Power System Engineering, Inc.

Full-service consultants

Transformer Specification

City of Negaunee
Irontown Substation

STATE OF MICHIGAN
SETH PACKWOOD
License No. 6201311239
LICENSED PROFESSIONAL ENGINEER

Seth Packwood 3/10/23

Prepared by:

Power System Engineering, Inc.

March 6th, 2023

This page has been left intentionally blank.

SECTION 00 01 10 – TABLE OF CONTENTS

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

END OF INDEX

This page has been left intentionally blank.

SECTION 00 11 16 – ADVERTISEMENT

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

Furnish and deliver a substation transformer
For City of Negaunee, Negaunee, Michigan

City of Negaunee, Negaunee, Michigan will receive sealed bids to furnish and deliver, including any necessary labor and materials needed to provide the equipment for two (2) new 138 kV to 12.47 kV x 4.16 kV, 7.5/10.5 MVA transformers.

Sealed Bids will be received at City of Negaunee City Hall, 319 West Case Street, P.O. Box 70, Negaunee, MI 49866, until April 11th, 2023 at 11:00 a.m. EST at which time the bids will be opened and publicly read aloud.

Bids shall be addressed to City of Negaunee, Attn: City Clerk, 319 West Case Street, P.O. Box 70, Negaunee, MI 49866 and shall be marked "SEALED BID – IRONTOWN SUBSTATION TRANSFORMER - Submitted by (Bidder's name)".

The Bidder shall include evidence of having satisfactorily furnished and delivered similar substation transformers for at least five (5) similar installations during the past five (5) years.

Specifications and bid documents may be examined at or obtained from the Consulting Engineering Firm: Power System Engineering, Inc., Attn: Jill Igl, 2424 Rimrock Road, Suite 300, Madison, WI 53713. Ph# 608-268-3574 or by email at iglj@powersystem.org. The bidding documents will be issued electronically.

No proposal will be accepted unless accompanied by a certified check or bid bond for at least five percent (5%) of the amount of the proposal, payable to the Owner.

The Owner reserves the right to reject any or all bids, to waive any informalities in a bid, and to make awards in the interest of the Owner.

Published by authority of City of Negaunee City Clerk, and duly authorized agent for City of Negaunee Public Works.

This page has been left intentionally blank.

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

PART 1 - GENERAL

1.1 INDEX

A. Part 1 - General
   1. Index
   2. Contract Time
   3. Definitions
   4. Contract Documents Identification
   5. Availability of Documents
   6. Examination of Documents
   7. Inquiries and Addenda
   8. Bidder Qualifications
   9. Submission Procedure
   10. Bid Ineligibility
   11. Bid Security
   12. Bid Form Requirements
   13. Selection and Award of Bids
   14. Bid Opening
   15. Duration of Offer
   16. Acceptance of Offer

1.2 CONTRACT TIME

A. Identify the Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

B. The Owner requires the work of this Contract be completed as quickly as possible. Consideration may be given to time of completion when reviewing submitted Bids.

1.3 DEFINITIONS

A. Bidding Documents: Contract Documents supplemented with Advertisement to Bid, Instructions to Bidders, Bid Form, bid securities, and other documents identified on the Table of Contents (Section 000110).

B. Bid: Executed Bid Form and required attachments submitted in accordance with these Instructions to Bidders.

C. Bid Price: Monetary sum identified by the Bidder in the Bid Form.

D. The term "BIDDER" means one who submits a Bid directly to the Owner, as distinct from a Sub-bidder, who submits a Bid to a Bidder. The term "Bidding Documents" includes the Advertisement or Invitation to Bid, Instructions to Bidders, the Proposal

Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Proposals).

E. The OWNER of this project is City of Negaunee and may also be referred to as the Purchaser or Buyer.

F. The term “CONTRACTOR” or “SUPPLIER” shall be held to mean the firm which is given a Purchase Order and/or Contract for material purchase.

G. The ENGINEER for this project is Power System Engineering, 2424 Rimrock Road, Madison, WI.

H. The terms "Bid" and "Proposal" have the same meaning.

1.4 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as the Irontown Substation Transformer specifications for City of Negaunee as prepared by Power System Engineering, Inc., located at 2424 Rimrock Road, Madison WI, 53713.

1.5 AVAILABILITY OF DOCUMENTS

A. Bidding Documents may be obtained from the Engineer as stated in Advertisement to Bid.

B. Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

C. Bidding Documents are made available only for the purpose of obtaining offers for this Project. Their use does not grant a license for other purposes.

1.6 EXAMINATION OF DOCUMENTS

A. Bidding Documents may be viewed at the office of Power System Engineering, 2424 Rimrock Road, Madison WI, 53713. The Bidding Documents will be issued electronically.

B. Upon receipt of Bidding Documents, verify that documents are complete. Notify the Engineer if documents are incomplete.

C. Immediately notify the Engineer upon finding discrepancies or omissions in Bidding Documents.

D. The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Section, that without exception the Bid is premised upon performing and furnishing the equipment required by the Contract Documents as may be indicated in or required by the Contract

Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the equipment.

1.7 INQUIRIES AND ADDENDA

A. Direct questions in writing or via e-mail to the Engineer, at the office of the Engineer.

B. Verbal answers are not binding on any party.

C. It is the Bidder's responsibility to verify with the Engineer that all Addenda have been received prior to submitting a Bid.

D. Submit questions not less than eight days before the date set for receipt of Bids. Replies will be made by Addenda.

E. Addenda may be issued during the bidding period. Addenda will be sent to known Bidders. Addenda become part of the Contract Documents. Oral and other interpretations or clarifications will be without legal effect. Include resultant costs in the Bid Price.

1.8 BIDDER QUALIFICATIONS

A. The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item of material or equipment may be furnished or used by the Contractor if acceptable to Engineer, application for such acceptance will not be considered by the Engineer until after the Effective Date of the Agreement or issuance of a Purchase Order.

B. The Bidder shall include evidence of having satisfactorily provided similar services to similar users for at least five installations during the past five years.

1.9 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for delivery of Bids in the manner and time prescribed in the Advertisement.

B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security deposit in a closed opaque envelope, clearly identified with the Bidder’s name, Project name, and Owner's name on the outside.

C. Improperly completed information, irregularities in security deposit or Bid Bond, will be cause not to open the Bid Form envelope and declare the Bid invalid or informal.

D. An abstract summary of submitted Bids will be made available to all Bidders following the Bid Opening.

1.10 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, or that contain arithmetical errors, erasures, alterations, or irregularities of any kind, will be declared unacceptable at the Owner's discretion.

B. Bid Forms, Appendices, and enclosures which are improperly prepared will be declared unacceptable at the Owner's discretion.

C. Failure to provide the security deposit, bonds, or insurance requirements will invalidate the Bid at the discretion of the Owner.

1.11 BID SECURITY

A. Each Bid must be accompanied by Bid Security made payable to the Owner in an amount and in the form as defined in the Advertisement. If the amount of Bid Security is not defined in the Advertisement, the Bid security shall be five percent (5%) of the Bidder's maximum Bid Price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety meeting the requirements. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act. If the surety on any Bond furnished by the Bidder is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the above requirements, the Bidder shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to the Owner. The security deposit of the accepted Bidder will be returned after delivery to the Engineer of the required Performance Bond by the accepted Bidder.

B. Bid, Performance, and Payment Bonds shall be issued by a surety company licensed to do business in the state of the Owner and Owner's project. The Performance Bond shall be equal to 100% of the contract price.

C. The Bid Security is used as a guarantee that if the Proposal is accepted, the Bidder will execute and file three (3) completed copies of the required proper Contract and Performance Bond within fifteen (15) days after award of the Contract.

D. The Bid Security of the successful Bidder will be retained until such Bidder has executed the Agreement or accepted the Purchase Order and furnished the required Contract Security, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute and deliver the Agreement or accept the Purchase Order within fifteen days after the Notice of Award or issuance of Purchase Order, the Owner may annul the Notice of Award or Purchase Order and the Bid Security of that Bidder will be forfeited. The Bid Security of other Bidders whom the Owner believes to have a reasonable chance of receiving the award may be retained by the Owner until the earlier of the

seventh day after the Effective Date of the Agreement or the forty-sixth day after the Bid Opening, whereupon Bid Security furnished by such Bidders will be returned. Bid Security with Bids which are not competitive will be returned on acceptance of the Contract.

E. If no Contract is awarded, security deposits will be returned.

1.12 BID FORM REQUIREMENTS

A. Complete requested information in the Proposal Form and Bidding Documents.

B. Provide additional Bid data as outlined in the technical specification.

1.13 SELECTION AND AWARD OF BIDS

A. Bids will be evaluated and selected based on the lowest evaluated, responsible, acceptable total base Bid price with full consideration of alternates.

1.14 BID OPENING

A. Bids will be opened publicly immediately after the time for receipt of Bids noted in the Advertisement or any Addendums adjusting the timeframe.

1.15 DURATION OF OFFER

A. Bids shall remain open to acceptance for a period of 60 days after the bid closing date.

B. No Bid shall be withdrawn after the opening of Bids without written consent of the Owner for a period of sixty (60) days after the scheduled time of receiving the Bids.

1.16 ACCEPTANCE OF OFFER

A. The Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the work and to negotiate Contract terms with the successful Bidder and the right to disregard all nonconforming, non-responsive, unbalanced or conditional Bids. Also, the Owner reserves the right to reject the Bid of any Bidder if the Owner believes that it would not be in the best interest of the project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the Owner.

B. After acceptance by the Owner, the Engineer, on behalf of the Owner, will issue to the accepted Bidder a written Notice of Award.

C. The Owner may conduct such investigations as the Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, Suppliers and other persons and organizations to perform and furnish

the equipment in accordance with the Contract Documents to the Owner's satisfaction within the prescribed time.

D. If the Contract is to be awarded, it will be awarded to the Bidder whose Bid offer, as evaluated by the Owner, indicates to the Owner that the award will result in the lowest overall project cost at completion and be in the best interests of the project and the Owner.

E. Notwithstanding delay in the preparation and execution of the Agreement, the accepted Bidder shall be prepared, upon written Notice of Award, to commence work immediately following receipt of official written order of the Owner to proceed, or on a date stipulated in such order.

F. The accepted Bidder shall assist and cooperate with the Owner to prepare the Agreement, and within fifteen days following its presentation shall execute the Agreement and return it to the Owner.

END OF SECTION

This page has been left intentionally blank.

SECTION 00 41 13 – PROPOSAL

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

*All bids shall be in U.S. Dollars in lawful money of the United States of America.

TO: City of Negaunee (Hereinafter called the "Owner")

1. Base Bid - Total firm price to furnish and deliver two (2) 7.5/10.5 MVA, 55/65° C, 138,000 Volt Delta Primary, dual voltage 12,470 Y/7,200 Volt and 4,160 Y/2,400 Volt Secondary, three-phase transformers in accordance with the Specifications:

   Quoted Price – two (2) transformers $_____

   $ _____dollars and _____cents.

2. Alternate Bid - Manufacturer suggested alternate, assuming alternates are acceptable:

   Quoted Price – two (2) transformers $_____

   $ _____dollars and _____cents.

3. Unit price for optional offloading $_____

4. Unit price for optional assembly $_____

5. Unit price for optional testing $_____

6. Five (5) year warranty included as specified (Yes/No) _____

7. Delivery:

   Shipping ARO: _____ Weeks

8. List items which will be shipped unassembled and require assembly in the field:

   _____

   _____

9. Shop drawing submittal schedule:

   For Review ARO: _____

   Final ARO: _____

10. Transformer data

a. Manufacturer _____

b. Factory location (where windings are manufactured and transformer is assembled) _____

c. Guaranteed maximum no-load loss at rated voltage and base OA rating _____

d. Guaranteed maximum load loss at rated voltage and base ONAN rating _____

e. Estimated total accessory load _____

f. Main core design (Ex. round) _____

g. Main coil material: copper or aluminum _____

h. HV winding: Disk, Helical, Other _____

i. LV winding: Disk, Helical, Other _____

j. Does the winding design assume an infinite bus limited only by the impedance of the transformer? _____

k. Impedance _____

l. Estimated base dimensions _____

m. Estimated overall outside dimensions _____

n. Estimated weight _____

o. Estimated total oil capacity _____

p. Warranty:

i. State the length of warranty period _____

ii. Is in/out coverage included? For how long? _____

iii. Does the warranty cover all accessories as well as the core and coil? _____

q. Shipment:

i. Will transformer ship oil filled? Yes/No _____

ii. F.O.B. destination? _____

iii. Proposed destination _____

11. The equipment proposed is in accordance with the specifications:

☐ Yes ☐ No - (If not, list all exceptions on a separate sheet & identify as “Exceptions”)

12. Options:

[List as required for each application]

_____

_____

13. The following Addenda have been received. The modifications to the Contract Documents noted therein have been considered and all costs thereto are included in the Bid Price.

Date	Addendum #
_____	_____
_____	_____

(a) BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, Site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the materials and equipment.

(b) BIDDER has given ENGINEER written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.

(c) BIDDER certifies that this proposal is made and submitted without fraud or collusion with any other firm or corporation whatsoever. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

(d) The BIDDER acknowledges the right of the OWNER to reject any or all Bids, waive any irregularities or informalities therein and award the Contract to other than the lowest evaluated Bidder if, in its discretion, the interests of the OWNER would be best served thereby.

14. City of Negaunee is a tax exempt entity. Tax exempt information can be provided to the successful bidder if required.

15. The following documents are attached to and made a condition of this Bid:

Required bid security in the form of a Certified Check or Bid Bond, being at least five percent (5%) of the amount bid, and made payable to the OWNER.

SELLER: _____

ADDRESS: _____

AUTHORIZED REPRESENTATIVE: _____

SIGNATURE: _____

DATE: _____

TITLE: _____

TELEPHONE NUMBER: _____

Proposal contact person: _____

Email address of proposal contact person: _____

Phone number of proposal contact person: _____

This page has been left intentionally blank.

SECTION 00 42 00 – BID BOND

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

BIDDER
(Name and Address):

_____

SURETY
(Name and Address of Principal Place of Business):

_____

OWNER (Name and Address)

City of Negaunee
319 West Case Street
P.O. Box 70
Negaunee, MI 49866

BID

BID DUE DATE: April 11th, 2023

PROJECT: Substation Transformer

BOND

BOND NUMBER: _____

DATE: (Not later than Bid Due Date): _____

PENAL SUM: _____

IN WITNESS WHEREOF, Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the following page hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

_____ (Seal)
Bidder's Name and Corporate Seal

By: _____
Signature and Title

Attest: _____
Signature and Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title (Attach Power of Attorney)

Attest: _____
Signature and Title

Note: (1) Above addresses are to be used for giving required notice.
(2) Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.
3. This obligation shall be null and void if:
    a. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents, or
    b. All Bids are rejected by Owner, or
    c. Owner fails to issue a notice of award to Bidder within the time specified in the Bidding Documents (or any extensions thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by Owner and Bidder, provided that the time for issuing notice of award including extensions shall not in the aggregate exceed 120 days from Bid Due Date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the project is located.
8. Notice required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of the Bond conflicts with any applicable provision of any applicable statute, then the provision of said statue shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein included a bid, offer or proposal as applicable.

END OF SECTION

This page has been left intentionally blank.

SECTION 00 52 00 – CONTRACT

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

THIS CONTRACT, made this ____ day of_____, by and between _____ _____hereinafter called the "CONTRACTOR", and City of Negaunee, 319 West Case Street, P.O. Box 70, Negaunee, MI 49866 hereinafter called the "OWNER".

WITNESSETH: That the Contractor and the Owner for the consideration stated herein agree as follows:

ARTICLE I, SCOPE OF WORK: The Contractor shall perform everything required to be performed and shall provide and furnish the labor, and/or equipment, materials, necessary tools, expendable equipment and all utility and transportation services required to:

furnish and deliver two (2) Substation Transformer as defined in the specifications

all in accordance with the drawings and specifications, including any and all addenda, prepared by POWER SYSTEM ENGINEERING, INC., "ENGINEER", which drawings and specifications are made part of this Contract; and in strict compliance with the Contractor's proposal and other component parts of the Contract Documents herein mentioned, which are a part of this Contract. The Contractor shall do everything required by this Contract including all the component parts of the Contract Documents constituting a part hereof.

ARTICLE II, CONTRACT PRICE: The Owner shall pay to the Contractor for the performance of this Contract, subject to any addition or deduction provided therein, in current United States funds, the amount of_____Dollars and_____Cents ($_____). This said amount includes

_____

_____

Payments are to be made to the Contractor in accordance with and subject to the provisions embodied in the Contract Documents made a part of this Contract.

ARTICLE III, CONTRACT DOCUMENTS: The Contract Documents consist of the following component parts, all of which are as fully a part of this Contract as if herein set out verbatim or, if not attached, as if hereto attached:

1. All documents as outlined in the Table of Contents.
2. Agreed upon clarifications between the Owner and Contractor after receipt of proposal.
3. The Contractor's proposal.
4. All other documents affixed to this Contract.

In the event that any of the provisions in any of the above component parts of this Contract conflict with any provision in any other of the component parts, the provision in the component part first enumerated above shall govern over any other component part which follows it numerically, except as may be otherwise specifically stated.

ARTICLE IV, CONTRACT EXECUTION: This Contract is executed in triplicate.

IN WITNESS WHEREOF: The parties hereto have caused this instrument to be executed the day and year first above written.

CONTRACTOR:

_____

_____

_____

Attest:

By_____ By _____

(CORPORATE SEAL) (CORPORATE SEAL)

Print Name_____ Print Name _____

Title_____ Title _____

OWNER:

City of Negaunee
600 Cherry Street
Negaunee, MI 49866

Attest:

By_____ By_____(Seal)

Print Name_____ Print Name _____

Title_____ Title _____

INSTRUCTIONS FOR EXECUTING THE CONTRACT

The full name and business address of the Contractor shall be inserted and the Contract shall be signed with an official signature. The name of the signing party or parties shall be printed legibly under all signatures to the Contract.

If the Contractor be a corporation the following certificate shall be executed:

I,_____, certify that I am the_____secretary of the corporation named as

Contractor herein; that _____ who signed the foregoing Contract on behalf of the

Contractor was then_____of said Corporation; that said Contract was duly signed for and in behalf of said Corporation by authority of its governing body, and is within the scope of its corporate powers.

By_____(Seal)

Title _____

In lieu of the foregoing certificate there may be attached to the Contract, a certified copy of the resolution of the board of directors of the corporation evidencing the authority of such official to sign the Contract.

The Contract shall also bear the attesting signature of the secretary or the assistant secretary of the corporation, and impressions of the corporate seal where indicated if a seal exists. Contracts which are signed by the secretary of the corporation shall be attested by some other officer of the corporation. If the corporation has no seal, include a statement or notation stating that the corporation has no seal.

If the Contractor be a partnership, the trade name (if the Contractor be operating under a trade name) shall be indicated in the Contract and the Contract shall be signed by each partner. If the Contract is not signed by each partner, there shall be attached to the Contract, a duly authenticated power of attorney executed by the partners evidencing the signer's authority to sign such Contract for and in behalf of the partnership or the partner.

If the Contractor be an individual, the trade name (if the Contractor be operating under a trade name) shall be indicated in the Contract and the Contract shall be signed by such individual. If the Contract is signed by one other than the individual, there shall be attached to the Contract, a duly authenticated power of attorney executed by the individual evidencing the signer's authority to sign such Contract for and in behalf of the individual.

END OF SECTION

This page has been left intentionally blank.

SECTION 00 61 13 – PERFORMANCE BOND

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

KNOW ALL MEN BY THESE PRESENTS that

we_____

_____as Principal, and_____

_____as Surety, are held and firmly

bound unto_____hereinafter

called the Owner, in the penal sum of _____ Dollars

($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The Condition of the obligation is such that whereas the Principal has executed the attached Contract dated

_____, 2023, to:

furnish and deliver two (2) Substation Transformer per the plans and specifications.

NOW THEREFORE, if the Principal shall:

well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract during the terms of said Contract and any extensions thereof that may be granted by the Owner, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived; and

promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said Contract, and any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived;

then this obligation to be void, otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above bounden parties have executed this document under their several seals this

_____ day of _____, 2023, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In the presence of: Witness

By _____
(Seal)

_____
Title

Attest:

By_____

_____
Title

Individual Principal

By _____

Corporate Principal

_____
Business Address

(Affix)
By_____(Corporate)
(Seal)

_____
Title

Corporate Surety

_____

_____
Business Address

(Affix)
By_____(Corporate)
(Seal)

_____
Title

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____Secretary of the

Corporation named as Principal in the within bond, that _____

who signed the said bond on behalf of the Principal was _____ of said Corporation; that I know his signature, and his signature thereto is genuine, and that said bond was duly signed, sealed, and attested for in behalf of said Corporation by authority of its governing body.

(Affix)
By _____(Corporate)
(Seal)

END OF SECTION

This page has been left intentionally blank.

SECTION 00 61 14 – PAYMENT BOND

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

That "the **Contractor**," _____, a corporation___, individual___, partnership___, joint venture___ of the State of _____, qualified to do business in the State of Michigan, as Principal, and "the Surety," _____, of the State of _____ , as surety, are held bound unto the City if Negaunee, "the **Owner**," as Obligee, in the amount of_____Dollars ($_____), for the payment of which the **Contractor** and Surety bind themselves, their respective heirs, successors, legal representatives and assigns, jointly and severally, in compliance with 1963 PA 213, as amended, MCL 129.201 et seq.

The Contractor has entered into "the Contract" with the **Owner** for _____ "the Work," covered by the Contract Document which are incorporated into this Payment Bond by this reference:

If the Contractor promptly pays all claimants supplying labor or materials to the **Contractor** or to the **Contractor's** Subcontractors in the prosecution of the Work, then THIS OBLIGATION IS VOID, OTHERWISE TO REMAIN IN FULL FORCE AND EFFECT.

A. All rights and remedies on this Payment Bond are solely for the protection of all claimants supplying labor and materials to the **Contractor** or the **Contractor's** Subcontractors in the prosecution of the Work, and must be determined in accordance with Michigan Law.

B. No change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion or other revision) must release the Surety of its obligations under this Payment Bond. The Surety hereby expressly waives notice of any such change in Contract Price or Contract Time, "or equal" or substitution or modification of the Contract Documents (including addition, deletion or other revision).

C. It is the intention of the **Contractor** and Surety that they must be bound by all terms and conditions of the Contract Documents (including, but not limited to this Payment Bond). However, this Payment Bond is executed pursuant to 1963 PA 213, as amended, MCL 129.201 et seq., and if any provision(s) of this Payment Bond is/are illegal, invalid or unenforceable, all other provisions of this Payment Bond must nevertheless remain in full force and effect, and the **Owner** must be protected to the full extent provided by 1963 PA 213, as amended, MCL 129.201 et seq.

IMPORTANT: The Surety must be authorized to do business in the State of Michigan by the Department of Licensing and Regulatory Affairs - Insurance Bureau, must be listed on the current U.S. Department of the Treasury Circular 570, and, unless otherwise authorized by the Owner in writing, must have at least an A- Best's rating and a Class VII or better financial size category per current A. M. Best Company ratings.

Name, Address, and Telephone of the Surety	Address and Telephone of Agent, who is either a resident of, or whose principal office is maintained in the State of Michigan
_____	_____
_____	_____
_____	_____

Signed and sealed this ____ day of _____, 20___.

THE **CONTRACTOR**: (Print Full Name and Sign) By: _____

WITNESS _____ Name & Title: _____

Telephone No: _____

THE **SURETY**: (Print Full Name and Sign) Agent: _____

WITNESS _____ Attorney-in-Fact: _____

Telephone No: _____

This page has been left intentionally blank.

SECTION 00 65 20 – WAIVER AND RELEASE OF LIEN

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

WHEREAS, the undersigned, _____ has furnished to
manufacturer, materialman, contractor or subcontractor

_____ the following: _____
name of contractor kind of material and services furnished

in the construction of a project belonging to _____, known as
name of owner

_____.
project designation

NOW, THEREFORE, the undersigned, _____ (name of manufacturer, materialman or subcontractor), for and in consideration $_____, and other good and valuable consideration, the receipt whereof is hereby acknowledged, do(es) hereby waive and release any and all liens, or right to or claim of lien, on the above described project and premises, under any law, common or statutory, on account of labor or materials, or both, heretofore or hereafter furnished by the undersigned to or for the account of said _____for
name of contractor
said project.

Given under my (our) hand(s) and seal(s) this ____ day of _____, 2023.

_____
name of manufacturer, materialman or subcontractor

By _____, president, vice president, partner or owner, or, if signed by other than one of the foregoing, accompanied by power of attorney signed by one of the foregoing in favor of the signer (use designation applicable).

This page has been left intentionally blank.

SECTION 00 72 00 – GENERAL CONDITIONS

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

PART 1 - GENERAL

1.1 INDEX

A. Part 1 - General
   1. Index
   2. Intent of the Contract Documents
   3. Definitions
   4. Performance Bond and Payment Bond
   5. Assignment of Contract
   6. Chattel Mortgages
   7. Liens
   8. Contract Completion Date
   9. Termination for Breach of Contract
   10. Specifications and Submittals
   11. Record Data
   12. Equipment, Materials, and Workmanship
   13. Damages
   14. Authority of Engineer
   15. Payment to Contractor
   16. Delays
   17. Owner's Right to Withhold Payment
   18. Payment for Additional or Omitted Work
   19. Final Payment
   20. Deduction for Incorrect Work
   21. Correction of Work After Final Payment
   22. Royalties and Patents
   23. Warranties and Guarantees
   24. Compliance with Statutes and Regulations
   25. Supplementary Conditions

1.2 INTENT OF THE CONTRACT DOCUMENTS

A. It is the intent of the Contract Documents to describe a functionally complete Project, or a portion thereof, to be furnished in accordance with the Contract Documents.

B. The costs of equipment, materials, labor, documentation, supplies, and services as may be necessary to furnish the purchased equipment, materials, and/or labor of construction, except as expressly omitted, shall be included as part of the Work in the Contract Documents.

C. Any equipment, materials, labor, documentation, supplies, and services that may reasonably be inferred from the Contract Documents, or from prevailing custom or trade

usage as being required to produce the intended result, shall be furnished whether or not specifically called for at no additional cost to the Owner.

D. The Contract Documents are complimentary; what is called for by one is as binding as if called for by all.

E. In interpreting the Contract Documents, words describing the Work that have a well-known technical or trade meaning, unless otherwise specifically defined in the Contract Documents, shall be construed in accordance with such well-known meaning recognized by architects, engineers, or the trade.

F. These General Conditions will be included in the Contract Documents to furnish equipment, materials, labor of construction, or any combination thereof.

1.3 DEFINITIONS

A. Definitions are described in the Instructions to Bidders.

1.4 PERFORMANCE BOND AND PAYMENT BOND

A. The Performance and Payment Bonds shall be provided as described in the Instructions to Bidders.

1.5 ASSIGNMENT OF CONTRACT

A. The Contractor may not assign the Work, or any portion thereof, without the Owner's written consent. No assignment will be valid unless it contains a provision indicating that funds to be paid to the assignee are subject to a prior lien for equipment, materials, and/or labor of construction furnished in performance of the Work, in favor of all persons, firms, or corporations furnishing such equipment, materials, and/or labor of construction.

1.6 CHATTEL MORTGAGES

A. No equipment or material items may be purchased by the Contractor or a Subcontractor subject to a chattel mortgage or under conditional sale or agreement by which an interest is retained by the Seller. The Contractor warrants he will have good title to equipment and/or material items used in the Work.

1.7 LIENS

A. If within thirty (30) days after the Work herein has been completed and accepted by the Owner any person claiming to have furnished equipment, materials, and/or labor of construction in completion of the Work has filed a lien or claim against the Contractor for said equipment, materials, and/or labor of construction, the Owner shall retain from monies under its control then due, or to become due under this Contract, such monies sufficient to pay off, satisfy, and discharge such lien or claim, together with the

reasonable cost of any such action or actions brought, or that may be brought, to enforce such claim or lien.

1.8 CONTRACT COMPLETION DATE

A. Neither a time extension beyond the date affixed herein for completion of the Work, nor delivery of articles called for in the Work after the time herein specified for completion, shall be deemed to be a waiver of abandonment or delay in the manner herein provided and/or of the right to abrogate this Contract or to enforce other provisions of this Contract.

1.9 TERMINATION FOR BREACH OF CONTRACT

A. In the event the Contractor or his Subcontractor violates a provision of the Contract Documents, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate such contract within ten (10) days after serving such notice. Such notice shall contain the reasons for intent to terminate the contract. In the event of termination, the Owner shall immediately serve notice thereof upon the Contractor and the Surety, and if the Surety does not commence performance thereof within thirty (30) days from the date of the mailing to such Surety of notice of termination, the Owner may take over the Work and prosecute the same to completion by contract for the account and at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for excess costs occasioned the Owner thereby, and in such event the Owner may take possessions of and utilize in completing the Work such materials, appliances, and plant as may be on the site of the Work and necessary therefore.

1.10 SPECIFICATIONS AND SUBMITTALS

A. The Work shall be executed in conformance with the specifications, drawings, and issued addenda that are included in the Contract Documents.

B. The Contractor shall perform no Work prior to obtaining Engineer-approved submittals as specifically described in the Project Requirements and technical sections of the Contract Documents or as requested by the Engineer. Equipment, materials, and/or installation methods used without the Engineer's prior approval may be subject to rejection.

1.11 RECORD DATA

A. The Contractor shall provide record data as specifically described in the General Requirements and technical sections of the Contract Documents or as requested by the Engineer.

1.12 EQUIPMENT, MATERIALS, AND WORKMANSHIP

A. Unless otherwise stipulated in the Contract Documents, the equipment, materials, and Workmanship incorporated in the Work covered by this Contract shall be new and of the best grade of their respective types for the purpose. The Contractor will, if required,

furnish such evidence as to the type and quality of equipment, materials, and/or Workmanship.

B. The equipment, materials, and Workmanship furnished under this Contract shall be furnished and performed in accordance with well known, established practices and standards recognized by architects, engineers, and the trade.

1.13 DAMAGES

A. The Contractor shall pay all damages for injury to real or personal property, for any injury sustained by any person growing out of any act or deed of said Contractor, his Subcontractors, or of his or their employees, that is in the nature of a legal liability, and shall indemnify and save the Owner harmless against suits or actions of every name and description brought against said Owner for, or on account of, any such injuries to real or personal property, injuries received or sustained by any person or persons caused by said Contractor, his servants, agents or employees, in the execution of said Work or by or in consequence of any negligence in guarding his agents or employees, and the said Contractor further agrees that so much of the money due to him under and by virtue of this contract, as shall be considered necessary by the Owner, may be retained by the Owner to protect itself against loss until such suit or claim for damage shall have been settled, and evidence to that effect shall have been furnished to the satisfaction of the Owner.

1.14 AUTHORITY OF ENGINEER

A. The Work contemplated and described in this Contract, and in the specifications, plans, profiles, and drawings, shall be done under the direction and supervision of and to the satisfaction of the Engineer, who shall be the sole judge as to the fitness of materials, and shall have the right of correcting errors or omissions in the Contract Documents when such corrections are necessary for proper completion of the Work herein stipulated and for the proper fulfillment of their intention, the action of such correction to date from the time the Engineer gives due notice not increase the respective prices herein set forth in the Owner Contractor Agreement.

1.15 PAYMENT TO CONTRACTOR

A. For equipment and/or material contracts, the Contractor shall submit an invoice to the Owner after the equipment and/or material item(s) have been shipped as instructed with the record data as specified in the General Requirements and technical sections of the Contract Documents. The Engineer will review each invoice and make a recommendation regarding payment.
   1. Ninety percent (90%) of the prorated Contract amount on each item of equipment and/or group of materials will be paid within thirty (30) days after receipt of the equipment and/or materials or in the next scheduled monthly payment review period.
   2. Ten percent (10%) of the Contract amount will be paid within thirty (30) days after final testing is completed, the equipment is accepted by the Owner, and record data

as described in these General Conditions, General Requirements, and technical sections is received by the Engineer.

B. For labor of construction contracts, the Contractor shall submit to the Owner an estimate of Work performed by the Contractor during a calendar month or a time agreed between the Contractor and the Owner. The Engineer will review each invoice and make a recommendation regarding payment.
   1. Ninety percent (90%) of each approved monthly billing will be paid within thirty (30) days of receipt or in the next scheduled monthly payment review period.
   2. Ten percent (10%) of each approved monthly billing will be retained until completion of the Work. Final payment will be made to the Contractor within thirty (30) days after the Work is completed to the satisfaction of the Owner and Engineer, and record data as requested in these General Conditions General Requirements and technical sections is received by the Engineer.

1.16 DELAYS

A. If the Contractor is delayed in Work completion due to an act of neglect by the Owner or another contractor employed by the Owner, or due to strike, fire, unavoidable casualty, or cause beyond the Contractor's control, the time of completion shall be extended for a reasonable time. The Contractor shall, within five (5) days from the beginning of a delay, notify the Owner in writing as to the cause of such delay.

1.17 OWNER'S RIGHT TO WITHHOLD PAYMENT

A. In addition to payment retained by the Owner under the preceding provisions of these General Conditions, the Owner may withhold payment otherwise due the Contractor as the result of:
   1. Payments earned or due for just labor or material legal claims pertaining to Work under this Contract.
   2. Defective Work not remedied.
   3. The Contractor’s failure to make proper payment to his Subcontractor.

B. The Owner may withhold from the Contractor payment due as may be necessary to protect the Owner from loss due to defective Work not remedied, injury to persons, or damage to the Work or property of others caused by an act of neglect by the Contractor or any of his Subcontractors. The Owner shall have the right, as agent for the Contractor, to apply such amounts so withheld as the Owner may deem proper to satisfy such claims or to secure such protection. Such application of money shall be deemed payment for the Contractor’s account.

1.18 PAYMENT FOR ADDITIONAL OR OMITTED WORK

A. Upon proper action, the Owner may authorize changes in, additions to, or deductions from the Work to be performed pursuant to provisions of the Contract Documents.

B. Adjustment in an amount to be paid to the Contractor by reason of a change, addition, or deduction shall be determined by one or more of the following methods:

1. Unit pricing that was included the Contractor's Proposal form and incorporated into the Contract Documents.
2. A supplemental price schedule that was included with the Contractor's Proposal form and incorporated into the Contract Documents.
3. A proposal from the Contractor that is acceptable to the Owner.

C. No claim for additional payment to the Contractor shall be valid unless authorized as aforesaid and by a written order of the Owner or the Engineer.

1.19 FINAL PAYMENT

A. When the Contractor shows to the satisfaction of the Owner and the Engineer that liens, claims, and demands for payment of equipment, materials, and/or labor of construction costs are fully satisfied, that the Work completed is fully released from such liens, claims, and demands, and that the Contractor has completely performed the Work, the Engineer shall certify the same in writing. A lien waiver form is included as part of these Contract Documents and shall be completed for each primary Contractor or Subcontractor used for the Work. Each lien waiver shall be returned before final payment is released.

B. When said certificate has been filed with the Owner, the Owner will pay to the Contractor the sum due out of the aforementioned fund set aside to meet and defray the expenses of such Work, the whole amount of money accruing to the Contractor for the Work, excepting such sum or sums as shall have been paid to the Contractor under the foregoing provisions of the Contract Documents and such as may be lawfully retained under the provisions of the Contract Documents, provided that no such certificate or payment for the Work shall be held to be an acceptance on the Owner's part of defective Workmanship or improper materials used by the Contractor in performance of the Work, or as waiver on the Owner's part of any claim or demands for, or on account of, such defective Workmanship or improper materials or as a waiver of a breach of the Contract Documents.

1.20 DEDUCTION FOR INCORRECT WORK

A. If the Owner deems it expedient to accept Work injured or not done in accordance with the Contract Documents, the difference in value, together with a fair allowance for damages, shall be deducted.

1.21 CORRECTION OF WORK AFTER FINAL PAYMENT

A. Neither final payment, nor a provision in the Contract Documents, shall relieve the Contractor of responsibility for negligence, faulty materials, or faulty Workmanship within the extent and period provided by law. Upon written notice, the Contractor shall remove defects due thereto and shall pay for damage due to other Work resulting therefrom which shall appear within one (1) year after the date of completion and acceptance.

1.22 ROYALTIES AND PATENTS

A. The Contractor shall pay for royalties and patents, shall defend suits or claims for infringement on a patent right, and shall save the Owner harmless from loss on account thereof.

1.23 WARRANTIES AND GUARANTEES

A. The Contractor shall furnish warranties and/or guarantees as specifically described in the General Requirements and technical sections of the Contract Documents.

B. Delivery of warranties and/or guarantees shall not relieve the Contractor of obligations under the Contract Documents.

1.24 COMPLIANCE WITH STATUTES AND REGULATIONS

A. The Contractor shall comply with applicable statutes, ordinances, rules, and regulations pertaining to the Work as prescribed by federal, state, or local governmental and administrative authorities.

B. Each Bidder shall be responsible for consideration and verification of the site conditions, laws, construction methods, etc. that may affect the performance, warranty, or furnishing of the Work.

1.25 SUPPLEMENTARY CONDITIONS

A. Refer to the Supplementary Conditions section for additional conditions if provided with the Bidding and Contract Documents.

END OF SECTION

This page has been left intentionally blank.

SECTION 00 72 01 – SUPPLEMENTARY CONDITIONS

CITY OF NEGAUNEE

IRONTOWN SUBSTATION TRANSFORMER

PART 1 GENERAL

1.1 SUPPLEMENTARY CONDITIONS

A. These Supplementary Conditions modify the General Conditions of the Contract for Construction, and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.

B. The terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.2 BASIC DEFINITIONS

1.2.1	Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
1.2.2	Furnish: To supply and deliver and inspect for damage.
1.2.3	Install: To unload, unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use.
1.2.4	Provide: To furnish and install.

1.3 CONTRACTOR'S LIABILITY INSURANCE

A. If the Contractor is providing labor of installing, unloading, or testing, the Contractor shall secure and maintain such insurance from an insurance company authorized to write casualty insurance in the State where the work is located as will protect himself, his Subcontractors and which shall indemnify and save harmless the Owner and the Engineer and their officers, agents, and employees from and against all claims for bodily injury, death or property damage which may arise from the Contractor's operations under this Contract, whether such operations be by himself or any Subcontractor or by anyone directly or indirectly employed by the Contractor or Subcontractor.

B. The Contractor shall not commence labor of installation, unloading, or testing under this Contract until he has obtained all insurance required under this section and shall have filed the certificate of insurance with the Owner and a copy with the Owner's attorney. Each insurance policy shall contain a clause assuring the insurance company will not cancel the insurance without thirty days written notice to the Owner, the Owner's attorney, and the Engineer of intention to cancel.

The amounts of such insurance shall be not less than the following, or greater if required by law:

1. Worker's Compensation:
    a. State Statutory
    b. Applicable Federal
    c. Employer's Liability:
        1) $100,000 Each occurrence

2. Commercial General Liability (including Premises-Operations; Independent Contractors' Protective; products and Completed Operations; Broad Form Property Damage):
    a. Bodily Injury and Property Damage (Name Owner as additional insured):
        1) $1,500,000 Each occurrence
        2) $3,000,000 Annual aggregate
    b. Products and Completed Operations to be maintained for two years after final payment.
    c. Property Damage Liability Insurance shall provide X, C, or U coverage as applicable.
    d. Contractual Liability to be included.

3. Comprehensive Carrier Vehicle Liability:
    a. Bodily Injury:
        1) $1,000,000 CSL Each Person
        2) $(Included) Each Occurrence
    b. Property Damage:
        1) $(Included) Each Occurrence
        2) Note: The State of Minnesota has a no-fault vehicle insurance requirement. The Contractor shall be certain coverage is provided which conforms to any specific stipulation in the law.

4. Umbrella Excess Liability: Name Owner as additional insured:
    a. Excess Liability:
        1) $1,000,000 Over primary insurance
        2) $10,000 Retention for self-insured hazards each occurrence.

END OF SECTION

This page has been left intentionally blank.

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01 10 00 – INFORMATION AND REQUIREMENTS

SECTION INDEX

1 LOCATION OF THE PROJECT

The project is located at the south end of Peninsula Street in Negaunee, Michigan. Coordinates of the substation are approximately 46°29'39.0"N 87°36'43.2"W. The transformer delivery will need provision to accommodate a steep driveway into the substation and narrow turns within the city. See Exhibit 3 for the grading plan.

2 SCOPE OF THE PROJECT

2.1 The project consists of furnishing and delivering two (2) new substation transformers for use at the City of Negaunee Irontown Substation. Technical specifications for the equipment are included as part of the specification.

2.2 Optional costs are requested for unloading, assembly, and testing the equipment provided under this specification by the manufacturer.

3 OWNER FURNISHED MATERIALS AND LABOR

3.1 The Owner may choose to perform or subcontract unloading, assembly, and testing.

3.2 The 138 kV structures, and primary and secondary bus to/from the transformers will be by the Owner or by others.

3.3 Substation construction will be by the Owner or by others.

4 WORK BY OTHERS

4.1 Work by others includes all work items not associated with furnishing and delivering the transformers.

5 PERMITS AND REGULATIONS

5.1 Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained and paid for by the Contractor, such as shipping permits, etc., other than those noted as being provided by the Owner.

A. The Owner will obtain the building permit if required. All other permits for the transformer delivery are by the Contractor.

5.2 The Contractor shall give all notices and comply with all laws, ordinances, building and construction codes, rules, and regulations applicable to the work. If the Contractor observes that the plans or specifications are at variance therewith, the Contractor shall promptly notify the Engineer.

6 APPLICATIONS FOR PAYMENT

6.1 Due to the possibility of grant funds and other requirements pre-payment/progress payments are not anticipated.

6.2 Submit invoices directly to the Owner. It is also recommended to send (email) a copy of the invoice to the Engineer for review and recommendation for payment. Applications for payment shall show the scheduled value of each item, total completed from the previous application, work completed this period, total completed, and percent completed. A 10% retainage shall be applied to the invoicing until the project is complete. The Owner will process payments based on its normal payment cycle, which is typically once a month. The payment timeframe will be reviewed with the successful Bidder.

6.3 The cost breakdown from the unit prices in the Contractor's Proposal should be used for the price breakdown for payment.

6.4 Final payment and contract closeout can be completed when all material, labor, testing, and records are provided as outlined in the technical specifications.

7 TRADE NAMES AND CATALOG REFERENCES

7.1 References in the specifications or on the plans to a manufacturer's name, make, model or catalog number is intended to be descriptive as to type and quality of equipment and material required and is not necessarily intended to preclude the use of another make of equipment as material equal in quality and performance. Substitute equipment and materials will be considered under the following conditions:

A. No manufacturer or product name specified: Any product meeting the specifications may be used.

B. Manufacturer or product name(s), or equal, specified: Any product meeting the specifications may be substituted.

C. Manufacturer or product name(s), or approved equal, specified: Substitutes must be approved by the Engineer.

D. Manufacturer or product name(s) specified, without stating an equal or approved equal: no substitutions allowed. Furnish the product or one of the products specified.

7.2 The Contractor shall be responsible for investigating the proposed substitute and determining that it meets or exceeds the specified product for coordination of installation, and for any other changes which may be required for the work to be completed in all respects. The Contractor shall provide verification to the Engineer.

8 PROGRESS MEETINGS

8.1 At the request of the Owner, conference calls may be required to determine the progress of the work, to receive instructions from the Engineer or the Owner and to expedite completion of the project. Subcontractors present at such meetings shall be represented by a person with full authority to act on behalf of the Subcontractor.

9 FIELD ENGINEERING AND STAKING

9.1 Field engineering and staking are not required for this contract.

10 CODES AND STANDARDS

10.1 Laws, Codes and Regulations: The Contractor shall comply with and the work shall be performed in compliance with all laws, ordinances, building and construction codes, rules and regulations applicable to the work, including the following:

- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
- National Electric Code (NEC)
- Occupational Safety and Health Act (OSHA)

10.2 Standards: All equipment and materials shall be furnished, installed and tested in conformance with the latest revisions of the following standards, as applicable:

- American National Standards Institute, Inc. (ANSI)
- American Society for Testing and Materials (ASTM)
- Edison Electric Institute (EEI)
- Institute of Electrical and Electronic Engineers, Inc. (IEEE)
- Insulated Power Cable Engineers Association (IPCEA)
- National Electrical Manufacturers' Association (NEMA)
- Underwriters' Laboratories, Inc. (UL)

10.3 Conflicts: Where conflicts occur between codes and standards, or between codes and standards and Specifications and Plans, the one establishing the more stringent requirements shall be followed.

END OF SECTION

This page has been left intentionally blank.

DIVISION 33 - UTILITIES

SECTION 337313 – LIQUID FILLED UTILITY TRANSFORMER – NON-LTC

SECTION INDEX

PART 1 GENERAL

1.1 SUMMARY

A. The Seller is requested to provide a proposal to design, construct, test, and deliver two (2) power transformer, without LTC, rated 7.5/10.5 MVA, 55/65 degree C. rise, 138 kV Delta primary, 12.47Y/7.2 kV x 4.16Y/2.4 kV dual-voltage secondary in accordance with these Procurement Specifications. The transformer is intended to be used for step-down purposes within a substation to supply a 4.16Y/2.4 kV grounded wye distribution system.

B. The base bid price shall also include a SEL-2414 Transformer Monitor and inert gas pressure system, both of which are defined later in this specification.

C. The quoted price shall not include sales tax. Sales tax shall be determined in the evaluation process based on the transformer and options chosen.

D. Optional quotes are requested for offloading the transformer to the pad, assembly, and field testing.

1.2 DEFINITIONS

A. Owner:

City of Negaunee
600 Cherry Street
Negaunee, MI 49866

Attn: Mark Wainio
Phone: (906) 475-9993
Email: dpwelectric2@cityofnegaunee.com

B. Seller's Representative: The manufacturer or manufacturer's representative submitting the proposal to provide the products and services described herein.

C. Seller: The manufacturer or provider of the products and services described herein and in the accepted proposal.

D. Engineer:

Power System Engineering, Inc.
2424 Rimrock Road
Madison, WI 53713

Contact: Nicole Hall
Phone: (763) 783-5361
Email: halln@powersystem.org

1.3 REFERENCES / STANDARDS

A. The products described herein shall be manufactured in accordance with the current standards published by the following organizations:

1. American National Standards Institute (ANSI)
2. Institute of Electrical and Electronics Engineers (IEEE), particularly:
    - IEEE 386 - Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V
    - IEEE C57.12.00 - Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
    - IEEE C57.12.10 - American National Standard for Transformers—230 kV and Below, 833 / 958 through 8333 / 10 417 kVA, Single-Phase, and 750 / 862 through 60 000 / 80 000 /100 000 kVA, Three-Phase Without Load Tap Changing; and 3750 / 4687 through 60 000 / 80 000 / 100 000 kVA with Load Tap Changing - Safety Requirement
    - IEEE C57.12.70 – Standard Terminal Markings and Connections for Distribution and Power Transformers
    - IEEE C57.12.90 - Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short Circuit Testing of Distribution and Power Transformers
    - IEEE C57.106 - Guide for Acceptance and Maintenance of Insulating Oil in Equipment
3. National Electrical Manufacturers Association (NEMA)
4. National Fire Protection Association (NFPA)
5. Occupational Safety and Health Administration (OSHA)

1.4 SUBMITTALS

A. Section 00 41 13: Submit a completed Proposal Form for each transformer design.

B. Outline Drawings: Indicate electrical characteristics and connection requirements, outline dimensions, connection and support points, specified ratings and materials, and the location of all proposed accessories.

C. Product Data: Submit electrical characteristics and connection requirements, standard model design tests and options, and supplemental descriptive data for all proposed equipment and accessories.

D. Test Reports: Indicate procedures for specified factory and field testing and inspection.

E. Manufacturer's Warranty: Indicate the proposed warranty, as well as any optional extended warranties and their costs.

F. Manufacturer’s Qualifications: Submit a list of previously manufactured units, their purchasers, delivery dates, and ratings as described in Section 1.5 to validate the required manufacturer qualifications.

G. Short Circuit Information: Submit information that demonstrates that the proposed transformer shall have sufficient mechanical strength to withstand without failure all through fault currents by one of the methods described in Section 2.4.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience. The manufacturer shall have designed, manufactured and delivered during the last five years at least five or more units having similar design requirements and of a size and voltage equal to or greater than specified herein, each of which have been in successful commercial operation at least one year. The proposal must include a list of units meeting the above requirements indicating purchasers, delivery dates, and ratings.

B. Testing Agency: Company specializing in testing products specified in this section with a minimum of five years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. The transformer shall be delivered FOB destination with freight prepaid and allowed to the following location.

B. Destination: Negaunee Irontown Substation located at the south end of Peninsula Street, Negaunee, MI. Lat./Long. 46°29'39.0"N 87°36'43.2"W. The transformer delivery will need provision to accommodate a steep driveway into the substation and narrow turns within the city. See Exhibit 3 for grading plan.

1.7 LOSS EVALUATION

A. The transformer’s efficiency will be evaluated by adding an amount of dollars determined by the following formula to the proposal price.

Evaluated equivalent first cost of transformer losses
($) = (NL x NLF) + (LL x LLF)
where,
NL = No load losses in kW at rated voltage

LL = Load loss in kW at base MVA rating and rated voltage
NLF = No-Load loss cost factor in $/kW = $9,750/kW
LLF = Load loss cost factor in $/kW = $2,500/kW

B. In the event the Seller's factory test or Owner's field test shows the transformer losses are in excess of the loss guarantee quoted in the Proposal by the Seller, the excess multiplied times the no-load cost factor (NLF) for no-load losses and load loss cost factor (LLF) for load losses will be deducted from the purchase price owed the Seller. In calculating the price deduction, credit will not be given if one of the losses is less than guaranteed. There shall be no additional payment to the Seller if test results indicate losses are less than the Seller's guaranteed limits.

1.8 PAYMENT TO SELLER

A. Payment of ninety percent (90%) of the transformer price will be made by the Owner after delivery of the transformer and receipt by the Owner of a payment request, provided that such payment will not be deemed approval of the workmanship or materials. Payment of the remaining ten percent (10%) will be made by the Owner after the transformer has been in continuous successful commercial service for at least thirty (30) days, or within six (6) months after delivery of the transformer, whichever occurs first. However, no payment shall be due while the Seller is in default in respect of any of the provisions of this specification.

B. Due to the possibility of grant funds and other bond requirements pre-payment/progress payments are not anticipated.

PART 2 PRODUCTS

2.1 GENERAL SPECIFICATIONS

A. Product Description: Three-phase, substation power class 1, transformer unit designed to operate on a 60 Hertz system.

B. Cooling and Temperature Rise: IEEE C57.12.00; 55/65 degrees C. rise; class ONAN/ONAF.

C. Insulating Liquid: Oil conforming to IEEE C57.106.

2.2 SERVICE CONDITIONS

A. The transformer shall be suitable for outdoor installation in an ambient temperature of

-40 degrees C to +40 degrees C, an elevation of less than 3300 feet (1000 m), and the seismic zone of the location the transformer is to be delivered.

B. Meet requirements for usual service conditions described in IEEE C57.12.00.

2.3 RATINGS

A. The transformer shall be a three-phase unit designed to operate on a 60 hertz system.

B. Capacity: The transformer shall have ratings for continuous use as follows:

Transformer Ratings (ONAN/ONAF):

1. 7.5/9.375 MVA at 55^{o}C temperature rise by resistance &
2. 8.4/10.5 MVA at 65^{o}C temperature rise by resistance

C. Primary Voltage (High Voltage): 138,000 volts primary, delta connected.

D. Taps (Primary Voltage): The high voltage winding shall be furnished with externally mounted tap changer (DETC) for de-energized operation and notice clearly given adjacent to switch lever that this operation is only to be performed when transformer is de-energized. Provisions shall be made for padlocking in each position. The externally mounted DETC(s) shall be located at a convenient height for operation by a person standing on the transformer pad and shall include clear position indication with taps designated 1 through 5 or A through E. Taps shall be at 2.5% and 5% above nominal and 2.5% and 5% below the nominal 138,000-volt rating. The transformer's full rated capacity must be available at all tap positions.

E. Secondary Voltage: 12,470Y/7,200 V x 4,160Y/2,400 V dual-voltage, wye connected with insulated neutral brought out.

F. Impedance: 8.5% or greater to limit infinite bus fault current on the 4.16 kV bus to less than 12.5kAIC.

G. Basic Impulse Level: 650 kV Primary; 110 kV Secondary, including X0 neutral winding.

H. Phase Relation: The low voltage wye shall be 30˚ lagging in relation to the delta high side per Figure 20, item (e) of ANSI C57.12.70.

I. The transformer shall have full rated capacity at 65 degrees C with all fans running on all tap positions.

2.4 SHORT CIRCUIT STRENGTH

A. Without limiting in any way any obligation of the Seller under this specification, the Seller shall demonstrate to the satisfaction of the Owner that the transformer proposed to be furnished under this specification shall have sufficient mechanical strength to withstand without failure all through fault currents. The Seller shall demonstrate that the transformer meets this requirement by one of the following methods:

1. Certified test data showing that a transformer with a core and coil identical in design and construction and identical or similar with respect to kVA capacity, kV ratings, BIL, impedance and voltage taps has been tested under maximum short-circuit conditions without failure. A description of the test code under which the transformer was tested for short-circuit strength shall be provided by the Seller to the Owner.
2. History of successful experience with transformers of identical or similar ratings, design and construction. The Seller shall list all transformers in service with core and coils which are essentially identical in design and construction and manufactured to the transformer covered by this specification. Information on the date of the cumulative service record, if less than 20 transformer years, and a list of transformers in service which represent the closest approximation to the transformer covered by this specification shall be submitted. The information submitted shall be representative of the total experience of the manufacturer with the design of the transformer to be furnished and shall include the dates of installation (or shipment if not installed), the ratings of the transformer, and a list of failures and causes of failures if any have been experienced.

2.5 ACCESSORIES

A. Mechanical pressure-relief device mounted on the top of the transformer main tank with automatic reset-reseal operation, resettable mechanical signal to indicate device operation, and separate alarm contacts for remote indication.

B. Pressure/vacuum gauge mounted on the transformer main tank, equipped with separate high pressure and vacuum alarm contacts for remote indication.

C. Sudden/Rapid rise fault-pressure relay mounted on the transformer main tank with “seal-in” relay located in the control cabinet. The relay shall be DC powered. The unit shall be equipped with test plugs to simulate a rapid pressure rise to allow for periodic testing. The fault-pressure device shall be positioned to allow testing with the transformer in service and shall have an isolation valve separating the compartment oil from the relay during servicing. The fault-pressure device shall be equipped with separate alarm contacts for tripping and for remote indication. Qualitrol Series 900 or approved equal.

D. Magnetic liquid-level gauge mounted on the transformer main tank equipped with separate high- and low-level alarm contacts for remote indication.

E. Top oil temperature dial-type indicator shall be mounted on the transformer main tank, with Celsius scale, 6-inch diameter face for visual observation, and have three adjustable high temperature alarm contacts. The alarm contacts are for the Owner's use for tripping and remote indication. Maximum temperature drag hands shall be provided with an external reset, accessible from ground level. The oil temperature gauge's extra capillary tubes shall not be compressed beyond their minimum bend radiuses (1.5" per Qualitrol).

F. Winding temperature (simulated hot spot) dial-type indicator shall be mounted on the main tank, with Celsius scale, 6 inch diameter face for visual observation, with isolated auxiliary contacts wired to the fan circuit via a terminal board in the control panel for operating fans, and have three adjustable high temperature alarm contacts, for use by Owner. Maximum temperature drag hands shall be provided with an external reset, accessible from ground level. The winding temperature device will monitor top oil temperature and have a resistance heater which will be supplied secondary current from a CT mounted on an X2 bushing. The winding temperature gauge's extra capillary tubes shall not be compressed beyond their minimum bend radiuses (1.5" per Qualitrol).

G. Fan control is to be provided by means of winding temperature simulated hot spot as well as a Schweitzer SEL-2414 Transformer Monitor. The monitor shall calculate winding hot spot temperature and turn fans on when manufacturer determined limits are met. Typical manufacturer recommended alarms shall also be active for display on front panel and/or remote indication. The monitor shall also be the interface with the Owner's SCADA system. More details are provided elsewhere in this specification in Section 2.7.

H. Resistance Temperature Detector (RTD) for top oil, with electrical output shall be supplied for input to Transformer Monitor SEL-2414. Its output shall be inputted into the transformer monitor in a form compatible with the monitor's analog input capability and service voltage.

I. An RTD to sense ambient temperature shall be furnished and installed. The ambient temperature RTD shall be a Qualitrol model 103-047, or approved equal, and properly located away from the wash of air from cooling fans and direct sunlight. Its output shall be inputted into the Transformer Monitor SEL-2414 in a form compatible with the monitor's analog input capability.

J. All RTDs shall be 100 Ohm Platinum.

K. The Seller is requested to offer any recommended predictive maintenance indicators as options for consideration during the proposal evaluation. Combustible gas and oil dielectric indicators should be offered as a minimum response.

L. All the gauges, indication, and alarm devices shall be manufactured by Qualitrol, Messko, or Engineer approved equal and be furnished with auxiliary contacts wired to terminal

blocks in the transformer control cabinet for the Owner's use. All control and indication functions shall be SCADA ready.

M. Dial-type gauges should be grouped together at eye level when possible on the low voltage side of the transformer for easy accessibility and maintenance. Wells for oil thermometer bulbs, RTDs, and liquid-level gauge floats shall be outside the main tank so as not to require untanking for their removal.

N. Alarm and trip contacts shall have minimum 125 volts DC and 120/240 volts AC control voltage ratings. Please note: The new substation will have a 125 volt DC system.

O. Available power for accessories will be 120/240 volts AC, single phase. Separate circuits with overload protection shall be provided for transformer cooling and for the transformer auxiliary control and indication.

2.6 CONTROL CABINET

A. The control cabinet shall be a weatherproof, dust tight, NEMA 3R or NEMA 4 control cabinet, with a stainless steel hinged front door, and pad lockable stainless steel three-point latch. It should also be designed to permit outgoing conduits to exit from the side and bottom as may be required.

B. The control cabinet is to be mounted on the main tank, preferably on the low voltage side, and mounted at a height that is convenient for access from ground level.

C. Screw terminations in the control cabinet shall be confirmed to be tight with no loose connections or cable terminations.

D. Control Cabinet Accessories:

1. Terminal Blocks, including twenty percent (20%) spare terminals, for terminating control and alarm wiring as well as individual short-circuiting type terminal blocks for all current transformer secondary leads. The terminal blocks shall be GE type EB-25, EB-27, or equal.
2. A copper ground bus tapped for 10-32 screws for grounding all CTs, spare control wires and cable shields shall be provided.
3. LED maintenance light with guard and controlled from door activated switch.
4. Convenience outlet with GFI protection.
5. Thermostat controlled heater (anti-condensation) each with manual operated control switches.
6. Loss of voltage status indication relays with isolated contacts for remote indication of loss of fan control and power.
7. All power circuits shall be protected with appropriately sized individual over current devices, circuit breakers are preferred. All wiring except current circuits shall be No.

14 AWG stranded type SIS wire minimum and be terminated with insulated lugs. Current circuits shall be No. 10 AWG type SIS wire and be terminated with ring lugs.

8. Test switch(es) for SEL Transformer Monitor if applicable.

2.7 TRANSFORMER MONITOR

A. The transformer monitor shall be a SEL-2414, with a model number 241421A3A9174CA1130. The catalog number is to be verified during review of the transformer design. Changes in the catalog number/features will not be reason for additional charge.

B. All cooling system controls shall be enclosed in the transformer control cabinet, complete with all conduit and inner wiring to the fans.

C. The SEL-2414 shall control the primary operation of cooling fans. Seller shall program the SEL-2414 to calculate winding hot spot temperature (based on top oil temperature, ambient temperature, and load amps) and operate the fans as determined by manufacturer requirements.

D. The transformer monitor shall be capable of use with 125 VDC.

E. The SEL-2414 processor board shall have 10/100 Base-T Ethernet, fiber-optic serial port communications with Multimode ST connectors, Modbus, TCP, DNP3, and DNP3 LAN/WAN.

F. Seller shall program SEL-2414 front panel pushbuttons accordingly and with labels:

1. PB01 – “Fan Control,” upper LED “Auto” & lower LED “Manual”
2. PB02 – “Manual Fans,” upper LED “Off” & lower LED “On”
3. PB03 & PB04 – “Spare”

G. Seller shall program SEL-2414 front panel target LEDs accordingly and with labels:

1. LED 1 – Pressure Relief Alarm
2. LED 2 – Sudden Pressure Alarm
3. LED 3 – Loss of Main AC
4. LED 4 – Loss of Fan AC
5. LED 5 – Loss of Fan control AC
6. LED 6 – Fans On

H. See Exhibit 1 for listing of typical input and output utilization for Transformer. Modifications to the input/output list may be required for a complete functioning transformer and is considered a part of the work if required.

2.8 FABRICATION

A. Conform to requirements of ANSI C57.12.10.

B. The transformer shall have circular core and copper coil windings, of either disk or helical design.

C. The transformer shall have facilities for lifting core and coil assembly from the tank and for lifting the transformer cover.

D. Lifting attachments on the main tank for lifting the complete transformer with and low voltage bushing installed shall be included.

E. Hand hole covers for tank entrance to perform inspection and maintenance shall be included.

F. The base of the transformer shall be designed for rolling with provisions for pulling along either axis. If a flat base is provided, it shall be coated with coal tar epoxy mastic.

G. Jacking facilities with pulling eyes at four corners of the base shall be included. Jacking pads to be a minimum of 15” above foundations.

H. The drain system shall be a globe-type combination drain and lower filter valve with sampling device (3/8”) and plug. The drain valve(s) shall be located so as to allow draining or sampling from the bottom of each oil compartment and shall be pad lockable.

I. There shall be a globe-type upper filter valve with plug for each oil compartment.

J. The transformer cover shall be constructed to shed water, have a non-slip surface coating and an OSHA approved tie-off point for fall protection.

K. Radiators shall be hot dipped galvanized and removable, equipped with lifting attachments and valve connection to the main transformer tank which allow radiator disconnection while the transformer tank remains filled shall be included. Radiators shall be interchangeable and be marked to indicate their original location when attached to the transformer at the factory.

L. Radiators shall be installed in Segment 3.

M. All gaskets shall be of reusable rubber with means provided for controlled compression. A complete set of spare gaskets shall be provided.

N. A stainless-steel nameplate showing all ratings, winding connections, impedances, weights and oil type, and all other information outlined in ANSI C57.12 shall be attached in Segment 1.

O. Standard NEMA two-hole grounding pads shall be provided near the base of neutral bushing, each lightning arrester, and the base of the transformer at each corner of the tank. The transformer tank shall be furnished with 4/0 stranded copper (min.) ground wire supports and clamps at each corner to support the arrester and neutral bushing ground connections. Support spacing shall be three feet or less. Neutral grounding bus/conductor shall be sized for the full ampacity of the transformer's associated windings and brought down the side of the transformer, connected to the ground pad for the Owner's connection to the ground grid. The core ground bond to ground shall be confirmed to be tight and without any loose connections.

P. The audible average sound level shall not exceed ANSI or NEMA standards when the transformer is energized at normal voltage and frequency. Sound levels shall be measured as specified in NEMA publication No. 48-132. The vendor shall provide the maximum sound level with its proposal.

2.9 FACTORY FINISHING

A. The color of the transformer, bushings, arresters, and accessories shall be ANSI #70 Sky Gray.

B. Painted surfaces shall be covered with a rust-inhibiting primer and top-coat.

C. Paint thickness shall be a minimum of 3mil.

D. Inside tank and control cabinet surfaces shall be painted white.

2.10 COOLING SYSTEM

A. Cooling fans shall be suitable for operation from a single-phase 240 volt, 60-cycle supply. Fan control power and each fan stage shall be protected by separate overcurrent devices and provisions for remote indication of loss of power.

B. The fans shall have OSHA approved guards and shall be mounted on the sides of the radiators.

C. The fan motors shall be totally enclosed and have individual overload protection.

D. The fans shall be individually connected to the power supply by flexible cords with weatherproof plugs and receptacles.

E. The recommended starting and alarm temperatures for the cooling shall be shown on the transformer nameplate and published in the transformer operating manual. Provisions shall be made for remote control and indication of transformer fans.

F. A running time hour meter device shall be provided for the set of fans. This device shall be externally readable and non-resettable.

G. A three-position selector switch, labeled MANUAL-OFF-AUTO, shall be provided for control of the cooling fans. In the MANUAL position, all fans shall be energized. In the AUTO position, the cooling equipment shall be energized according to the demand of the temperature relays. In the OFF position, the fans shall be off.

H. Cooling fans shall be equipped with automatic control via one SEL-2414 Transformer Monitor to provide operation based on calculated transformer winding hot spot temperature based on top oil temperature, ambient temperature, and transformer load. Backup cooling shall be provided by the winding temperature sensor detailed in section 2.5.

2.11 INSULATING OIL SYSTEM

A. Oil preservation shall be provided by an inert gas pressure system design w, including, but not limited to, the following: outdoor rated cabinet for gas cylinder, all required fittings, three-stage regulator, cylinder pressure gauge, adjustable standard alarms, alarms contacts brought to a terminal location for connection to the SEL-2414 Transformer Monitor and/or SCADA, and all other items for a complete system.

B. Insulating oil shall be certified to be free of PCBs.

C. Oil shall be Type II mineral oil (Type I oil with oxidation inhibitor in the appropriate amount for the transformer oil volume making it Type II oil) free from corrosive sulfur and certified as such when tested in accordance with both ASTM D1275 and D1275B.

D. Provisions shall be made for a future oil monitoring system. This shall include a dedicated 1 ½” NPT valve port located near the top of the transformer tank below the top oil level and another located near the base of the transformer. The valves shall be located near each other on the same side of the transformer tank.

2.12 BUSHINGS

A. All of the transformer bushings shall be top mounted and meet the minimum requirements set forth in the current ANSI standards. Liquid-filled bushings shall be supplied with liquid level indication and a provision for power factor testing. Bushings having a current rating below 1,200 amperes shall be of draw-lead design to allow removal without access to the interior of the transformer tank. All bushings shall have threaded studs for conductor

terminals and be provided with NEMA 4-hole pads suitable for aluminum or copper conductor terminations.

B. The high voltage bushings shall be porcelain, standard light grey, 145 kV voltage class, 650 kV BIL and spaced to develop their full electrical characteristics: PCORE catalog number B-86210-70, ABB Type O Plus Condenser bushing, or equivalent by others with approval of Owner.

C. The low voltage bushings shall be porcelain, standard light grey, 25 kV voltage class, 150 kV BIL and spaced to develop their full electrical characteristics: PCORE catalog number B-89253-70, ABB Type O Plus Condenser bushing, or equivalent by others with approval of Owner.

D. A core ground bushing shall be provided to facilitate testing for extraneous grounds. The core ground bushing shall include an external ground strap to the transformer tank.

2.13 BUSHING CURRENT TRANSFORMERS (BCTs)

A. Bushing type current transformers shall be provided as follows:

1. H1-H2-H3: Two sets shall be 600:5 multi-ratio type; relaying accuracy class C800; for use by the Owner.
2. X1-X2-X3: Two sets shall be 1,200:5 multi-ratio type, relaying accuracy class C800; for use by the Owner.
3. X1-X2-X3: One set to be of a ratio and accuracy compatible with their application, i.e. for winding hot spot calculations (3 CTs for the SEL-2414 to control fans and joint use of 1 to also operate winding temperature indicator). These CTs to be mounted closest to the windings. Provide shorting test switch for connection between CTs and transformer monitor.
4. Neutral X0: One 1200:5 multi-ratio type, relaying accuracy class C8000; for use by the Owner.

B. All the secondary leads of the current transformers shall be extended to shorting type terminal blocks (GE EB-27 or equivalent) in the control cabinet. CT wiring shall be No. 10 AWG minimum and be terminated with insulated ring lugs.

2.14 SURGE ARRESTERS AND BRACKETS

A. Provide three (3) removable tank mounted brackets for mounting the specified station class arresters near each high voltage bushing. If necessary to maintain clearance of the jumper wire from the 138 kV breaker to the transformer, the high voltage arrester bracket shall extend out from the tank the full length of the radiators and be drilled to accommodate a station post insulator with a 5” bolt circle for supporting the cable/bus to the primary

protective device. This will be reviewed based on the transformer manufacturers outline drawing. The insulator shall be provided by others. See Exhibit 2 for an example.

B. Provide three (3) brackets for mounting the specified low side arresters near each low voltage bushing.

C. Provide three (3) polymer housed metal oxide station class arresters complete with cap assembly with a NEMA 4-hole pad suitable for aluminum or copper conductor termination and mounting base, rated 88 kV MCOV, for use on a nominal 138,000-volt transmission system. Ohio brass type EVP catalog number EVP0088003001 or approved equal.

D. Provide three (3) polymer housed metal oxide station class arresters complete with cap assembly with a NEMA 4-hole pad suitable for aluminum or copper conductor termination and mounting base, rated 2.55 kV MCOV, for use on a 4,160/2,400-volt grounded wye distribution system. Ohio brass type EVP catalog number EVP0003003001 or approved equal.

E. All surge arresters shall be standard grey and meet ANSI minimum requirements.

PART 3 EXECUTION

3.1 APPROVAL DRAWINGS

A. Within 30 days after Notice of Award, the Seller shall furnish Approval Drawings and equipment documentation to the Engineer for approval prior to beginning fabrication.

B. Approval drawings shall include “Shop Drawings” showing layout and installation details prepared by the manufacturer to demonstrate fabrication of the transformer and associated equipment is as called for by these specifications. Shop drawings shall include but not be limited to the following:

1. Outline, general arrangement, assembly and installation detail drawings. The outline drawing shall include base dimensions, centers of gravity when shipped and when fully assembled, and provide information on types of foundations permitted and/or recommended.
2. Complete nameplate data.
3. Schematic and wiring diagrams for all control circuits, alarm devices, and current transformers.
4. Current transformer excitation and ratio correction factor curves.

C. Equipment documentation shall include but not be limited to catalog data, manufacturer’s specifications, and equipment and material schedules, for the equipment and devices to be used in the fabrication and assembly of the transformer.

D. The Seller shall submit electronic copies of the shop drawings and equipment documentation to the Engineer for approval in advance of manufacturing on or before the date specified in the Seller's Proposal.

E. As soon as practical after the approval drawings have been approved, the manufacturer shall provide the Engineer with AutoCAD DWG files of the transformer – outline, schematic, wiring, and equipment layout drawings to aid the Engineer in the creation of the transformer installation drawings.

3.2 SHOP TESTS

A. The manufacturer shall provide factory tests conforming to IEEE C57.12.90. Include routine tests as defined in IEEE C57.12.00. The shop tests shall include but not be limited to:

1. Resistance measurements of all windings
2. Core insulation resistance
3. Ratio tests on the rated voltage connection and on all tap connections
4. Polarity and phase relation tests at rated voltage
5. No-load loss at rated voltage
6. Impedance and load loss at rated load (including zero sequence impedance if different than positive sequence impedance)
7. Excitation current
8. Temperature rise test (manufacturer may supply results of a standard test made on a previous unit of the same rating and design)
9. Low frequency dielectric test
10. Audible sound level
11. Mechanical leaks
12. Insulation power factor test
13. Sweep frequency response analysis
14. Dielectric testing, including partial discharge

B. Test insulating liquid samples in accordance with IEEE C57.106. The shop tests shall include but not be limited to:

1. DGA – Both before and after electrical testing
2. Dielectric strength
3. Dissipation factor
4. Interfacial tension
5. Color
6. Visual examination
7. Neutralization number
8. Water content
9. Corrosive sulfur (upon receipt from supplier)
10. Relative density (upon receipt from supplier)

11. PCB

C. Allow the Engineer and Owner the opportunity to witness the factory inspections and tests at manufacturer's test facility. Notify the Engineer at least two weeks before inspections and tests are scheduled. Provide the Engineer with two (2) certified copies of all transformer test data.

3.3 DELIVERY AND SHIPMENT

A. Delivery shall be to the location stated in Section 1.6

B. The Seller shall ship the transformer(s) by truck and investigate all limitations regarding shipping the equipment. The transformer(s) shall be shipped as completely assembled, as transportation limits allow.

C. The Seller shall provide an impact recorder attached to the transformer. Information on maximum impact limit requirements requiring transformer inspection, testing or return to the factory shall be provided to the Engineer at the time of the bid or before shipment. The Seller's representative shall be responsible for packaging and returning the impact recorder. The impact recorder shall provide near real time GPS tracking and impact reporting.

D. The Seller shall notify the Owner and the Engineer in writing at least two weeks before the day of shipment of the shipping date and the approximate anticipated date of arrival at the destination.

E. The Seller (or shipper) shall also provide a two-week advance notice of arrival to the Owner's Representative as listed in Section 1.2. Delivery shall be coordinated with the owner and the Engineer.

F. The Seller shall be responsible for the transformer(s), oil, and accessories during shipment and shall make whatever inspections are necessary after arrival to locate all visible and concealed shipping damage. The inspections shall be performed in the presence of the Owner or the Owner's Representative. The Seller shall settle any damage claims with the shipper.

G. After the transformer has been delivered, placed on its pad, assembled and its installation completed, the Seller shall provide a representative to inspect the transformer including reviewing the results of tests done after installation, to verify that the transformer is ready to be energized and carry load.

3.4 INSTALLATION AND FIELD TEST (OPTIONAL)

A. As an optional service, the Seller shall quote the price to offload the transformer(s) to the concrete pad(s).

B. As an optional service, the Seller shall quote the price to complete the transformer assembly at the project site after the transformer has been off loaded and placed on its pad by the Seller, Seller's Contractor, or Owner's Contractor.

C. As an optional service, the Seller shall quote the price of performing the following field tests and inspection in the presence of the Owner after the final installation and oil filling is completed:

1. Insulation power factor test.
2. Winding insulation Megger test.
3. Ratio tests at rated voltage connection and all tap connections.
4. Resistance measurements of all windings.
5. Core insulation resistance.
6. Oil dielectric test.
7. Oil tests to confirm that the oil has not been contaminated with PCB compounds during the filling process.
8. Field commissioning tests to verify the proper function of all transformer temperature and oil level gauges, pressure relief devices, and cooling controls.
9. Sweep frequency response analysis, including comparing results with the shop tests and providing a report with explanation of any differences in test results.

D. The Seller shall provide two (2) certified copies of all field test data to the Owner within ten days of completion.

E. If any equipment fails to function properly because of defect, the Seller will make the necessary corrections. The Seller shall give the Owner a written certification that the equipment is ready for service upon completion of the installation and field tests specified herein.

3.5 INSTRUCTION MANUALS AND RECORD DRAWINGS

A. The Seller shall provide the Engineer with two (2) bound and indexed sets, and one electronic set of the transformer instruction manuals, at least thirty days prior to shipment. The instruction manuals shall include all installation, operation, and maintenance instructions, equipment data sheets and the "For Record" drawings. A replacement parts bulletin with identification symbols/drawings for all replaceable parts and accessories shall be included in each instruction manual.

B. The Record Drawings shall include certified “For Record” copies of all shop drawings and equipment documentation furnished for approval plus any drawings created as part of the design and manufacturing process.

C. At the time of shipment, the manufacturer shall provide the Engineer, via email or file transfer AutoCAD DWG and PDF file formats, a digital copy, and two (2) paper copies of all “For Record” drawings. In addition, the manufacturer shall provide an electronic copy, in PDF file format, of all instruction manual material.

D. One (1) complete full-size set of “For Record” drawings and one complete instruction manual shall be shipped with each transformer, in addition to those required above.

3.6 EQUIPMENT GUARANTEE

A. Without limiting any other provisions of this specification regarding guarantees, the Seller shall guarantee that the complete transformer, together with all parts included in the original purchase is free of defect in workmanship and materials, and is capable of continuous and satisfactory performance when operated in accordance with the instructions provided by the manufacturer at the specified ratings and capacity.

B. The guarantee/warranty shall extend for a minimum of five years from the date of commercial operation, but not more than five years and six months from date of delivery, whichever is shorter, and cover all defects and malfunctions of the transformer and accessories. The Seller shall pay all the expenses of on-site repair, out-in freight by common carrier, and the costs of removal from the site and reinstallation after repair. The Seller shall not be liable for indirect or consequential damages in the performance of the guarantee.

END OF SECTION

This page has been left intentionally blank.

Exhibit 1

(New) City of Negaunee Irontown Substation Transformer Monitor Connections (Preliminary Proposed)					
Latest Revision: 3-9-2023					
Hot Spot Simulation by SEL-2414					**Hot Spot Simulation by Qualitrol**
Status (Qualitative) - Digital Input	Function	2414 Card Slot	Card	2414 Terminal	
Vacuum gauge	Alarm	C	Digital Input	IN301	Same
Pressure gauge	Alarm	C	Digital Input	IN302	Same
Oil level	Alarm	C	Digital Input	IN303	Same
Loss of fan power	Alarm	C	Digital Input	IN304	Same
Loss of cooling power	Alarm	C	Digital Input	IN305	Same
Nitrogen High/Low pressure	Alarm	C	Digital Input	IN306	na
Sudden pressure	Trip	C	Digital Input	IN307	Same
Fan Status	On / Off	C	Digital Input	IN308	na
Amount (Quantitative) - Analog Input					
Current (Bushing CT)*	Amps	E	Amps (or Amps/Volts)	IN (Neutral)	None
Ambient temperature (Qualitrol)	Degrees	D	RTD	01-02-03	Same
Oil temperature (Top) Qualitrol*	Degrees/alarm	D	RTD	04-05-06	Same
Simulated Hot Spot by Qualitrol	Degrees	x	x	x	* D-RTD-(13-14-15)
Status (Qualitative) - Digital Output					
Trip	Trip	Z	Digital Output	OUT501	Same
Fans	On / Off	Z	Digital Output	OUT502	Same
* Used in calculation of Hot Spot					
** Gets Hot Spot Temp from Qualitrol					

This page has been left intentionally blank.

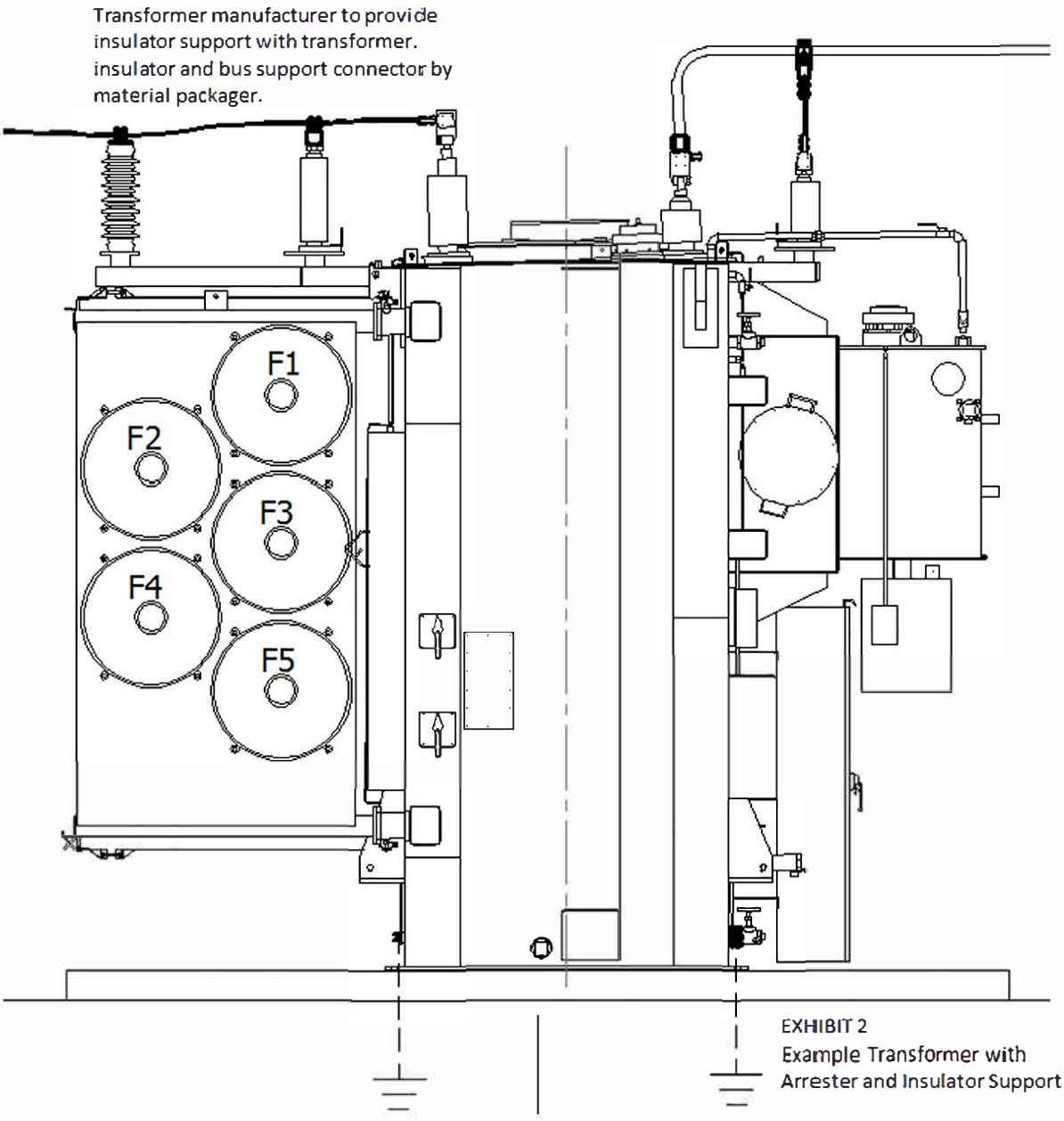
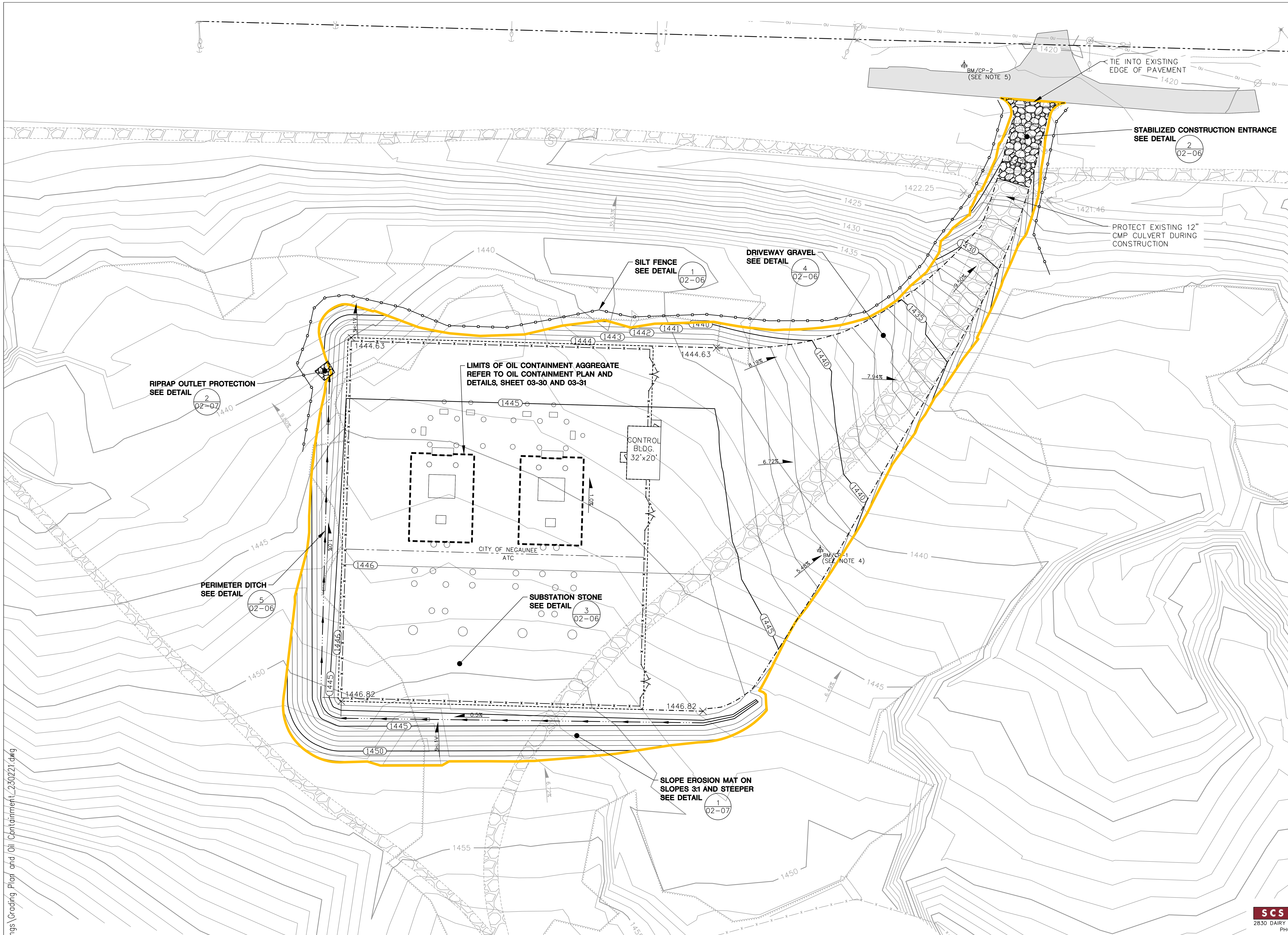


EXHIBIT 2
Example Transformer with Arrester and Insulator Support

This page has been left intentionally blank.



LEGEND

- 1425 — EXISTING GRADE (5' CONTOUR)
- EXISTING GRADE (1' CONTOUR)
- PROPERTY LINE
- EXISTING PAVED ROAD
- EXISTING PATH/TRAIL
- EXISTING FENCE
- EXISTING TREELINE
- OH — EXISTING OVERHEAD ELECTRIC
- T — EXISTING TELEPHONE
- EXISTING CULVERT
- 1422.25 — EXISTING CULVERT INLET ELEVATION
- 1.0% — EXISTING SLOPE
- EXISTING TELEPHONE PEDESTAL
- EXISTING GUY WIRE ANCHOR
- EXISTING POWER POLE
- BENCHMARK/CONTROL POINT
- PROPOSED FOUNDATION
- PROPOSED FENCE
- PROPOSED NEW DRIVEWAY GRAVEL
- PROPOSED LIMITS OF SUBSTATION GRAVEL
- PROPOSED LIMITS OF OIL CONTAINMENT AGGREGATE
- 1.0% — PROPOSED SLOPE
- 1440 — PROPOSED GRADE (5' CONTOUR)
- PROPOSED GRADE (1' CONTOUR)
- 1430.00 — PROPOSED SPOT ELEVATION
- PROPOSED LIMITS OF DISTURBANCE
- PROPOSED DITCH
- PROPOSED SILT FENCE

NOTES

1. EXISTING SITE FEATURES AND TOPOGRAPHY FROM TOPOGRAPHIC SURVEY BY COLEMAN ENGINEERING COMPANY DATED 7/25/2022.
2. PROPOSED FOUNDATIONS FROM FOUNDATION SITE PLAN BY PSE DATED 11/14/2022.
3. SEE GRADING AND EROSION CONTROL PLAN DETAILS (SHEET 02-06 AND 02-07) FOR ADDITIONAL REQUIREMENTS.
4. BM/CP-1 ELEVATION = 1441.66', NORTHING = 624321.6, EASTING = 26092696.6
5. BM/CP-2 ELEVATION = 1420.62', NORTHING = 624613.6, EASTING = 26092783.3
6. BENCHMARKS ARE REFERENCED TO GRID NORTH NAD83 MICHIGAN STATE PLANE, NORTH ZONE. ELEVATION IS REFERENCED FOR NAVD88.

N E S W

15 0 30 60
Scale in Feet

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE
1	ISSUED FOR BID	MJT	JMO	02/22/2023
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023

PSE Power System Engineering, Inc.
www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895

GRADING AND EROSION CONTROL PLAN
IRONTOWN SUBSTATION
CITY OF NEGAUNEE, MI

ENGR J. OMERNIK	CHK'D/APP'D ---	SCALE 1" = 30'	PROJECT NO. MI0592107
DWN BY M. THOMPSON	DATE 02/22/2023	FILE NAME IRT-02-05	DRAWING NO. 02-05