEM - 15



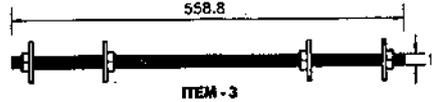
ITEM - 16



ITEM - 2



ITEM - 10



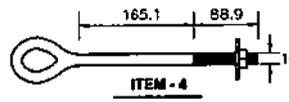
ITEM - 3



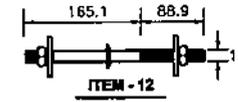
ITEM - 11



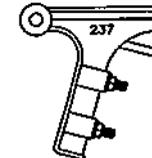
ITEM - 17



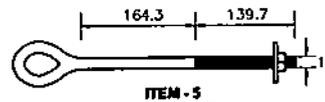
ITEM - 4



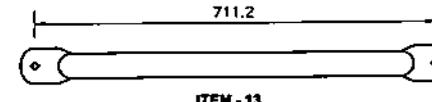
ITEM - 12



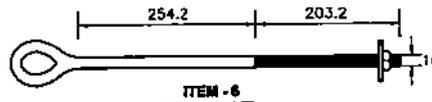
ITEM - 18



ITEM - 5



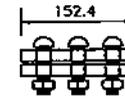
ITEM - 13



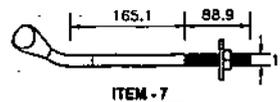
ITEM - 6



ITEM - 14



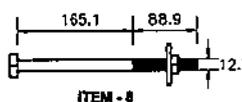
ITEM - 19



ITEM - 7

NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.



ITEM - 8

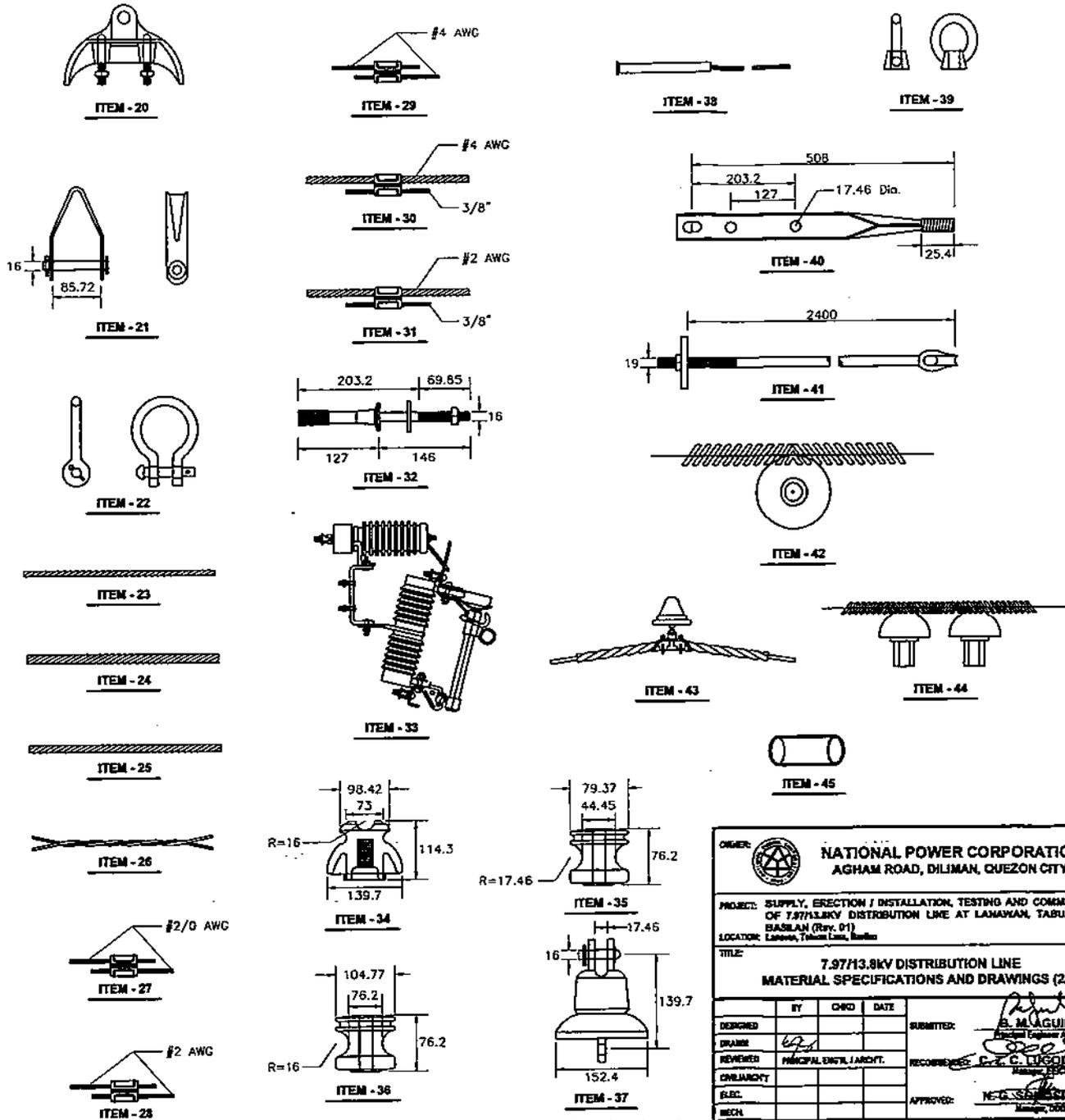
OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT:		SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LAGA,	
LOCATION:		BASILAN (Rev. 01) Lomon, Tabuan Laga, Basilan	
TITLE:		7.97/13.8KV DISTRIBUTION LINE MATERIAL SPECIFICATIONS AND DRAWINGS (1/2)	
DESIGNED:	BY:	CHKD:	DATE:
DRAWN:	BY:	CHKD:	DATE:
REVIEWED:	PRINCIPAL ENGR. / ARCHT.:	RECORDED:	
CHECKED:		APPROVED:	
ELEC.:			
MECH.:			
DWG. NO. LanDL-BDE-04.023		SPEC. NO. MInP21213545dg	
SCALE: NTS		BID DRAWING	
REV.	DATE	NATURE OF REVISION	BY

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

ITEM	MATERIALS DESCRIPTION/SPECIFICATIONS
20	CLAMP, SUSPENSION, ALUMINUM ALLOY CLEVIS, 2 BOLTS $\frac{1}{2}$ " ACSR NOMINAL. ALL FERROUS TYPE ARE HOT-DIP GALVANIZED. ALL PARTS ARE FREE FROM CORROSION INCLUDING SHARP EDGES AND SURFACE ROUGHNESS. KEYS AND WASHERS ARE DROP FORGED FROM C-1030 SEQ STEEL.
21	CLEVIS, SECONDARY SWINGING WINDOUT SPOOL.
22	SHOULDER, ANCHOR, DROP FORGE STEEL, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR EQUIVALENT THICK. STEEL AS PER ASTM A-307.
23	CONDUCTOR, BARE ACSR $\frac{1}{2}$ " A.C.S. 6/1 (60RS)
24	CONDUCTOR, BARE ACSR $\frac{1}{4}$ " A.C.S. 6/1 (60RS)
25	CONDUCTOR, BARE ACSR $\frac{1}{2}$ " A.C.S. 6/1 (60RS)
26	CONDUCTOR, DUPLEX $\frac{1}{2}$ " A.C.S. (60RS)
27	CONNECTOR, COMPRESSION, $\frac{1}{2}$ " A.C.S. RUN TO $\frac{1}{2}$ " A.C.S.
28	CONNECTOR, COMPRESSION, $\frac{1}{2}$ " A.C.S. RUN TO $\frac{1}{2}$ " A.C.S.
29	CONNECTOR, COMPRESSION, $\frac{1}{4}$ " A.C.S. RUN TO $\frac{1}{4}$ " A.C.S.
30	CONNECTOR, COMPRESSION, 10 (5/8"), (GROUND WIRE) RUN TO $\frac{1}{4}$ " A.C.S.
31	CONNECTOR, COMPRESSION, 10 (5/8"), (GROUND WIRE) RUN TO $\frac{1}{2}$ " A.C.S.
32	FW, CROSS ARM, STEEL, 16 x 273 (5/8" x 10-3/4"), WELD MIT, LOCK MIT AND RIGID/STEEL PER ASTM A-307, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR EQUIVALENT THICK.
33	FUSE, CUT-OFF, 15 KV (FOR UNIVERSAL, BOTTOM HEAD, TYPE K, FUSE LINK) AND ARRESTER, COMBINATION (WITH MOUNTING BRACKET), STRUCTURAL STEEL AS PER ASTM A-36 77A, HOT DIP GALVANIZED AS PER ASTM A-123 70 MINIMUM COATING 162 G/M ² OF SURFACE OR EQUIVALENT THICK.
34	INSULATOR, PIN TYPE, PORCELAIN, ANSI CLASS 55-4
35	INSULATOR, SPOOL, 44 (1-3/4"), ANSI CLASS 55-2
36	INSULATOR, SPOOL, 76 (3"), ANSI CLASS 55-4
37	INSULATOR, SUSPENSION, CLEVIS 152 (6"), CLEVIS TYPE, ANSI OR NEHA CLASS 52-1
38	LINK, FUSE, UNIVERSAL, BOTTOM HEAD, TYPE K, 4 AMP.
39	NUT, EYE, 16 (5/8"), CONE/CONICAL, HOT DIP GALVANIZED BOLTS MADE TO EEI-NEHA SPECIFICATIONS.
40	PIN, POLE TOP, CHANNEL, 25 (1"), TYPICAL, 300 (20") LONG.
41	ROD, ANCHOR, THREADED, SINGLE EYE, 19 x 246 (3/4" x 8") WELD MIT LOCALITY AND WISHER - 57 x 57 x 5 (6" x 6" x 1/2"), 21 (13/16") DIA. CARBON STEEL AS PER ASTM A-307 CSR SWAGING, HOT DIP GALVANIZED AS PER ASTM A-153 MINIMUM COATING 301 G/M ² OF SURFACE OR EQUIVALENT THICK.
42	ROD, ANCHOR, PREFORMED, FOR $\frac{1}{2}$ " ACSR, SINGLE SUPPORT.
43	ROD, ANCHOR, PREFORMED, FOR $\frac{1}{2}$ " ACSR, SINGLE SUPPORT.
44	ROD, ANCHOR, PREFORMED, FOR $\frac{1}{2}$ " ACSR, DOUBLE SUPPORT.
45	SPACER, PIPE, 19 x 36 (3/4" x 1-1/2")

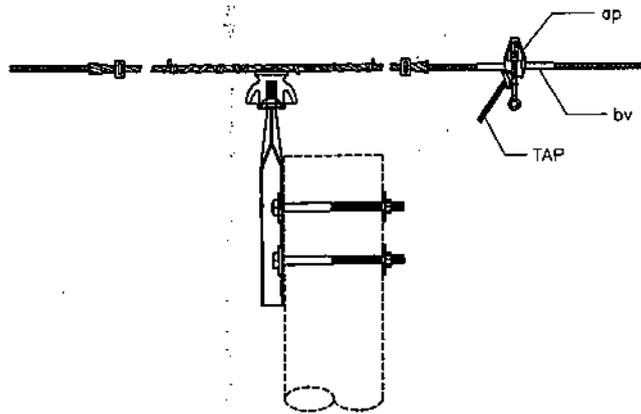
NOTES:

1. ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.



REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APP.

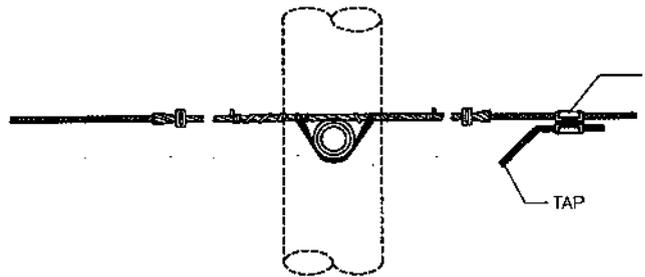
OWNER:  NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAKAN, TABUAN LASA, BASILAN (REV. 01)	
LOCATION: Lapan, Tabuan Lasa, Basilan	
TITLE: 7.97/13.8KV DISTRIBUTION LINE MATERIAL SPECIFICATIONS AND DRAWINGS (2/2)	
DESIGNED: 	DATE: 
DRAWN: 	REVISOR: 
REVIEWER: 	RECOMMENDED BY: 
ENCLARITY: 	APPROVED: 
ELEC: 	MECH: 
DRG. NO. LanDL-BDE-04.024	SPEC. NO. MinP21Z1354Sdg
SCALE: NTS	BID DRAWING
REV. 0	REV. 0



**TAP FROM PRIMARY LINE
WITH HOT LINE CLAMP**

SCALE

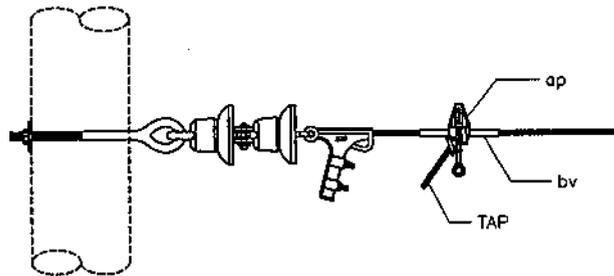
NTS



**TAP FROM NEUTRAL OR
SECONDARY LINE WITH CONNECTOR**

SCALE

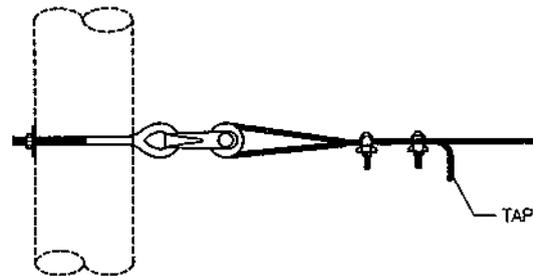
NTS



**TAP FROM PRIMARY DEAD-END
WITH HOT LINE CLAMP**

SCALE

NTS



**TAP FROM NEUTRAL OR
SECONDARY DEAD-END**

SCALE

NTS

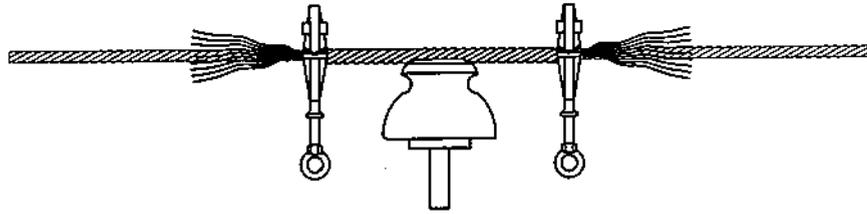
BILL OF MATERIALS	
QTY.	DESCRIPTION
p	Connector
hv	Hot line clamp, Tap assembly
br	Armor Rod, Tapping

NOTES:

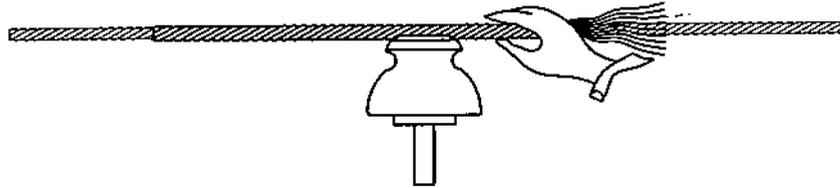
1. WIRE BRUSH CONDUCTOR THOROUGHLY BEFORE APPLYING TAP SADDLE.
2. ON NEW CONSTRUCTION, TAP MAY BE MADE DIRECTLY OVER ARMOR RODS PROVIDED CONDUCTOR IS THOROUGHLY CLEANED AND INHIBITOR USED BEFORE INSTALLING RODS.
3. TAP ARMOR RODS MAY BE SUBSTITUTED FOR TAP SADDLE PROVIDED CONDUCTOR IS WIRE BRUSHED THOROUGHLY AND INHIBITOR IS USED BEFORE INSTALLING.

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT:		SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASLAN (Rev. 01)	
LOCATION:		Lanaw, Tabuan Lasa, Baslan	
TITLE:		7.97/13.8KV DISTRIBUTION LINE TAP ASSEMBLY GUIDE FOR AC8R CONDUCTOR	
DESIGNED	BY	CHKD	DATE
DRAWN	BY		
REVIEWED	PRINCIPAL ENGR./ARCHT.	RECOMMENDED	
CIVIL/ARCHT		ELEC.	
MECH.		APPROVED:	
DWG. NO. LanDL-BDE-04.025		SPECS. NO. MinP21Z1354Sdg	
SCALE: NTS		BID DRAWING REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

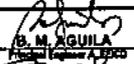
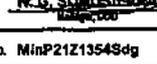


FOR TOOL APPLICATION, INSERT HALF OF THE REINFORCEMENTS IN ONE CAVITY AND ENTER THE OTHER HALF IN THE OTHER CAVITY OF THE OPEN WRENCHES, KEEPING THE ENDS EVEN. HOOK WRENCHES OVER THE CONDUCTOR AND CLOSE JAWS. SPACE WRENCHES APPROXIMATELY ONE REINFORCEMENT PITCH APART AND TWIST THEM IN THE SAME DIRECTION AS THE LAY OF THE CONDUCTOR. WIND EACH WRENCH TO THE END OF THE REINFORCEMENT AND REMOVE.



FOR HAND APPLICATION, HOLD ONE OR MORE REINFORCEMENTS AGAINST THE CONDUCTOR WITH MIDPOINT AT THE INSULATOR, AND ROTATE IN SAME DIRECTION AS THE LAY OF THE CONDUCTOR, FOR THREE OR FOUR INCHES EACH SIDE OF CENTER. IN LIKE MANNER APPLY REMAINING REINFORCEMENTS TO CENTER SECTION. AFTER ALL HAVE BEEN STARTED, COMPLETE THE APPLICATION BY A ROTARY OUTWARD WIPING MOTION OF THE HAND. MAKE CERTAIN THAT THE ENDS SNAP INTO PLACE IN PROPER ORDER.

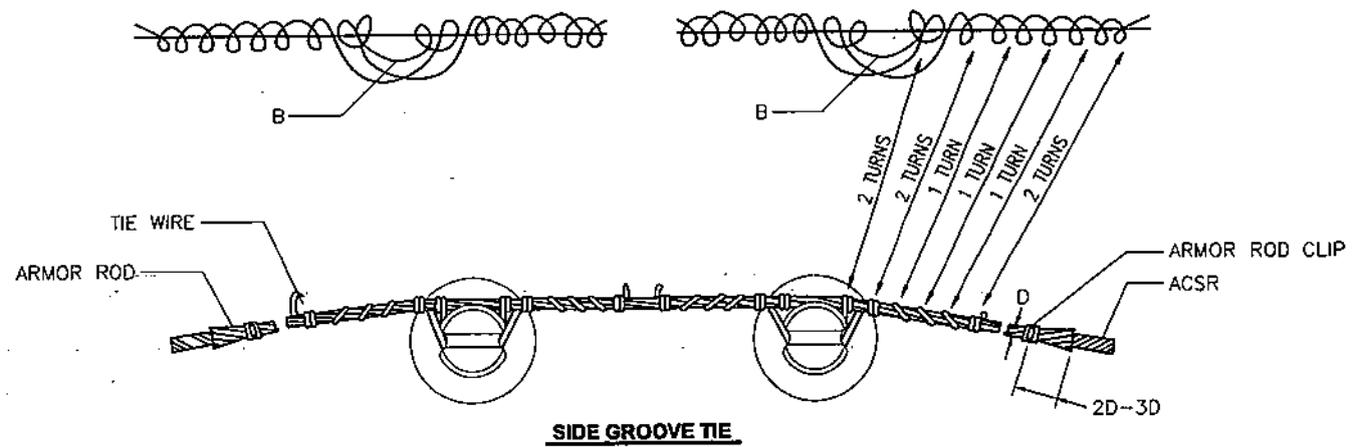
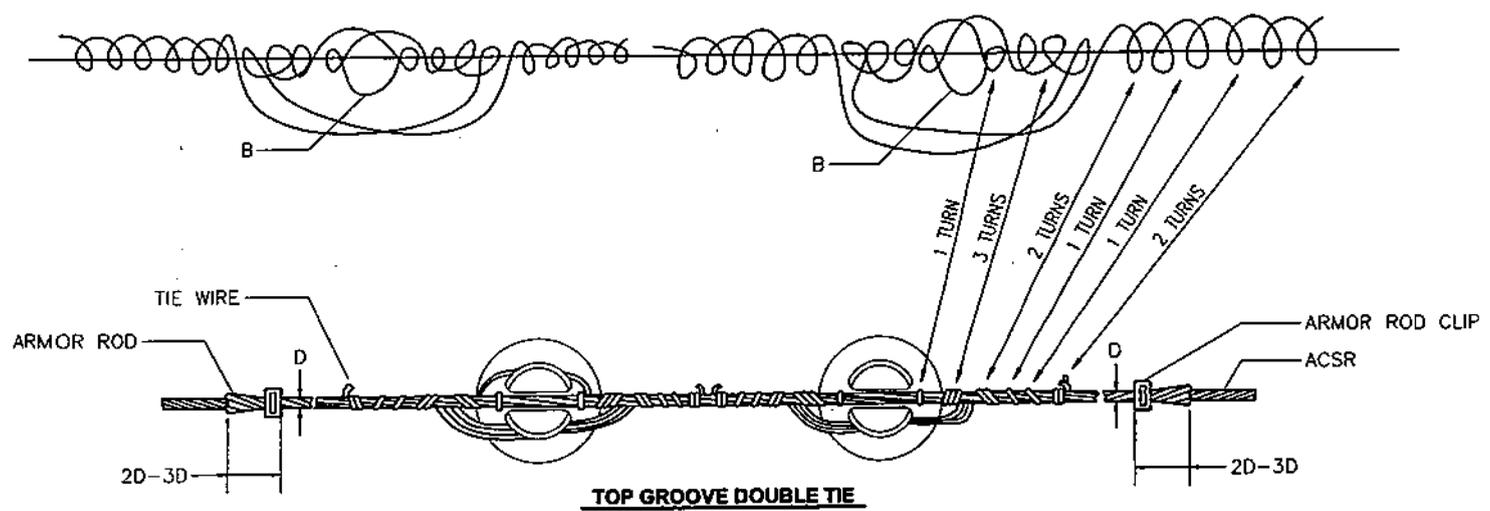
PREFORMED ALUMINUM ALLOY ARMOR RODS					
ACSR	LENGTH SINGLE SUPPORT mm (in.)	LENGTH DOUBLE SUPPORT mm (in.)	NO. PER SET	WIRE DIAMETER mm (in.)	DIAMETER PLUS RODS mm (in.)
4/0 (6 x 1)	1524 (60")	72"	11	4.6 (0.182)	23.5 (0.927)
3/0 (6 x 1)	1422 (56")	68"	11	4.2 (0.167)	21.2 (0.836)
2/0 (6 x 1)	1732 (54")	66"	10	4.2 (0.167)	19.8 (0.781)
1/0 (6 x 1)	1321 (52")	64"	9	4.2 (0.167)	18.6 (0.732)
1 (6 x 1)	1219 (48")	60"	9	3.7 (0.146)	16.3 (0.643)
2 (7 x 1)	1118 (44")	56"	9	3.7 (0.146)	15.6 (0.613)
2 (8 x 1)	1118 (44")	56"	9	3.7 (0.146)	15.3 (0.604)
4 (7 x 1)	1016 (40")	52"	7	3.7 (0.146)	13.8 (0.545)
4 (8 x 1)	1016 (40")	52"	7	3.7 (0.146)	13.6 (0.538)

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BAYLAN (Rev. 01)			
LOCATION: Lanawan, Tabuan Lasa, Baylan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE PREFORMED ARMOR RODS ACSR CONDUCTORS			
DESIGNED	BY	CHKD	DATE
DRAWN	lay		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
ENCLARNGT			
ELEC.			
MECH.			
SUBMITTED:		 B.M. AGUILERA PRINCIPAL ENGR./ARCHT.	
RECOMMENDED:		 S.C. LUGO ENGR.	
APPROVED:		 N.G. SIMENTERA ENGR.	
DWG. NO. LanDL-BDE-04.028		SPECR. NO. MinP21Z13548dg	
SCALE: NTS		BID DRAWING	
REV. DATE		MATURE OF REVISION	
BY	CHKD.	RECD.	APPD.
		REV. 0	

A. C. S. R.		ARMOR RODS		TIE WIRE ALUMINUM	
SIZE	DIAMETER mm (in.)	"D" DIAMETER mm (in.)	SIZE	LENGTH	
				meter	(feet)
4/0	14.3 (0.563)	23.9 (0.939)	4	2,8194	(9' 3")
3/0	12.8 (0.502)	21.2 (0.836)	4	2,667	(8' 9")
2/0	11.4 (0.447)	18.9 (0.745)	4	2,5146	(8' 3")
1/0	10.1 (0.398)	18.9 (0.744)	4	2,5146	(8' 3")
2	8.3 (0.325)	15.1 (0.595)	4	2,2606	(7' 5")
4	6.5 (0.257)	14.1 (0.555)	4	2,1844	(7' 3")

NOTES:

1. IN MAKING TIES, START WITH MIDDLE OF LENGTH OF TIE WIRE AT POSITION MARKED "B". TO COMPLETE TIE, CINCH UP LAST TWO TURNS AT EACH END WITH PLIERS UNTIL TIE WIRE IS SNUG AND TIGHT. USE THE FLAT FACE OF THE PLIERS AGAINST THE ARMOR RODS



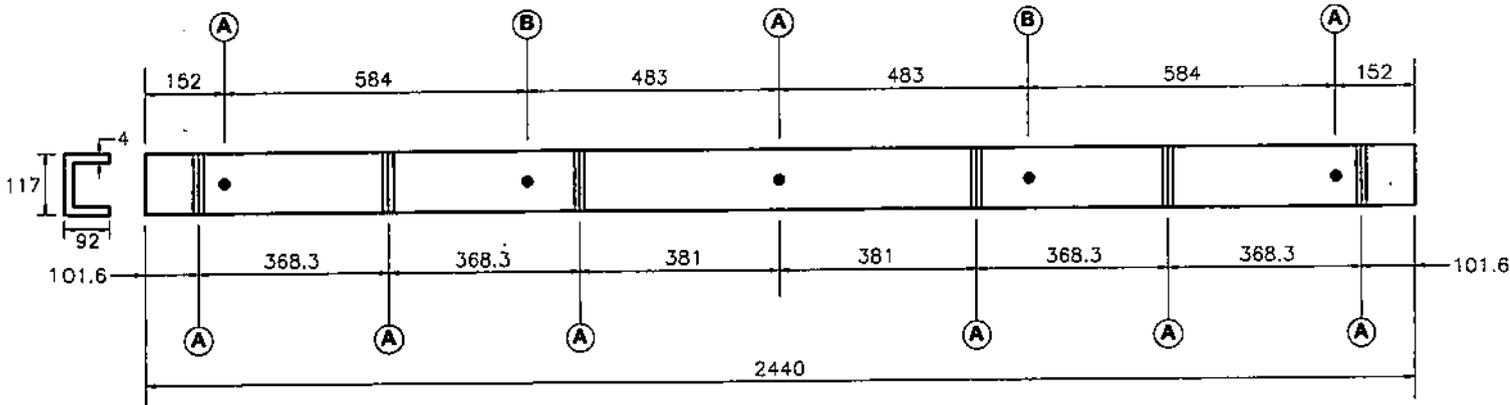
OWNER:  NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.87/11.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BAMBAN (Rev. 01)	
LOCATION: Lanawan, Tabuan Lasa, Bamban	
TITLE: 7.87/11.8KV DISTRIBUTION LINE TYING GUIDE, DOUBLE INSULATOR, ALUMINUM ALLOY OR ALUMINUM TIE WIRE, ACSR CONDUCTOR ALUMINUM ALLOY, STRAIGHT OR PREFORMED ARMOR RODS	
DESIGNED: [Signature]	SUBMITTER: B. MAGUILA
DRAWN: [Signature]	RECOMMENDER: C. Z. C. LUGO, JR.
REVIEWED: [Signature]	APPROVED: M. G. SOMEREBERA
CIVIL/ARCHT:	
ELEC:	
MECH:	
DWG. NO. LsnDL-BDE-04.028	
SPEC. NO. MinP21Z1354Sdg	
SCALE: NTS	BID DRAWING
REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

TOLERANCE SIZE OF HOLE		
CODE	NOMINAL HOLE DIAMETER	SIZE OF BOLT
(A)	18 (11/16")	16 (5/8")
(B)	12 (7/16")	10 (3/8")

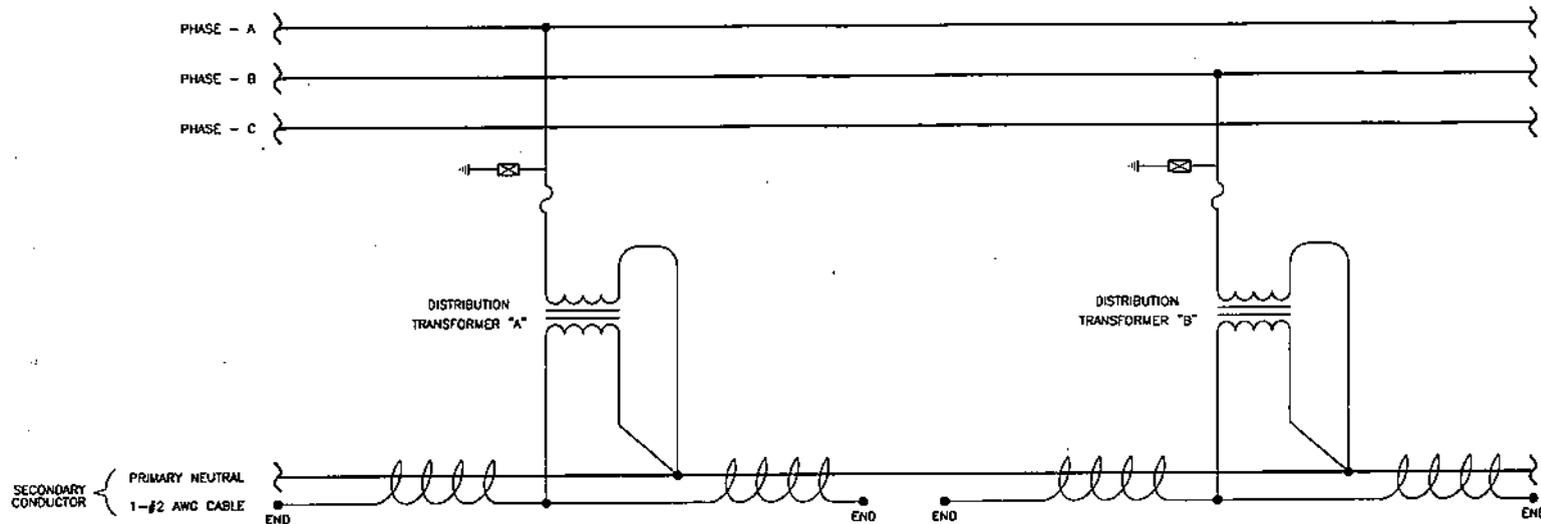
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. DRILL HOLES ON CENTERLINES OF CROSSARM FACES.
3. REMOVE ANY BURRS THAT REMAIN.
4. ALL THREADS MUST BE HAND-TAPPED AFTER GALVANIZING.
5. ALL STEEL MEETS OR EXCEEDS ASTM A572M GRADE 50 SPECIFICATIONS. YIELD STRENGTH (YS) => 50 ksi OR 345 MPa.
6. CROSSARMS ARE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123M WITH MINIMUM COATING THICKNESS OF 85 MICRONS.
7. CROSSARM SPECIFICATION CONSIDERATIONS INCLUDE THE CONDUCTOR, LINE HARDWARES, SPAN DISTANCES, LINE ANGLE, WIND LOAD ON CROSSARMS AND CONDUCTORS.
8. CROSSARM OR SIDEARM CONSTRUCTION FOR SINGLE PHASE TO THREE-PHASE CIRCUIT APPLICATION.



CROSSARM DRILLING GUIDE
SCALE: NTS

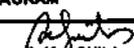
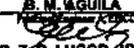
OWNER: 		NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (Rev. 01) LOCATION: Lanawan, Tabuan Lasa, Basilan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE CROSSARM DRILLING GUIDE			
DESIGNED	BY	CHKD	DATE
DRAWN	6/2		
REVIEWED	PERSONAL ENGR. / ARCHT.		RECOMMENDED
ENCLAVANT			
E.L.C.			
M.E.C.A.			
DWG. NO. LanDL-BDE-04.029		SPEC. NO. MinP21Z13S4Sdg	
SCALE: NTS		BID DRAWING	
REV. DATE		NATURE OF REVISION	
BY	CHKD.	RECD.	APPR.
		REV. 0	



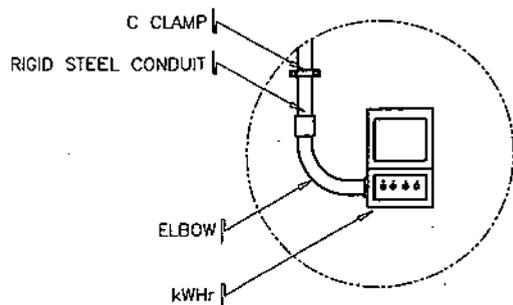
TYPICAL CONNECTION DIAGRAM

NOTES:

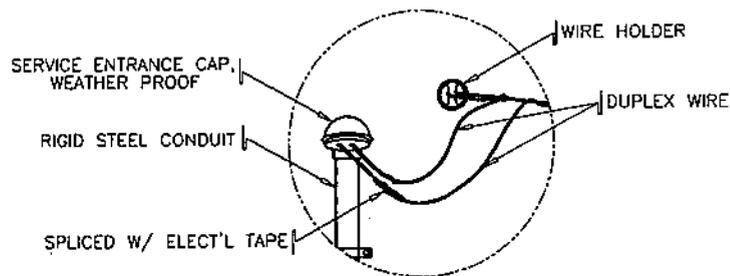
1. EACH DISTRIBUTION TRANSFORMERS SHALL HAVE THEIR OWN DEDICATED RUN OF SECONDARY CONDUCTOR. PARALLELING OF TWO OR MORE DISTRIBUTION TRANSFORMERS IN A SINGLE RUN OF SECONDARY CONDUCTOR IS NOT ALLOWED
2. ONLY THE SECTION OR SEGMENT OF THE LINE IDENTIFIED WITH UNDERBUILD AND OPEN-SECONDARY SHALL BE PROVIDED WITH 1-#2AWG INSULATED CABLE TO BE WRAPPED AROUND WITH THE PRIMARY NEUTRAL CONDUCTOR. ACTUAL LINE LENGTH OF THE SECONDARY CONDUCTOR SHALL BE DETERMINED AT SITE BASED ON THE ACTUAL SITE REQUIREMENTS
3. TOTAL CONNECTED LOAD FOR SECONDARY CONDUCTOR SHALL BE LIMITED TO 80% OF THE CONDUCTOR AMPACITY

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LAHAWAN, TABUAN LASA, BAKILAN (Rev. 01)			
LOCATION: Lantao, Tabuan Las, Bacolan			
TITLE:		7.97/13.8KV DISTRIBUTION LINE TYPICAL CONNECTION DIAGRAM	
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	BY	CHKD	DATE
CHECKED	BY	CHKD	DATE
DATE	BY	CHKD	DATE
SUBMITTED:		 B. M. AGUILA ENGINEER IN CHARGE	
RECOMMENDED:		 G. Z. C. LUGO, JR. PRINCIPAL ENGR. / ARCHT.	
APPROVED:		 M. L. SANTIAGO ENGINEER	
DWO. NO. LanDL-BDE-04.030		SPEC. NO. MInP21213543dg	
SCALE: NTS		BID DRAWING	
REV. 0		REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



DETAIL "A"

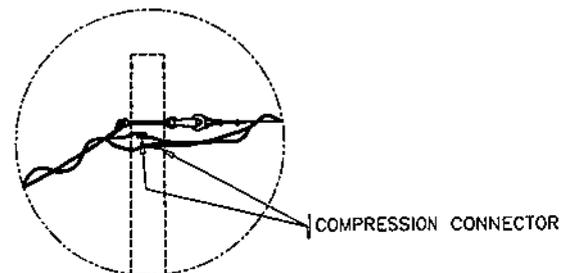
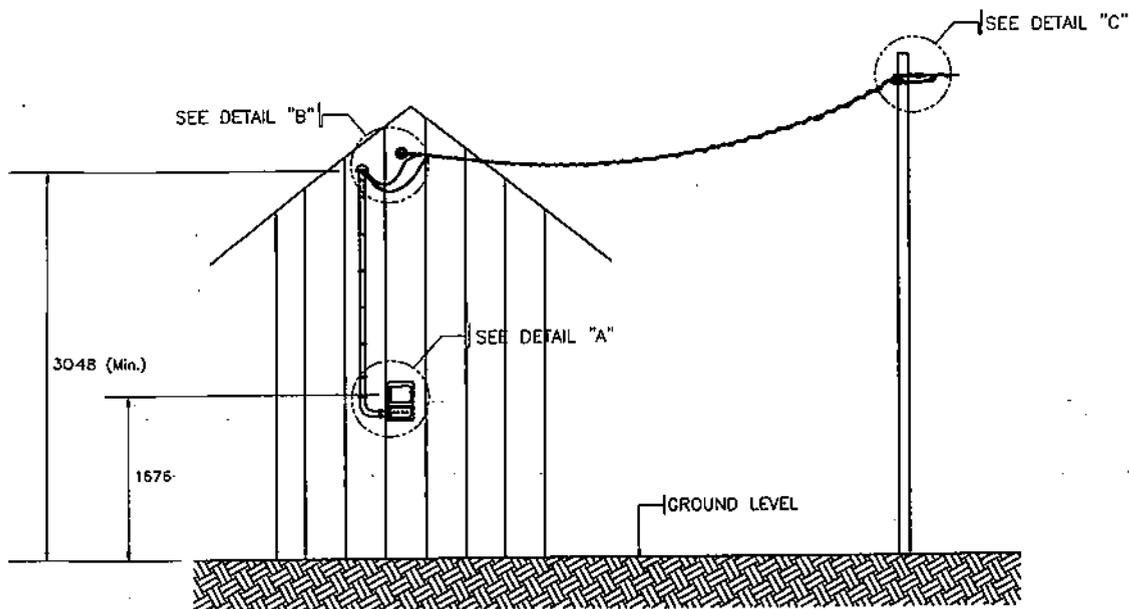


DETAIL "B"

BILL OF MATERIALS	
QTY.	DESCRIPTION
1	Digital KiloWatt-Hour Meter, 230V, 2wires, 10(60)A
25m	Duplex Cable #6 AWG, 6/1 stranding for service dropwire
1	Service Entrance Cap, weather proof type, 19 (3/4") dia.
1	Rigid Steel Conduit, 19 (3/4") dia x 254 (10"), w/ locknut, elbow & bushing
1	Wire Holder, universal service type no. 22
1	Tape, electrical, big
2	Tapping Connector, compression type for (#2 - #8)
10m	Wrs. 8.0 mm ² THW/THWN-2, 600V

NOTES:

- ALL DIMENSIONS AS SHOWN ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.



DETAIL "C"

OWNER:		 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (Rev. 01)			
LOCATION: Lanawan, Tabuan Lasa, Basilan			
TITLE: 7.97/13.8KV DISTRIBUTION LINE TYPICAL SERVICE DROP ELEVATION AND DETAILS			
DESIGNED	BY	CHKD	DATE
DRAWN	BY	CHKD	DATE
REVIEWED	PRINCIPAL ENGR. / ARCHT.	RECOMMENDED	C. Z. C. LUGAO, JR.
CIVIL/ARCHT		APPROVED:	N. G. SOMEREBERA
ELEC.			
MECH.			
DWG. NO. LanDL-8DE-04.031		SPEC. NO. MinP21Z1354Sdg	
REV.	DATE	NATURE OF REVISION	BY
SCALE: NTS		BID DRAWING	
		REV. 0	

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

SECTION IX – BID/REFERENCE DRAWINGS**CW – CIVIL WORKS**

DRAWING NO.	TITLE
LanDL-BDC-004.001	7.97/13.8kV DIRECT BURIED STEE POLE (Elevation, Sections and Detail)
LanDL-BDC-004.002	7.97/13.8kV DIRECT BURIED STEE POLE (Secondary and 1 Phase)
LanDL-BDC-004.003	7.97/13.8kV DIRECT BURIED STEE POLE (2 Phase and 3 Phase)
LanDL-BDC-004.004	STEEL POLE CONCRETE ENCASEMENT (Plan, Elevation, Details)

7.97/13.8 KV STEEL POLE DESCRIPTIONS

Span Deflection Angle	25 ft	30 ft	35 ft	40 ft	50 ft
	7.62 m	9.10 m	10.65 m	12.15 m	15.20 m
Qs (0°-5°)					
Tip Diameter (mm)	100	100	100	100	100
Butt Diameter (mm)	207.5	210	213	215	220
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.35	1.50	1.65	1.80	2.10
Rs (5°-30°)					
Tip Diameter (mm)	100	100	100	100	100
Butt Diameter (mm)	238	240	243	245	250
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.35	1.50	1.65	1.80	2.10
Ss (30°-60°)					
Tip Diameter (mm)	100	100	100	100	100
Butt Diameter (mm)	273	275	278	280	285
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.35	1.50	1.65	1.80	2.10
Ts (60°-90°)					
Tip Diameter (mm)	100	100	100	100	100
Butt Diameter (mm)	288	290	293	295	300
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.35	1.50	1.65	1.80	2.10

SECONDARY

Types of Pole	Length				
	30 ft 9.10 m	35 ft 10.65 m	40 ft 12.15 m	45 ft 13.70 m	50 ft 15.20 m
QNA (0°-5°)					
Tip Diameter (mm)	130	130	130	130	130
Butt Diameter (mm)	225	240	255	265	280
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
RNA (5°-30°)					
Tip Diameter (mm)	130	130	130	130	130
Butt Diameter (mm)	265	280	300	315	345
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
SNA (30°-60°)					
Tip Diameter (mm)	130	130	130	130	130
Butt Diameter (mm)	310	345	375	410	445
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
TNA (60°-90°)					
Tip Diameter (mm)	130	130	130	130	130
Butt Diameter (mm)	330	365	395	430	465
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10

1 PHASE

NOTES:

1. THE MATERIAL FOR POLE SHALL BE 345 MPa (50 ksi) MINIMUM YIELD STRENGTH OF ROLLED STEEL PLATE.
2. TYPE AND THICKNESS OF POLES SHALL BE EMBOSSED LEGIBLY ON THE BODY 1.5 METERS HIGH ABOVE THE GROUND LINE BEFORE GALVANIZING. THE HEIGHT OF THE LETTERS SHALL BE THREE (3) CENTIMETERS.
3. THE SPANNING ARE AS FOLLOWS:
FOR SECONDARY- SPAN OF 30 METERS, 40 METERS AND 50 METERS.
FOR PHASE 1- MAXIMUM SPAN OF 100 METERS.
4. THE POLES SHALL BE OCTAGONAL (8 SIDES) AND THE DIAMETERS ARE MEASURED ON THE OUTSIDE AND ACROSS THE FLAT SURFACE.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPR.

OWNER:				NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY	
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (REV. P1)					
LOCATION: Lanawan, Tabuan Lasa, Basilan					
TITLE: 7.97/13.8KV DIRECT BURIED STEEL POLE (SECONDARY AND 1 PHASE)					
DESIGNED	BY	CHKD	DATE	SUBMITTED:	<i>H. L. ENDOZA</i> Principal Engineer, E&C
DRAWN	DATE			RECOMMENDED:	<i>A. G. ESPERITU</i> Chief Engineer
REVIEWED	PRINCIPAL ENGR. / ARCHT.			APPROVED:	<i>N. G. SORIANO</i> Chief Engineer
CHKD/ARCHT					
ELEC					
MECH					
DWG. NO. LanDL-BDC-04.002			SPECS. NO. MinP2121354Sdg		
SCALE: NTS		BID DRAWING		REV. 0	

7.97/13.8 KV STEEL POLE DESCRIPTIONS

Type of Pole \ Length	30 ft	35 ft	40 ft	45 ft	50 ft
	9.10 m	10.65 m	12.15 m	13.70 m	15.20 m
QNB (0°-5°)					
Tip Diameters (mm)	150	150	150	150	150
Butt Diameter (mm)	240	255	270	285	300
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
RNB (5°-30°)					
Tip Diameters (mm)	150	150	150	150	150
Butt Diameter (mm)	300	320	335	365	400
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
SNB (30°-60°)					
Tip Diameters (mm)	150	150	150	150	150
Butt Diameter (mm)	350	380	415	450	485
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
TNB (60°-90°)					
Tip Diameters (mm)	150	150	150	150	150
Butt Diameter (mm)	370	400	435	475	510
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10

2 PHASE

Type of Pole \ Length	30 ft	35 ft	40 ft	45 ft	50 ft
	9.10 m	10.65 m	12.15 m	13.70 m	15.20 m
QNC (0°-5°)					
Tip Diameters (mm)	200	200	200	200	200
Butt Diameter (mm)	260	270	285	300	320
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
RNC (5°-30°)					
Tip Diameters (mm)	200	200	200	200	200
Butt Diameter (mm)	310	340	365	380	420
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
SNC (30°-60°)					
Tip Diameters (mm)	200	200	200	200	200
Butt Diameter (mm)	370	400	435	470	510
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10
TNC (60°-90°)					
Tip Diameters (mm)	200	200	200	200	200
Butt Diameter (mm)	390	425	455	495	535
Thickness (mm)	4	4	4	4	4
Embedded to Ground (m)	1.50	1.65	1.80	1.95	2.10

3 PHASE

NOTES:

1. PLATES MATERIALS FOR STEEL POLE SHALL BE 345MPa (50 ksi) MINIMUM YIELD STRENGTH.
2. STEEL POLE TYPES AND LENGTHS SHALL BE MARKED LEGIBLY ON THE BODY AS SPECIFIED IN THE SPECIFICATIONS.
3. STEEL POLE TIPS & BUTTS SHALL BE COVERED WITH PLATES SIMILAR TO SHAFT BODY THICKNESS.
4. STEEL POLES SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123M WITH MINIMUM COATING THICKNESS OF 85 MICRONS.
5. STEEL POLES SHALL BE OCTAGONAL AND THE DIAMETERS ARE MEASURED ON THE OUTSIDE SURFACE & ACROSS THE FLATS.

 NATIONAL POWER CORPORATION AGHAM ROAD, DILIMAN, QUEZON CITY									
PROJECT: SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, SABLAN (REV. 01) LOCATION: Lanawan, Tabuan Lasa, Sablán									
TITLE: 7.97/13.8KV DIRECT BURIED STEEL POLE (2 PHASE AND 3 PHASE)									
<table border="1"> <tr> <th>DESIGNED</th> <th>BY</th> <th>CHKD</th> <th>DATE</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	DESIGNED	BY	CHKD	DATE					SUBMITTED: <i>H. L. MENDOZA</i>
DESIGNED	BY	CHKD	DATE						
<table border="1"> <tr> <th>DRAWN</th> <th>CHKD</th> </tr> <tr> <td></td> <td></td> </tr> </table>	DRAWN	CHKD			RECOMMENDED: <i>A. C. ESPINOSA</i>				
DRAWN	CHKD								
<table border="1"> <tr> <th>REVIEWED</th> <th>PRINCIPAL ENGR. / ARCHT.</th> </tr> <tr> <td></td> <td></td> </tr> </table>	REVIEWED	PRINCIPAL ENGR. / ARCHT.			APPROVED: <i>H. L. MENDOZA</i>				
REVIEWED	PRINCIPAL ENGR. / ARCHT.								
<table border="1"> <tr> <th>CIVIL ARCHT</th> <th>ELEC</th> <th>MECH</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	CIVIL ARCHT	ELEC	MECH						
CIVIL ARCHT	ELEC	MECH							
DWG. NO. LmDL-BDC-04.003 SPEC. NO. MlnP21Z13548dg									
BID DRAWING									
SCALE: NTS	REV. 0								

REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPR.

SECTION X

STAKING SHEETS



STAKING SHEET

Project Title: **SUPPLY, ERECTION / INSTALLATION, TESTING AND COMMISSIONING OF 7.97/13.8KV DISTRIBUTION LINE AT LANAWAN, TABUAN LASA, BASILAN (Rev. 01)**

Specs No: **MinP2I2I354Sdg**

Location: **Lanawan, Tabuan Lasa, Basilan**

Primary Conductor: 1/0 AWG ACSR
 Neutral Conductor: 1/0 AWG ACSR
 Secondary Conductor: No. 2 AWG DUPLEX WIRE
 Service Drop Wire: No. 6 AWG DUPLEX WIRE
 Ruling Span (meter): 60

Qty	Pole Code	Type	Height	Pole No.		Pole Data				Dist. angle	T-Strut Assy		Bracket Assy		Crossing Assy		Crossover Assy		Anchor Assy		Secondary Assy				Service Assy			Regulator Assy		Meter Assy		Remarks			
				From	To	Span	Phase	Type	Code		Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty	Code	Qty				
				take-off																															
1	QNC-SP	40		1	2	44.30	3	C7-2	1																										
1	QNC-SP	40		2	3	44.30	3	C1	1																										
1	QNC-SP	35		3	4	44.30	3	C1	1																										
1	RNC-SP	35		4	5	29.08	3	C2	1	7°R					E1-2A	1			F2-2A	1															
1	RNC-SP	35		5	6	42.70	3	C2	1	15°R					E1-2A	1			F2-2A	1															
1	QNC-SP	35		6	7	42.70	3	C1	1																										
1	RNC-SP	35		7	8	49.01	3	C2	1	10°R					E1-2A	1			F2-2A	1															
1	RNC-SP	35		8	9	56.71	3	C2	1	12°R					E1-2A	1			F2-2A	1															
1	RNC-SP	35		9	10	54.90	3	C2	1	15°L					E1-2A	1			F2-2A	1															
1	RNC-SP	35		10	11	55.55	3	C2	1	12°L					E1-2A	1			F2-2A	1															
1	RNC-SP	35		11	12	56.11	3	C2	1	11°L					E1-2A	1			F2-2A	1			J15A	1	UB	56.11				M2-11A	1				
1	QNC-SP	40		12	13	53.86	3	C1	1			G123	1									J5	1	UB	53.86				M2-11	1			15KVA W/ 6A FUSE LINK		
1	TNC-SP	40		13	14	53.86	3	C7	1	81°R					E1-2A	1			F2-2A	1		J15A	1	UB	53.86				M2-11A	1					
	TNB-SP	40				53.86	V	B7	1	81R														N											
1	RNB-SP	40		14	15	56.57	V	B2	1	13°R					E1-2A	1			F2-2A	1		J10	1	UB	56.57				M2-11A	1					
1	QNB-SP	35		15	16	56.35	V	B1	1													J5	1	UB	56.35				M2-11A	1					
1	QNB-SP	35		16	17	44.26	V	B1	1	1°L												J5	1	UB	44.26				M2-11A	1					
1	QNB-SP	40		17	18	49.74	V	B1	1													J5	1	UB	49.74				M2-11A	1					
1	RNB-SP	35		18	19	50.13	V	B2	1	6°L					E1-2A	1			F2-2A	1		J10	1	UB	50.13				M2-11A	1					
1	QNB-SP	40		19	20	48.26	V	B1	1	1°R												J5	1	UB	48.26				M2-11A	1					
1	RNB-SP	40		20	21	50.89	V	B2	1	6°R		G122	1		E1-2A	1			F2-2A	1		J10	1	UB	50.89				M2-11	1			15KVA W/ 6A FUSE LINK		
1	QNA-SP	35		21	22	53.50	1	A1	1	1°L												J5	1	UB	53.5				M2-11A	1					
1	QNA-SP	35		22	23	54.53	1	A1	1	2°R												J5	1	UB	54.53				M2-11A	1					
1	QNA-SP	35		23	24	52.01	1	A1	1	2°L												J5	1	UB	52.01				M2-11A	1					
1	QNA-SP	35		24	25	47.67	1	A1	1													J5	1	UB	47.67				M2-11A	1					
1	QNA-SP	30		25	26	47.01	1	A1	1													J5	1	UB	47.01				M2-11A	1					
1	RNA-SP	30		26	27	58.00	1	A2	1	5°R		G124	1		E1-2A	1			F2-2A	1		J10	1	UB	58.00				M2-11	1			5VA W/ 2A FUSE LINK		
1	QS-SP	25		27	28	51.79	1	J5	1													J5	1	OS	51.79										
1	QS-SP	25		28			1	J15A	1													J15A	1	OS											