IN VITATION TO BID

WATER SYSTEM IMPROVEMENTS –
WELLS #6 AND #8 ELECTRICAL REMODELING

BIDS DUE: TUESDAY, JANUARY 28, 2020
AT 11:00 A.M. CST
Sealed bids for the Water System Improvements – Wells #6 And #8 Electrical Remodeling will be received at the address listed below until **Tuesday, January 28, 2020 at 11:00 a.m. CST.** Bids will be publicly opened and read aloud at date and time listed at the location stated below. Bids not physically received by the date and time listed above will be returned, unopened to the firm. Emailed or faxed bids will not be accepted. All bids should be addressed to:

Village of Oswego  
Re: (vendor name)  
Invitation to Bid – Wells #6 & #8 Electrical Remodeling  
Attention: Carri Parker, Purchasing Manager  
100 Parkers Mill  
Oswego, IL 60543

Bid packets are available online at [http://www.oswegoil.org](http://www.oswegoil.org). The link can be found under the Business & Development Tab-Bids & RFPs. Additional packets may be picked up at Oswego Village Hall, 100 Parkers Mill, Oswego, Illinois, 60543. Please contact the Purchasing Manager to schedule a time to pick up the packet.

The successful Bidder must provide a bid bond, performance bond, labor and materials bond and proper insurance as stated in the contract. The contractor must comply with all applicable laws including the Prevailing Wage Act. Each contractor is to submit their bid as indicated in the specifications and include all signed supporting documents.

Award of Contract: The Village of Oswego Board of Trustees will make the final award of the bid. The successful Bidder and the Village will execute a contract set forth in the bid package within fourteen (14) days from the award of the contract. The Village reserves the right to reject any or all Bids. No Bid shall be withdrawn for a period of thirty (30) days after the bid opening date without the consent of the Village.

Questions regarding this bid should be in writing and directed to: Carri Parker, Purchasing Manager, Village of Oswego, 100 Parkers Mill, Oswego, IL 60543 Email: cparker@oswegoil.org.
GENERAL REQUIREMENTS

1. **Introduction**

In general, the scope of this contract shall be to furnish all labor, materials, tools, equipment, and supervision for the electrical remodeling of Wells #6 and #8.

The requirements listed below are intended for the contractors to acquaint them with what is required to execute the work on this contract. Any item that might be needed and not herein specified shall be furnished and installed by the contractor in accordance with the terms of this contract.

The work to be done under this contract includes but is not limited to; the providing of all labor, materials, supervision, equipment, services, incidentals, and related items necessary to complete the work in accordance with this specification and scope of work.

2. **Contractor Qualifications**

The Contractor must be experienced in the electrical aspects of a well. Submitters that cannot demonstrate successful previous experience in work of the type in this contract will be considered not responsible and will not be considered for award of the contract.

The Contractor must possess (own or rent) and/or assure the availability of sufficient equipment, meeting the requirements that follow, to successfully pursue the work in this contract.

3. **Work**

The Contractor shall complete the work required as soon as practicable. The only exception to this requirement will be extenuating circumstances as may be accepted by the Village. Requests for exceptions due to extenuating circumstances must be made in writing to the Village within 48 hours of the occurrence. The Village's decision on extenuating circumstances will be final.

Subsequent to the award of the contract, at the commencement of weather conducive to providing said services, a notice to proceed shall be issued. The Contractor shall commence work as soon as possible thereafter. The work will need to be completed not later than April 30, 2021 subject to temperature constraints. See "Liquidated Damages" and "Default on Contract" in the contract document.

Work will not be permitted on Sunday or the following legal holidays:

- New Year’s Day
- Martin Luther King’s Birthday
- President’s Day
- Memorial Day
- Independence Day
- Christmas Day
- Labor Day
- Veteran’s Day
- Thanksgiving Day
- Day after Thanksgiving
- Christmas Eve, ½ Day (afternoon)
4. **Locations of Work and Method of Assignment**

The specific locations of work are listed herein as Exhibit A. Each item specifies the locations, items, and estimate quantities of work to be performed. The Village may add, delete, or change the work locations or details of the marking layouts at any time during the work period, with at least two (2) working days prior notice to the Contractor.

5. **Equipment**

All Equipment required to perform the contract is the sole responsibility of the contractor and should be included in the bid. Multiple mobilizations may be expected and will not be treated like extras.

6. **Pre-Bid Conference**

A mandatory pre-bid conference will be held on **Tuesday, January 7, 2020 at 2:00 p.m.** at the Village of Oswego Village Hall, 100 Parkers Mill, Oswego, Illinois 60543.

7. **Addenda**

Each Bid packet shall include specific acknowledgment of receipt of all addenda issued by the Village during the bidding period. Failure to so acknowledge may result in the Bid being rejected as not responsive.

8. **Substitute Or "Or Equal" Items**

The Contract, if awarded, will be based solely on the materials and equipment described in the Drawings and Specifications without consideration of possible substitute or "or equal" items.

Bidder’s lump sum price shall include the furnishing and installation of the proposed products listed in Proposed Products Form. Bidder shall submit Proposed Products Form with the Bid. Failure to submit the form may cause rejection of the Bid as non-responsive.

Bidder may propose substitute or "or equal" items in Alternates Form, for those major equipment and material items listed in Proposed Products Form and specified in the Specifications for which a substitute or "or equal" item of material or equipment may be allowed if acceptable to Engineer. The determination of lowest Bid will be based on the lump sum price in the Bid Form without consideration of alternate prices for the major equipment and materials. Application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.
9. **Subcontractors, Suppliers, And Others**

The apparent low Bidder, or any other Bidder so requested, shall submit to the office of Engineer within five (5) business days after the receipt of Bids, the following information on Proposed Subcontractors Form:

10. **Bid Form**

Only the Bid Forms attached hereto shall be used. Where required, the Bid price of each item shall be in writing and in figures; in case of conflict, the former shall apply.

11. **Basis Of Bid: Evaluation Of Bids**

Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in the General Requirements.

12. **Bid Bond**

Unless specifically waived, each bid shall be accompanied by a bid security in an amount of ten percent (10%) or such other percentage as stated in the supplementary conditions of the full amount of the bid in the form of a certified or bank cashier’s check or bid bond. In a reasonable time after the bid opening, bid deposits of all except the three lowest responsible bidders will be released. The remaining deposits will be released after the successful bidder has entered into the contract and furnished the required insurance and bonds. The bid deposit shall become the property of the Village if the successful bidder within fourteen (14) days from awarding the contract refuses or is unable to comply with the contract requirements, not as a penalty, but as liquidated damages.

13. **Performance Bond and Labor and Material Payment Bond**

Unless specifically waived or amended, the successful bidder shall furnish at the time of execution of the contract a performance bond for the full amount of the contract to guarantee the completion of any work to be performed by the contractor under the contract, payment of material used in such work, and for all labor performed in such work including by subcontractors.

Performance bond satisfactory to the Village, must be executed by a Surety Company authorized to do business in the State or otherwise secured in a manner satisfactory to the Village, in an amount equal to 110% of the contract price specified. The surety on the bond shall be a company that is licensed by the Department of Insurance authorizing it to execute surety bonds and the company shall have a financial strength rating of at least A as rated by A.M. Best Company, Inc., Moody’s Investors Service, Standard & Poor’s Corporation, or a similar rating agency.
In the event that the bidder fails to furnish the bonds within 14 days after notification of the award, then the bid guarantee shall be retained by the Village as liquidated damages and not as a penalty. It is agreed that the sum is a fair estimate of the amount of damages that the Village will sustain due to the bidder's failure to furnish the bonds.

14. **Award of Bid**

The Village reserves the right to reject any or all bids or packages and to waive any informality or technical error and to accept any bid deemed most favorable to the interests of the organization.

A. The items of work not specifically mentioned in the Schedule which are necessary and required to complete the work intended shall be done incidentally to and as part of the items of work for which a unit price is given. No additional payment will be made for such incidental work. The Bidder shall be responsible for identifying all costs to complete the project on time and in order to create a functional and operational system in accordance with the Plans and Specifications.

B. All awards made in accordance with this Code are final determinations.

C. The Contract shall be deemed as have been awarded when formal notice of award shall have been duly served upon the intended awardee.

D. In addition to price, the Village will consider:
   - Ability, capacity, and skill to fulfill the contract as specified.
   - Ability to supply the commodities, provide the services or complete the project promptly, or within the time specified, without delay or interference.
   - Character, integrity, reputation, judgment, experience, and efficiency.
   - Quality of performance on previous contracts.
   - Previous and existing compliance with laws and ordinances relating to the contract.
   - Sufficiency of financial resources.
   - Quality, availability, and adaptability of the commodities, services or construction, in relation to the Village's requirements.
   - Ability to provide future maintenance and service under the contract.
   - Number and scope of conditions attached to the Bid /bid.
   - Record of payments for taxes, licenses or other monies due to the Village.

15. **Rejection of Bids**

A. The Village reserves the right to cancel invitations for Bids or requests for bids without penalty when it is in the best interest of the Village. Notice of cancellation shall be sent to all individuals or entities solicited.

B. The Village reserves the right to reject any or all Bids, to waive any minor informality or irregularity in any Bid, to negotiate changes and/or modifications with the lowest responsible Bidder and to make an award to the response deemed to be the most advantageous to the Village.

C. Any Bid not conforming to the specifications or requirements set forth by the Village in the Bid request may be rejected.
D. Bids may also be rejected if they are made by a Bidder that is deemed un-responsible due to a lack of qualifications, capacity, skill, character, experience, reliability, financial stability or quality of services, supplies, materials, equipment or labor.

16. **Retainage During Guarantee Period**

Out of the amount representing the total amount due upon completion of work in any month, the Village shall deduct ten percent (10%) and shall hold such sum for a guarantee period which shall expire not less than ninety (90) days after the completion of the last work done in the Contract Work Period of each year.

17. **Billing/Invoicing**

All billing and invoicing will be at the completion of the job with detailed itemized billing. Billing will include the date, the work performed, and the total cost for each location. After receipt of a correct invoice, payments shall be due and owing by the Village in accordance with the terms and provisions of the Local Government Prompt Payment Act, Illinois Compiled Statutes, Ch. 50, Sec. 505, et. seq.;

If, in the opinion of the Village, the Contractor has not or is not satisfactorily performing the work covered by this specification, and within forty-eight (48) hours of receipt of a written demand from the Village, for performance, has not cured any defect in performance specifically itemized in such demand, the Village may, at its option:

A. Withhold payment.
B. Consider all or any part of this contract breached and terminate the contract, or
C. May hire another contractor to cure any defects in performance or complete all work covered by this specification for the remaining term of this contract.
D. Any demand for performance shall be specifically delivered to the contractor by personal delivery, certified or registered mail.

The Village will make periodic inspections and follow up as needed with the contractor to discuss any issues, etc.

18. **Delivery of Materials**

It shall be the Contractor’s responsibility to see that merchandise is delivered within or adjacent to the area of installation repair as specified by the Village.

The work described in this specification shall be done with the least inconvenience. Vehicles must have egress capabilities at all times. The amount of time that normal operations are interrupted must be kept to an absolute minimum and shall be coordinated with the Village.

The Contractor is responsible to protect all existing and newly installed work, materials, equipment, improvements, utilities, structures, and vegetation at all times during the course of
this contract. Any property or incidentals damaged during the course of this contract shall be repaired or replaced to the satisfaction of the Village.

19. **Injury to Property**

In case any direct or indirect damage is done to public or private property by or because of the work, or in consequence of any act or omission on the part of the Contractor, his employees or agents, the Contractor shall, at his own cost, restore such property to a condition similar or equal to that existing before such damage was done, by repairing, rebuilding, or otherwise restoring, as may be required by the Village, or shall make good such damage in a satisfactory manner; and in case of failure on the part of the Contractor to promptly so restore or make good such damage, the Village may, upon 48 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be necessary, and the cost thereof will be deducted from any monies due to become due to the Contractor under the Contract; or the Director of Public Works may deduct from any monies due to the Contractor a sum sufficient, in the judgment of the Village, to reimburse the owners of the property so damaged.

20. **Decisions and Explanations by Village**

The Village shall decide any and all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work and shall decide all questions which may arise as to the interpretations of any or all plans relating to the work and of the specifications, and all questions, as to the acceptable fulfillment of the Contract on the part of the Contractor; and the Village shall determine the amount and quantity of the several kinds of work performed and materials which are to be paid for under the Contract, and such decision and estimate shall be final and conclusive, and such estimate, in case any questions shall arise, shall be a condition precedent to the right of the Contractor to receive any money due under the Contract. Any doubt as to the meaning of any of the provisions of the specifications, Contract, or plans will be interpreted by the Village. The decision of the Village will be final.

21. **Schedule**

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<tr>
<th>Selection Process Steps</th>
<th>Estimated Date(s)</th>
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<tr>
<td>Release to the Public</td>
<td>Thursday, December 19, 2019</td>
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<tr>
<td>Pre-Bid Meeting (Mandatory)</td>
<td>Tuesday, January 7, 2020, at 2:00 p.m.</td>
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<tr>
<td>Final Date to Submit Questions</td>
<td>Thursday, January 9, 2020, by 12:00 p.m.</td>
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<tr>
<td>Addendum Posted (if any)</td>
<td>Monday, January 13, 2020, by 3:00 p.m.</td>
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<td>Bids Due</td>
<td>Tuesday, January 28, 2020, at 11:00 a.m.</td>
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<tr>
<td>Village Board Contract Approval</td>
<td>Tuesday, February 4, 2020</td>
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<tr>
<td>Contract End Date</td>
<td>April 30, 2021</td>
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INSTRUCTIONS TO BIDDERS

22. **Receipt of Bid:** Tuesday, January 28, 2020, at 11:00 a.m.

23. **Basis of Bid:** Sealed Bids will be received until the above noted time and date.

24. **Bid Description:** Water System Improvements – Wells #6 And #8 Electrical Remodeling

25. **Preparation and Submission of Bids:**
   A. Each bid shall be submitted on the exact form furnished. All blank spaces for bid prices, unit costs and alternates must be filled in using both words and figures if indicated. In case of any discrepancy in the amount Bid, the prices expressed in written words shall govern.
   B. Each Bidder must complete, execute and submit with its Bid a certification that Bidder is not barred from public contracting due to bid-rigging or bid rotating convictions on the form included with the bidding documents.
   C. Each Bidder must submit a complete Bid package, including the following items:
      a) Subcontractors List
      b) References
      c) Detailed Exception Sheet
      d) Signed Bid Sheet
      e) Signed Contractor Bid Agreement
      f) Signed Contract (2 copies)
      g) One (1) paper and one (1) electronic copy of the bid packet
      h) Bid Bond
   D. Bidders may attach separate sheets to the Bid for the purpose of explanation, exception, alternate Bid and to cover unit prices, if needed.
   E. Bidders may withdraw their Bid either personally or by written request at any time before the hour set for the Bid opening and may resubmit it. No Bid may be withdrawn or modified after the Bid opening except where the award of the contract has been delayed for a period of more than thirty (30) days.
   F. In submitting this Bid, the Bidder further declares that the only person or party interested in the bid as principals are those named herein; and that the Bid is made without collusion with any other person, firm or corporation.
   G. The Bidder further declares that he has carefully examined this entire Bid Package, and he has familiarized himself with all of the local conditions affecting the contract and the detailed requirements of this work and understands that in making the Bid he waives all rights to plead a misunderstanding regarding same.
   H. The Bidder further understands and agrees that if his bid is accepted, he is to furnish and provide all necessary machinery, tools, apparatus, and other means to do all of the work and to furnish all of the materials specified in the contract, except such materials as are to be furnished by the owner (Village), in the manner and at the time therein prescribed, and in accordance with the requirements therein set forth.
   I. The Bidder further agrees that if the Village decides to extend or shorten the work, or otherwise alters it by extras or deductions, including the elimination of one or more of the
items, as provided in the specifications, he will perform the work as altered, increased or
decreased.

J. The Bidder further agrees that the Village representative may at any time during the
progress of the work covered by this Contract, order other work or materials incidental
thereto and that all such work and materials as do not appear in the Bid or contract as a
specific item covered by a lump sum price, and which are not included under the Bid
price for other items in the Contract, shall be performed as extra work.

K. The Bidder further agrees to execute all documents within this Bid Package, for this
work and present all of these documents to the Village.

L. The Bidder further agrees to execute all documents within this Bid Package, obtain a
Certificate of Insurance for this work and present all of these documents within fifteen
(15) days after the receipt of the Notice of Award and the Contract.

M. The Bidder further agrees to begin work not later than ten (10) days after receipt of the
Notice to Proceed, unless otherwise provided, and to execute the work in such a
manner and with sufficient materials, equipment and labor as will ensure its completion
within the time limit specified within the Bid, it is understood and agreed that the
completion within the time limit is an essential part of the contract.

N. By submitting a Bid, the Bidder understands and agrees that, if his Bid is accepted, and he
fails to enter into a contract forthwith, he shall be liable to the Village for any damages
the Village may thereby suffer.

O. No Bid will be considered unless the party offering it shall furnish evidence satisfactory to
the Village that he has necessary facilities, ability, and pecuniary resources to fulfill the
conditions of the Contract.

P. No Bid shall be considered unless the party offering it shall furnish evidence satisfactory to
the Village that he has the necessary facilities, ability, and pecuniary resources to fulfill the
conditions of the Contract.

26. **Additional Information Request:** Questions regarding this Bid and specific questions
regarding the specifications in this Bid can be emailed to Carri Parker, Purchasing Manager,
Village of Oswego, 100 Parkers Mill, Oswego, IL 60543 or email cparker@oswegoil.org.
Answers will be provided in writing to all potential Bidders; No oral comments will be made
to any Bidder as to the meaning of the Bid and Specifications or other contract documents.
Bidders will not be relieved of obligations due to failure to examine or receive documents,
visit the site or become familiar with conditions or facts of which the Bidder should have
been aware of, and the Village will reject all claims related thereto.

Information (other than in the form of a written Addendum issued by the Village) from any
officer, agent, or employee of the Village or any other person shall not affect the risks or
obligations assumed by the Bidder or relieve him from fulfilling any of the conditions and
obligations set forth in the bid and other contract documents. Before the bids are opened, all
modification or additions to the bid documents will be made in the form of a written
Addendum issued by the Village. Any Addendum issued will be posted on the Village’s
website. In the event of a conflict with the original contract documents, addenda shall govern
all other contract documents to the extent specified. Subsequent addenda shall govern over
prior addenda only to the extent specified.
The Bidder shall be required to acknowledge receipt of the formal Addendum by signing the Addendum and including it with the bid quotation. Failure of a Bidder to include a signed formal Addendum in its bid quotation shall deem its quotation non-responsive: provided, however, that the Village may waive this requirement if it in its best interest.

27. **Conditions:** The Bidder is responsible for being familiar with all conditions, instructions, and documents governing this project and Bid. Failure to make such investigation and preparations shall not excuse the Contractor from the performance of the duties and obligations imposed under the terms of this contract. The Bidder acknowledges that local ordinance permits the Village to give preference to local businesses.

A. The Village is exempt from Federal excise tax and the Illinois Retailer's Occupation Tax. This Bid cannot include any amounts of money for these taxes.

B. To be valid, the Bids shall be itemized so that selection for purchase may be made, there being included in the price of each unit the cost of delivery (FOB Destination).

C. The Village shall reserve the right to add or to deduct from the Base Bid and/or alternate Bid any item at the prices indicated in itemization of the Bid.

D. All Bids shall be good for thirty (30) days from the date of the Bid opening.

E. Bidders shall be required to comply with all applicable federal, state and local laws, including those relating to the employment of labor without discrimination on the basis of age, race, color handicap, sex, national origin or religious creed and prevailing wages.

28. **Equal Opportunity:** The Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, sex, ancestry, national origin, place of birth, age or handicap unrelated to bona fide occupational qualifications.

29. **Non-Discrimination:** The Bidder, its employees, and subcontractors agrees not to commit unlawful discrimination and agrees to comply with applicable provisions of the Illinois Human Rights Act, the U.S. Civil Rights Act and Section 504 of the Federal Rehabilitation Act, and rules applicable to each.

30. **Execution of Documents:** The Bidder, in signing the Bid on the whole or any portion of the work, shall conform to the following requirements:

A. Bids signed by an individual other than the individual represented in the bid documents shall have attached thereto a power of attorney evidencing authority to sign the Bid in the name of the person for whom it is signed.

B. Bids which are signed for a partnership shall be signed by all of the partners or by an attorney-in-fact. If signed by an attorney-in-fact, there shall be attached to the Bid a power of attorney evidencing authority to sign the Bid, executed by the partners.

C. Bids which are signed for a corporation shall have the correct corporate name thereof and the signature of the President or other authorized officer of the corporation manually written below the corporate name.

D. If such Bid is manually signed by an official other than the President of the Corporation, a certified copy of a resolution of the board of directors evidencing the authority of such official to sign the Bid should be attached to it. Such Bid shall also bear the attesting signature of the Secretary of the corporation and the impression of the corporate
seal. If the Bid is signed for a limited liability company, it should have the correct legal name and be signed by the managing member or other person with authority.

E. Bids received from any listed contractor in response to an invitation for bids shall be entered on the abstract of Bids and rejected. Bids, quotations, or offers received from any listed contractor shall not be evaluated for award or included in the competitive range, nor shall discussions be conducted with a listed offer or during a period of ineligibility. If the period of ineligibility expires or is terminated prior to award, the village may, but is not required to, consider such bids, quotations, or offers.
1. Specifications of materials and labor required for the construction work shown on the Drawings are prepared by Baxter & Woodman, Inc., Consulting Engineers.

2. The Drawings which accompany these specifications are titled "Village of Oswego, Illinois, Water System Improvements, Well Nos. 6 and 8 Electrical Remodeling".

3. Copyright 2019 by Baxter & Woodman, Inc. All Rights Reserved. No part of these Specifications or the accompanying Drawing(s) may be reproduced by any means, or otherwise reused without the prior written permission of Baxter & Woodman, Inc.

December 10, 2019

[Signature]
Electrical Engineer
License Expires 11/30/2021
To: President and Board of Trustees
Village of Oswego
100 Parker's Mill
Oswego, Illinois 60543
(hereinafter called Owner)

From: ________________________________

Company

______________________________
Address

___________________  __________   __________
City     State     Zip Code

(____)__________________________
Telephone

(____)__________________________
FAX                           E-MAIL

(hereinafter called Bidder)

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to furnish all labor, materials, tools, and services required for the construction of the remodeling of the motor control centers at the Well Nos. 6 and 8 Well Houses for the Village of Oswego, Kendall County, Illinois [Engineer’s Job No. 181040.40], all in accordance with the Bidding Documents prepared by Baxter & Woodman, Inc., Consulting Engineers.

2. Bidder accepts all of the terms and conditions of the Advertisement for Bids and Bidder Instructions, including without limitation those dealing with the disposition of Bid Security. This Bid will remain open for 60 days after the date of Bid opening or for such longer period of time that Bidder may agree to in writing upon request of Owner. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Documents within 15 days after the date of Owner's Notice of Award.

3. In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

a. Bidder has examined copies of all the Bidding Documents.
b. Bidder is familiar with the nature and extent of the Bidding Documents, Work, site, locality, and all local conditions and legal and regulatory requirements that in any manner may affect cost, progress, performance, or furnishing of the Work, and has made such independent investigations as Bidder deems necessary.

c. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

d. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

e. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

f. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

g. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

h. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the Work for which this Bid is submitted.

i. This Bid is genuine and not made in the interest 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 a 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.

j. By submission of the Bid, Bidder certifies, and in the case of a Joint Bid each party thereto certifies as to his own organization, that in connection with the Bid:

BID FORM
00 41 00.13-2 (181040.40)
(1) The prices in the Bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in the Bid have not knowingly been disclosed by the Bidder, prior to opening, directly, or indirectly to any other Bidder or to any competitor.

(3) No attempt has been made or will be made by the Bidder to induce any other person or firm to submit or not to submit a Bid for the purpose of restricting competition.

(4) Bidder is not barred from contracting with the Owner as a result of a violation 720 ILCS 5/33 et seq.

k. Bidder agrees that no less than the prevailing rate of wages as determined by the Department of Labor or determined by the court on review, shall be paid to all laborers, workmen, and mechanics performing work under this contract.

l. Bidder complies with the provisions of the Employment of Illinois Workers on Public Works Act (30 ILCS 570/) as they may apply to this Project.

m. Bidder will comply with the requirements of Sections 22.51(f)(2)(B) and 22.51a(d)(2)(B) of the Illinois Environmental Protection Act ([415 ILCS5/22.51(f)(2)(B)] and [415 ILCS5/22.51a(d)(2)(B)]) for the disposal of uncontaminated soils including uncontaminated soil mixed with other clean construction or demolition debris (CCDD) materials and has included any costs associated with compliance in the Bid.

4. Bidder will complete the Work for the following lump sum price:

                                  Lump Sum


5. Bidder agrees the Work will be substantially completed within 270 calendar days after the Contract Time commences to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 1.11 of the Supplementary Conditions within 300 calendar days after the Contract Time commences to run.

a. Bidder accepts the provisions of the Supplementary Conditions as to liquidated damages in the event of failure to complete the Work on time.

6. Bidder submits the required Bid Security in the form of (Certified Check or Bid Bond) in the amount of _____________________ or _____________ Percent of the Bid Amount.
7. Bidder will be obtaining Performance and Payment Bonds through the following local agent or broker:

Name: __________________________________________________________

Address: _______________________________________________________

Telephone: ______________________ email: __________________________

8. Bidder submits all items listed in Section 00 43 93 – Bid Submittal Checklist.

9. Terms used in this Bid which are defined in the Standard General Conditions of the Construction Contract included as part of the Bidding Documents have the meanings assigned to them in the General Conditions.

10. Bidder acknowledges receipt of the following Addenda:

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<th>Addendum Number</th>
<th>Date Received</th>
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11. The person signing this Bid certifies that: (Check applicable box.)

( ) He/She is the person in the bidder’s organization responsible within that organization for the decision as to the prices being bid and that he/she has not participated, and will not participate, in any action contrary to that above; or

( ) He/She is not the person in the bidder’s organization responsible within that organization for the decision as to the prices being bid but that he/she has been authorized to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to the above, and as their agent shall so certify; and shall also certify that he/she has not participated, and will not participate, in any action contrary to that above.

BID FORM
00 41 00.13-4 (181040.40)
Respectfully submitted, signed, and sealed this _____ day of ____________, 20____.

_____________________________
Bidder

(SEAL)

By ____________________________

_____________________________
Name - Title

ATTEST:

_____________________________

_____________________________
Name – Title

END OF BID FORM
SUPPLEMENTAL UNIT PRICES

Bidder submits the following Schedule of Supplemental Unit Prices for additions to or deductions from the scheduled amount of Work as given in the Bid Form, and agrees that Owner reserves the unrestricted privilege to accept or reject any or all unit prices:

1. Cost per 10 foot of feeders conductor:
   a. #6 MV cable (5kv) $________
   b. #4 MV cable (5kv) $________
   c. #2 MV cable (5kv) $________
   d. #1 MV cable (5kv) $________
   e. #300 kcmil (480 V) $________
   f. #350 kcmil (480 V) $________
   g. #400 kcmil (480 V) $________
   h. #500 kcmil (480 V) $________

2. Cost per 10 foot of conduit run:
   a. 2-inch RMC (Galvanized) $________
   b. 3-inch RMC (Galvanized) $________
   c. 4-inch RMC (Galvanized) $________

Bidder agrees the Supplemental Unit Prices shown above include all overhead, profit, and those costs included in the Cost of the Work in accordance with Article 11 of the General Conditions.

PROVIDE SIGNATURE IDENTICAL TO THAT SHOWN ON THE BID FORM

BIDDER:

________________________

By:_____________________

END OF SUPPLEMENTAL UNIT PRICES
1. FAILURE TO SUBMIT THIS FORM WITH THE BID FORM, WHETHER OR NOT ALTERNATES ARE SUBMITTED, SHALL CAUSE REJECTION OF THE BID AS NON-RESPONSIVE. COMPLETE EITHER SECTION 2 OR SECTION 3.

2. Pursuant to bidding requirements for the Work titled:

VILLAGE OF OSWEGO, ILLINOIS
WATER SYSTEM IMPROVEMENTS
WELL NOS. 6 AND 8 ELECTRICAL REMODELING

Bidder submits the following prices for deduction from or addition to the lump sum price in the Bid Form for the following named substitute or "or equal" items, and expressly agrees to the following provisions: (It is not necessary to submit alternates).

A. That the determination of the lowest Bid will be based on the lump sum price in the Bid Form without consideration of the alternate prices.

B. That Owner may select items of any manufacturer or supplier as listed, and Bidder agrees to provide such items as selected, and for an adjusted Contract Price equal to the lump sum price in the Bid Form adjusted by the prices for the alternate items selected by Owner.

C. That the price for each item includes the preparation and submission to Engineer of detailed drawings showing all modifications necessary (if any) to accommodate such alternate, all as defined and described in the General Conditions and the General Requirements of the Specifications.

D. That each alternate price includes the cost to furnish and install the item, the cost of engineering redesign (if any), and the cost of any electrical, mechanical, piping, and structural changes necessary to provide a complete installation ready for use.

E. That Engineer will not evaluate the proposed alternate items until after Effective Date of the Agreement.

F. That Engineer will evaluate the proposed alternate items as Substitute Items in accordance with Paragraphs 6.05.A.2; 6.05.C; 6.05.D; 6.05.E; and 6.05.F of the General Conditions.
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<tr>
<th>SPECIFICATION SECTION</th>
<th>DESCRIPTION OF ITEM</th>
<th>PROPOSED MFR.</th>
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<th>ALTERNATE PRICES (CIRCLE ONE)</th>
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(Signature) ___________________ (Date) ________________

OR

3. BIDDER acknowledges alternates are not being submitted as evidenced by the following signature and date:

(Signature) ___________________ (Date) ________________

END OF ALTERNATES FORM
1. FAILURE TO SUBMIT THIS FORM WITH THE BID FORM, OR REVISING THE LISTED MANUFACTURERS IN THIS FORM, SHALL CAUSE REJECTION OF THE BID AS NON-RESPONSIVE.

2. Pursuant to bidding requirements for the Work titled:

**VILLAGE OF OSWEGO, ILLINOIS**
**WATER SYSTEM IMPROVEMENTS**
**WELL NOS. 6 AND 8 ELECTRICAL REMODELING**

Bidder's lump sum price proposed on the Bid Form is based upon one of the following items of equipment and materials as shown on the Drawings and described in the Specifications. Bidder shall circle the item (A or B) included in the Bid. Should Bidder fail to indicate which manufacturer is included in the Bid, Bidder shall provide Item A.

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<tr>
<th>SPECIFICATION SECTION</th>
<th>DESCRIPTION OF ITEM</th>
<th>MANUFACTURER (CIRCLE ONE)</th>
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**PROPOSED PRODUCTS FORM**
00 43 33-1 (181040.40)
3. Bidder submits the following prices for the Owner's information:

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<th>DESCRIPTION OF ITEM</th>
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END OF PROPOSED PRODUCTS FORM
SUBSTITUTION REQUEST FORM

This form is only to be used after the Effective Date of the Agreement. Provisions requiring submittal of this form are described in Specification Section 01 62 01 and paragraph 6.05 of the General and Supplementary Conditions.

Substitution Request No.: ____________________________________________

Project: __________________________________________________________

Contract: ______________________________________________________________________________________

We hereby apply for consideration of ____________________________________________ (Proposed Substitute Manufacturer) as a substitute manufacturer to the manufacturer(s) named in Specification Section __________________________ Paragraph/Drawing No. ___________________ for the following reasons. (Check one or more.)

_____ The specified equipment or material is unavailable or the time of delivery will substantially delay the construction of the project, but not as a result of Contractor’s failure to pursue Work promptly or coordinate various activities. (Provide supporting information.)

_____ The proposed equipment or material will provide for packaging and coordination with other equipment from a single source supplier. (Submit name of source supplier and other equipment to be packaged.)

_____ The proposed equipment or material is a “Substitute Item” to that specified and the Contractor will provide the Owner with a credit of $__________________ if the equipment or material is accepted.

We certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to the specified, be suited to the same use as that specified, and will not prejudice Contractor’s achievement of Substantial Completion on time.

Contractor: ______________________________________________________________________________________

Signature: ____________________________________________ Date: ______________

Name (print): ______________________________________________________________________________________

Title: ____________________________________________________________________________________________

NOTE: Engineer may require Contractor to furnish, at Contractor’s expense, additional data about the proposed substitute including but not limited to, an analysis by Contractor of the equivalency of the proposed substitute to the named item.
A. Physical Characteristics of Proposed Substitute (if applicable).

Operating Weight:____________ Height:________ Width:________ Depth:________
Voltage:_________________ Hertz:_________________ KW or HP:________________

B. Will acceptance of the proposed substitute by the Owner:

1. Require a change in the Drawings or Specifications: Yes____ No____
   If yes, attach an explanation and detailed drawings or specifications.

2. Require payment of any license fee or royalty: Yes____ No____
   If yes, attach an explanation.

3. Result in a change of contract time: Yes____ No____
   If yes, attach an explanation.

C. Variations of proposed substitute from specified material, equipment, methods or procedures include: (If none, state none. Attach separate listing if more space is needed.)

1. ________________________________________________________________

2. __________________________________________________________________________________________

3. __________________________________________________________________________________________

4. __________________________________________________________________________________________

D. Service Source (Maintenance, Repair, and Replacement) Availability:

1. Name of Business:________________________________________________________________________
   Address:____________________________________________________________________________________
   Years in Business:_______ Factory Authorized: Yes_____ No____
   Parts Stocked: Major: Yes_____ No_____ Minor: Yes_____ No____
   Field Service Staff Available: Yes_____ No____

2. Name of Business:________________________________________________________________________
   Address:____________________________________________________________________________________
   Years in Business:_______ Factory Authorized: Yes_____ No____
   Parts Stocked: Major: Yes_____ No_____ Minor: Yes_____ No____
   Field Service Staff Available: Yes_____ No____

E. Identify costs, direct or indirect, if any, associated with acceptance of this proposed substitute.
   (If none, state none.)

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

SUBSTITUTION REQUEST FORM
00 43 34-2
## INSTALLATION LIST

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<tr>
<th>Location:</th>
<th>Telephone No.:</th>
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TO: President and Board of Trustees
Village of Oswego
100 Parker’s Mill
Oswego, Illinois 60543
(hereinafter called Owner)

1. Pursuant to bidding requirements for the Work titled:

VILLAGE OF OSWEGO, ILLINOIS
WATER SYSTEM IMPROVEMENTS
WELL NOS. 6 AND 8 ELECTRICAL REMODELING

for portions of the Work equaling or exceeding $10,000, Bidder proposes to use the following Subcontractors. Except as otherwise approved by Owner, Bidder proposes to perform all other portions of the Work with his own forces:

2. Portion of the Work: Subcontractor name and address:

________________________________________________________________________
________________________________________________________________________
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PROPOSED SUBCONTRACTORS FORM
00 43 36-1 (181040.40)
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<thead>
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<th>Portion of the Work:</th>
<th>Subcontractor name and address:</th>
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USE ADDITIONAL SHEETS IF REQUIRED

END OF PROPOSED SUBCONTRACTORS FORM

PROPOSED SUBCONTRACTORS FORM
00 43 36-2 (181040.40)
BID SUBMITTAL CHECKLIST

BIDDER submits the following documents with this Bid:

a. Form 00 41 00.13 “BID FORM”.

b. Required Bid Security (Certified Check or Bid Bond).

c. 00 43 23 “ALTERNATES FORM”.

d. 00 43 33 “PROPOSED PRODUCTS FORM”.

e. CERTIFICATE 00 62 03 ILLINOIS DRUG FREE WORKPLACE ACT.

f. CERTIFICATE 00 62 04 ILLINOIS CONTRACTOR CERTIFICATION.

g. CERTIFICATE 00 62 05 ILLINOIS COMPLIANCE WITH SAFETY REQUIREMENTS.

h. CERTIFICATE 00 62 06 ILLINOIS TAX DELINQUENCY/DEFAULT.

i. CERTIFICATE 00 62 07 SUBSTANCE ABUSE PREVENTION PROGRAM.

j. CERTIFICATE 00 62 08 EMPLOYMENT OF ILLINOIS WORKERS ON PUBLIC WORKS ACT.

END OF BID SUBMITTAL CHECKLIST
SECTION 01 14 11
CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section applies to all situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

F. Provide a list of names and identification of all persons to be entering the Owner’s property in connection with the Work of this Contract, and submit a copy of the list to the Owner at the preconstruction conference.
   1. Advise the Owner of personnel changes at project meetings.

1.3 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.
1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store construction equipment, tools or materials on any area of the Owner's property except where shown on the Drawings as the "Contractor's Storage Area," or where otherwise directed by the Engineer.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

1.7 USE AND RESTORATION OF THE SITE

A. Construct and maintain temporary roadways from the existing public roadway to the site and within the entire site for material and equipment transport necessary to complete the work.
   1. Include necessary culverts for proper drainage.
   2. Obtain necessary permits for the construction of access temporary roadways.
   3. Obtain Engineer's approval for the location of the temporary roadways.

B. Upon completion of the Work, restore areas used for temporary roadways to fully graded condition totally free of stones or crushed rock.

C. Clean all permanent roadways used for construction activities by using motorized street sweeper that utilizes vacuum and water to pick up debris, when directed by Engineer.

1.8 CONTRACTOR'S INGRESS AND EGRESS

A. Truck and Equipment access:
   1. To avoid traffic conflict with vehicles of the Owner's employees and customers, and to avoid overloading of streets and driveways elsewhere on the Owner's property, limit the access of trucks and equipment to the route directed by the Engineer.
   2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the work site.

B. Contractor's vehicles:
   1. Require Contractor's vehicles, vehicles belonging to employees of the Contractor, and all other vehicles entering upon the Owner's property in performance of the Work, to use only the Access Route directed by the Engineer.
   2. Do not permit such vehicles to park on any street or other area of the Owner's property except in the area directed by the Engineer.

C. Restoration: Clean and restore to at least the preconstruction condition all roadways, streets, sidewalks, driveways, and parking areas used during construction.
1.9 ACCESS TO OWNER'S FACILITIES

A. Restricted areas and structures:
   1. Do not enter any designated restricted area or any existing structure, except as required to do specific work.
   2. Obtain Owner’s permission to enter restricted areas or existing structures to do specific work.
   3. Remove all construction debris and clean work areas daily when working in restricted areas or existing structures.

B. Equipment:
   1. Do not use Owner’s equipment or tools.

1.10 PROTECTION OF EXISTING PROPERTY AND EQUIPMENT

A. Equipment:
   1. Take all necessary precautions to protect all equipment from sand, dust, water and other debris which is produced during construction.
   2. Wherever possible, cut concrete or masonry from outside the structure to prevent production of dust in areas containing equipment.
   3. During dust-producing activities inside of structures, isolate work area from equipment using temporary impervious partitions or individual equipment encasement.
   4. Under excessive dust conditions, ventilate isolated working areas as directed by Engineer.
   5. Remove all temporary equipment protection facilities upon completion of construction activity requiring such protective measures.

1.11 DISPOSAL OF SPOIL

A. Remove all spoil, excess excavated material, or other construction activity residual materials from the work site. Do not deposit this material on private or public property without written permission from property owner or authorized representative of the appropriate public agency.

1.12 SECURITY

A. Restrict the access of all persons entering upon the Owner’s property in connection with the Work to the Access Route and to the actual site of the Work.

END OF SECTION
SECTION 01 14 15

PLANT OPERATION DURING CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Prepare and maintain a sequence of construction which will ensure the continuance during construction of the same degree of wastewater treatment as is provided by the existing treatment plant.

B. Related work:
   1. Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

F. Comply with pertinent provisions of Section 01 33 01.

G. Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed and as a part of the construction schedule required by Section 01 32 16, submit a detailed sequence of construction showing how the new work will be completed without interruption of the existing treatment process.

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
1.7 OPERATION OF TREATMENT FACILITIES

A. The well house will be removed from service for the duration of the demolition and equipment replacement. The Contractor is expected to coordinate the commencement of demolition with the Owner and to facilitate the installation and startup in an expeditious manner.

B. When construction or installation of a treatment unit has been completed and the inspection, testing, and guarantee provisions of Section 01 61 01 have been complied with, the unit may be placed into operation at which time the Owner will assume responsibility for the normal operation and maintenance of the equipment in accordance with paragraph 14.05 of the General Conditions.

END OF SECTION
SECTION 01 21 13
CASH ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY
   A. To provide adequate budget to cover items not precisely determined prior to bidding, allow within the proposed Contract Price amounts described in this Section.

   B. Related work:
      1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 - General Requirements of these Specifications.

   C. References:
      1. (Reserved).

1.2 SUBMITTALS
   A. Shop Drawing Submittals – (Reserved).

   B. Operation and Maintenance Manuals – (Reserved).

   C. Certificates and Guarantees – (Reserved).

   D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE– (Reserved).

1.7 CONTINGENT CASH ALLOWANCE
   A. From time to time it will be necessary to add unforeseen additional work to the Project. The intent of the Contingent Cash Allowance is to provide a means to fund reasonable charges and additions to the Project. The value of any work covered by the Contingent Cash Allowance(s) will be determined in accordance with the General Conditions and Supplementary Conditions.
B. Do not include any overhead and profit amount in the Project base bid for the Contingent Cash Allowance. Include the appropriate overhead and profit in each item funded from the Contingent Cash Allowance.

C. Include in the Lump Sum price a Contingent Cash Allowance of Ten Thousand Dollars ($10,000.00) for miscellaneous items for work.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY: REQUESTS FOR INTERPRETATION (RFI)

A. The Contractor may submit Requests For Interpretation (RFI) to the Engineer to expedite the Contractor’s performance on the Project. RFIs will be submitted following the requirements, all as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.
   2. Individual requirements for submittals will be described in pertinent Sections of these Specifications.

C. Work not included:
   1. Incomplete submittals will not be reviewed by the Engineer.
   2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

D. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Make submittals of RFIs in accordance with the provisions of this Section.

F. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence.
and documentation to determine that the information requested is not reasonably obtainable from such sources.

G. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required to allow the Engineer sufficient time, in the Engineer’s professional judgement, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 This Subsection intentionally left blank.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Each RFI shall be submitted to the Engineer, in writing, on such form and with such accompanying information as the Engineer may require for such purpose. Each RFI shall identify the specific sources which were reviewed by the Contractor in its efforts to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

B. Consecutively number all submittals.
   1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
   2. On re-submittals, cite the original submittal number for reference.

C. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
   1. Use Request for Interpretation (RFI) Form, Section 01 26 13.13.

D. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

E. Submittal log:
   1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times, the date of the request, to whom
the request was made, by whom the request was made, the nature of the request, and the Engineer’s resolution thereof.

2. Make the submittal log available to the Engineer for the Engineer’s review upon request.

3. Review this log at each Project Meeting and make the resolution of RFIs a part of the minutes of such meetings.

END OF SECTION
REQUEST FOR INTERPRETATION (RFI) FORM

RFI NO.________________

Contractor requests for interpretation will be considered upon receipt of this completed RFI Form. By submission of this form the Contractor attests to the fact that having carefully reviewed the Contract Documents and coordinated the Work with the appropriate trades and reviewed field conditions, that the information requested cannot be determined from such efforts as called for in the General Conditions of the Contract.

Date:___________________ Project:__________________________________________

To:________________________________________

Description of Requested Interpretation:______________________________________

________________________________________________________________________

________________________________________________________________________

Specification References:___________________________________________________

Drawing References:________________________________________________________

Proposed method of resolving issue. Sketches and/or Pages Attached:____ Yes,____ No

________________________________________________________________________

________________________________________________________________________

Potential impact on project cost:

Response Date:____________________ List date by which response by Engineer is requested to maintain project schedule. (Allow sufficient time for response).

Signed:________________________________________ Date:_____________________

ENGINEER’S RESPONSE

Notations listed below indicate the Engineer’s action on method proposed by the Contractor to resolve issues or remarks in response to RFI when no Contractor recommendation has been provided. Changes to Contract Amount and/or project time shall be processed using standard Change Order Forms. Sketches and/or Pages Attached____Yes____No

________________________________________________________________________

Signed:________________________________________ Date:_____________________

REQUEST FOR INTERPRETATION (RFI) FORM
01 26 13.13-1 (181040.40)
PART 1 - GENERAL

1.1 SUMMARY

A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.

F. Minutes:
   1. The Engineer will compile minutes of each project meeting, and will furnish three copies to the Contractor and required copies to the Owner.
   2. Recipients of copies may make and distribute such other copies as they wish.

1.3 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.
1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 No products are required in this Section.

PART 3 - EXECUTION

3.1 MEETING SCHEDULE
A. Project meetings will be scheduled at the Preconstruction Meeting.
B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION
A. The Engineer will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRECONSTRUCTION MEETING
A. Preconstruction Meeting will be scheduled to be held within 20 working days after the effective date of the Agreement.
   1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
   2. The Engineer will advise other interested parties, including the Owner, and request their attendance.
B. Minimum agenda: Data will be distributed and discussed on at least the following items:
   1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and Engineer.
   2. Channels and procedures for communications.
   3. Construction schedule, including sequence of critical work.
   4. Contract Documents, including distribution of required copies of original Documents and revisions.
   5. Processing of Shop Drawings and other data submitted to the Engineer for review.
   6. Processing of Bulletins, field decisions, and Change Orders.
   7. Rules and regulations governing performance of the Work; and
3.4 PROJECT MEETINGS

A. Progress meetings will be held throughout progress of the Work at intervals agreed to by Owner, Engineer and Contractor. Interval will generally be weekly.

B. Contractor's project manager, job superintendent, major subcontractors and suppliers shall attend, as appropriate, to address agenda topics for each meeting. Contractor's representatives shall have authority to bind Contractor to decisions at the meetings.

C. The project schedule shall be updated monthly and shall be reviewed at each progress meeting. Contractor shall provide the following information in written form at each meeting.
   1. Construction progress, including:
      a. Activities completed this reporting period.
      b. Activities in progress this reporting period.
      c. Activities scheduled to commence this reporting period.
   2. Description of problem areas.
   3. Current and anticipated delays.
      a. Cause of the delay.
      b. Corrective action and schedule adjustments to correct the delay.
      c. Impact of the delay on other activities, on milestones, and on completion dates.
   4. Changes in construction sequence.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Prepare and maintain the schedules and reports described in this Section to assure adequate planning and execution of the Work so that the Work is completed within the Contract Times, and to assist the Engineer in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Requirements for progress schedule: General Conditions.
   3. Construction period: Form of Agreement.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Comply with pertinent provisions of Section 01 33 01.

F. Construction schedule: Prior to submission of the first Application for Payment, but no later than 30 calendar days after Contract Times commence, submit to the Engineer one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.

G. Periodic reports: Update the construction progress monthly and submit it to the Engineer prior to submittal of each Application for Payment for completed work.
   1. Submit four prints of the construction schedule updated as described in Part 3 of this Section.
1.3 QUALITY ASSURANCE

A. Perform data preparation, analysis, charting, and updating in accordance with standards approved by the Engineer.

B. Reliance upon the approved schedule:
   1. The construction schedule as approved by the Engineer will be an integral part of the Contract and will establish interim completion dates for the various activities under the Contract.
   2. Processing of the first Application for Payment will not be completed by the Engineer until the construction schedule has been submitted in accordance with 1.2 F. above.
   3. Processing of the 50 percent and 80 percent progress payment applications will not be completed by the Engineer until the periodic reports have been submitted in accordance with 1.2 G. above.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 CONSTRUCTION ANALYSIS

A. Graphically show by Critical-Path (CPM), Program Evaluation and Review Technique (PERT), Precedence Methods, bar-chart, or other means acceptable to the Engineer, the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.

B. Include, but do not necessarily limit indicated activities to:
   1. Project mobilization.
   2. Work elements.
   3. Special material and equipment installation and testing.
   4. Final cleanup.
   5. Final inspecting and testing.
   6. All activities by the Engineer that affect progress, required dates for completion, or both, for all and each part of the work.
   7. Contractor’s anticipated working dates.
PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE

A. As soon as practicable after receipt of Notice to Proceed, complete the construction schedule in preliminary form, meet with the Engineer, review contents of the proposed construction schedule, and make all revisions agreed upon.

B. Submit in accordance with Paragraph 1.2 F. above.

3.2 PERIODIC REPORTS

A. As required under Paragraph 1.2 G. above, update the approved construction schedule.
   1. Indicate "actual" progress in percent completion for each activity;
   2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.3 REVISIONS

A. Make only those revisions to approved construction schedule as are approved in advance by the Engineer.

END OF SECTION
SECTION 01 33 01

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Individual requirements for submittals will be described in pertinent Sections of these Specifications.
      a. The process for securing approval of proposed substitutions is described in Section 01 62 01, "Product Options and Substitutions".

C. Work not included:
   1. Submittals not required by the various Specification Sections of the Contract Documents will not be reviewed by the Engineer.
   2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

D. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Provide submittals of Shop Drawings, Samples, Substitution Requests, progress schedules and other items required in the Contract Documents in accordance with the provisions of this Section.

1.3 QUALITY ASSURANCE

A. Coordination of submittals:
   1. Review and coordinate all aspects of each item being submitted.
   2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
3. Certify that this coordination has been performed by affixing the Contractor's signature to each Contractor's Submittal Transmittal Form Attachment 01 33 01.

B. Resubmittals and reimbursement of Engineer's costs.
   1. The Engineer will record all time used by the Engineer in the review of any third and subsequent submittals.
   2. The Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent in such third and subsequent reviews and deduct such costs from payments due the Contractor.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Provide Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
   1. Shop Drawings are not required for manholes, valve vaults, catch basins, pipe, and appurtenances needed for infrastructure systems (storm sewers, sanitary sewers, and water distribution) so long as the items are the materials and manufacturers specified in the project manual.

B. Submit Shop Drawings electronically to the Engineer as a single .pdf file set.
   1. Attach, as the first page of each Shop Drawing, a completely executed Contractor's Submittal Transmittal Form Attachment 01 33 01.
   2. Collate the electronic .pdf file to include all data pertaining to the Shop Drawing Submittal in one .pdf set.
      a. Separate .pdf files submitted will be cause for rejection and the Shop Drawing will be returned to the Contractor.
   3. In cases where Electronic Shop Drawing files exceed a size that is practical for electronic transmission via electronic mail or through an FTP site, the Contractor may and will be required to submit up to five (5) .pdf file shop drawing submittals on separate compact discs or removable USB storage, if requested, plus the quantity of discs or removable USB storage that will be required to be returned to the Contractor.

C. Submit all required shop drawings for a specification section at the same time under one Contractor's Submittal Transmittal Form Attachment 01 33 01.
D. Do not submit partial submittals of an item within a specification section or use a separate Contractor’s Submittal Transmittal Form for separate items within a particular section.

E. Identify exceptions or items that do not comply with the specifications and provide explanation for exception or non-compliance.

F. For Shop Drawings required to be resubmitted for review, include the following:
   1. A completely executed cover sheet Contractor’s Submittal Transmittal Form Attachment 01 33 01.
   2. A cover letter responding to each of the review comments returned to the Contractor by the Engineer with the previous review and specifically stating:
      a. If the equipment and resubmitted data provided complies with the review comment(s) then provide:
         (1) How the equipment complies.
         (2) Specifically indicate where support documentation can be located in the shop drawing.
      b. If the equipment and resubmitted data provided cannot or does not comply with the review comment(s) then provide:
         (1) What is being provided to comply instead.
         (2) Justify why the Contractor feels the Engineer should consider it is acceptable to allow the Contractor to not comply with the specification.
   3. Resubmission of a complete and fully-inclusive shop drawing with all data pertinent to the item(s) being submitted.
      a. Partial submission of data that only addresses the Engineer’s specific review comments, or a portion thereof, and does not include all data for a complete resubmittal, will be cause for immediate rejection.

G. Upon completion of the Engineers review of the Shop Drawings, one electronic .pdf file will be returned to the Contractor for their distribution.
   1. Upon the request of the Engineer or Owner at any time, the Contractor shall provide up to four (4) color, hard copy, shop drawing submittals.
   2. Upon the request of the Engineer or Owner at any time, the Contractor shall provide up to four (4) .pdf file shop drawing submittals on separate compact discs or removable USB storage.

2.2 MANUFACTURERS’ LITERATURE

A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly indicate which portion of the contents is being submitted for review by highlighting, circling, or other means, or by crossing out contents that do not pertain to the submittal and are not to be considered.
   1. This also applies to specifically indicating, when applicable, which optional items will or will not be provided with items specified.
2.3 SAMPLES

A. Provide Sample or Samples identical to the precise article proposed to be provided.
   1. Identify as described under "Identification of Submittals" below.

B. Number of Samples required:
   1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
   2. By prearrangement in specific cases, a single Sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Engineer.
   3. Because submittals shall be submitted to the Engineer in an electronic format as described herein, the Contractor shall specifically indicate on the Contractor’s Submittal Transmittal Form Attachment 01 33 01 included with each submittal (when samples are required) when and where the physical samples will or have been transmitted for physical observation.
   4. Include as part of the electronic submittal a .pdf copy of any and all transmittals, shipping information, signatures of receipt, etc. identifying the transmission and receipt of the said sample(s).

2.4 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Engineer for selection.

2.5 MANUFACTURERS’ RECOMMENDED INSTALLATION PROCEDURES

A. Maintain in a safe place at the site one copy of manufacturers’ recommended installation procedures for all equipment and materials.
   1. Make these installation procedures readily available to the Engineer for reference.

B. When the manufacturers’ recommended installation procedures are submitted as part of the shop drawings required by the Contract Documents, approval of such installation procedures by the Engineer will not be required.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Consecutively number all submittals, beginning with identifying number “001” for the first submittal delivered by the Contractor.
   1. When items are submitted for any reason, transmit under a new Contractor’s Submittal Transmittal Form Attachment 01 33 01 and with a new transmittal number.

SUBMITTALS
01 33 01-4 (181040.40)
2. When material is resubmitted for any reason, cite the original identifying submittal number followed by insertion of a letter “A” for the first resubmittal, “B” for the second resubmittal, and so on.

B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
   1. Use Contractor’s Submittal Transmittal Form Attachment 01 33 01.

C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

3.2 GROUPING OF SUBMITTALS

A. Shop Drawings may be submitted for different specification sections under one Contractor’s Submittal Transmittal Form Attachment 01 33 01, provided the items are specifically and directly related to each other such that review of the items from different specification sections is pertinent for a complete review.
   1. Identify any and all items and their specific specification section(s) if included with and submitted under a differing main specification section submittal.
   2. Partial submittals may be rejected as not complying with the provisions of the Contract.
   3. The Contractor may be held liable for delays so occasioned.
   4. Do not submit unrelated items in group submittals.

3.3 ELECTRONIC SUBMITTAL PROCEDURES

A. Summary:
   1. Transmit submittals to Engineer in electronic (PDF) format using Submittal Exchange, a website service designed specifically for transmitting submittals between construction team members.

B. Setup:
   1. Obtain and pay for the Submittal Exchange subscription for this Project.
      a. Contact Russell Bell at Submittal Exchange at 515.631.6543 or Russell.bell@oracle.com to verify cost prior to bid.
      b. The minimum time frame to maintain the Submittal Exchange account for this project shall be the number of days for Final Completion, or up to and including the Date for Final Completion, plus any contract time extensions.
   2. The Engineer will set up and define the requirements of the Project to be submitted, transmitted, and maintained through Submittal Exchange.
   3. At Contractor’s option, training is available from Submittal Exchange regarding use of website and .pdf submittals.
      a. Contact Submittal Exchange at 515.631.6543.
   4. Internet Service and Equipment Requirements:
      a. Email address and Internet access at Contractor’s main office.
b. Adobe Acrobat (www.adobe.com), Bluebeam .pdf Revu (www.bluebeam.com), or other similar .pdf review software for applying electronic stamps and comments.

C. Procedures:
   1. Submittal Preparation - Contractor may use any or all of the following options:
      a. Subcontractors and Suppliers provide electronic (.pdf) submittals to Contractor via the Submittal Exchange website.
      b. Subcontractors and Suppliers provide paper submittals to General Contractor who electronically scans and converts to .pdf format.
      c. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to .pdf format.
   2. Review and certify by signature that the submittal complies with the requirements of the Contract Documents including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.
   4. Engineer review comments will be made available on the Submittal Exchange website for downloading.
   5. Contractor will receive email notice of completed review.
   6. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.

D. Project Close-out:
   1. Submit three copies of the complete record of Submittal Exchange documents in .pdf format to the Engineer at the end of the Project.
      a. Provide each copy on a separate compact disc or removable USB storage.

3.4 TIMING OF SUBMITTALS

A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

B. In scheduling, allow at least ten working days for review by the Engineer following the Engineer’s receipt of the submittal.

END OF SECTION

SUBMITTALS
01 33 01-6 (181040.40)
ATTACHMENT 01 33 01

CONTRACTOR'S SUBMITTAL TRANSMITTAL FORM

TO: BAXTER & WOODMAN, INC.
8678 RIDGEFIELD ROAD
CRYSTAL LAKE, IL  60012

DATE: ____________________

ATTN: ____________________

PROJECT NAME: ____________________

FROM: ____________________

SPEC NO. ____________________

ENGR. DWG. NOS. ____________________

TRANSMITTAL NO. ____________________

1. The following submittals are forwarded for your review:

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<th>Manufacturer</th>
<th>Description</th>
<th>Drawing No.</th>
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2. Have all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data been determined and verified? Yes ___  No ______

3. Has work indicated in this submittal been coordinated with all trades? Yes ___  No ______

4. Is work by all trades being provided as necessary to accommodate this submittal?  Yes ___  No ______

5. Contractor's description and justification for deviations from Contract Documents (Use additional sheet if necessary.)

   ___________________________________________________________
   ___________________________________________________________

6. Remarks: ________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________
   ___________________________________________________________

   Signature: ____________________

1/15 - IL
PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes permit requirements for building, work in highway rights-of-way, work in railroad rights-of-way and for stormwater discharges.

B. Related Sections:
   1. Documents affecting work of this Section include, but are not necessary limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Other permits requirements may also be described in other Sections of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS - (Reserved).

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

1.7 BUILDING PERMITS

   A. Obtain all permits required, and pay all inspection fees for the respective work requiring such permits. Owner waives the permit filing fees.

END OF SECTION
SECTION 01 42 13

ABBREVIATIONS AND ACRONYMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes abbreviations referenced in the Contract Documents.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

1.7 ABBREVIATIONS

A. Referenced Standards:
   1. Where the Contract Documents reference any published specifications or standards of any organization or association, comply with the requirements
of the specification or standards which are current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

2. In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

B. Abbreviations:

1. The following are definitions of abbreviations that may be used within the Project Manual:
   - AA - Aluminum Association
   - AASHTO - American Association of State Highway and Transportation Officials
   - ACI - American Concrete Institute
   - AISC - American Institute of Steel Construction
   - ANSI - American National Standard Institute
   - ASTM - American Society for Testing and Materials
   - AWG - American Wire Gauge
   - AWS - American Welding Society
   - AWWA - American Water Works Association
   - CBM - Certified Ballast Manufacturers Association
   - CRSI - Concrete Reinforcing Steel Institute
   - ICEA - Insulated Cable Engineers Association
   - IEEE - Institute of Electrical and Electronics Engineers, Inc.
   - ISA - Instrument Society of America
   - FS - Federal Specifications
   - NAPF - National Association of Pipe Fabricators
   - NEC - National Electrical Code (NFPA 70)
   - NECA - National Electrical Contractors' Association
   - NEMA - National Electrical Manufacturer's Association
   - NFPA - National Fire Protection Association or National Forest Products Association
   - NSF - National Sanitation Foundation
   - OSHA - U.S. Department of Labor, Occupational Safety and Health Department
   - PS - United States Products Standards
   - SSPC - Society for Protective Coatings
   - UL - Underwriter's Laboratories, Inc.

END OF SECTION

ABBREVIATIONS AND ACRONYMS
01 42 13-2 (181040.40)
SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes testing to be provided by an independent testing laboratory service.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Requirements for specific tests will be described in various Sections of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Provide the services of a testing laboratory approved by the Engineer.

B. Upon completion of each test and/or inspection, promptly distribute copies of test or inspection reports to the Engineer, to governmental agencies requiring submission of such reports, and to such other persons as directed by the Engineer.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
1.7 TESTING AGENCY DUTIES AND LIMITS OF AUTHORITY

A. Cooperate with the Engineer and the Contractor; provide qualified personnel and equipment to perform the scope of testing work outlined.

B. Acquaint the Engineer and the Contractor with testing procedures for special conditions encountered at the site.

C. Perform specified monitoring, sampling, and testing of the materials and construction.
   1. Comply with specified standards, ASTM, other authorities, and as specified.
   3. Obtain written acknowledgment of sampling or testing.

D. Give prompt written notice to the Engineer and the Contractor of irregularities or deficiencies of work which are observed during performance of service.

E. The Laboratory is not authorized to release, revoke, alter or enlarge the Contract requirements, nor to approve or accept any portion of the work, nor to perform the duties of the Contractor.

PART 2 - PRODUCTS

2.1 PAYMENT FOR TESTING

A. Include within the Contract Price an amount sufficient to cover all testing required of the Contractor under pertinent Sections of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction.

B. The Owner will pay for all testing and inspecting specifically requested by the Engineer over and above those described in Paragraph 2.1 A. above.

C. When tests indicate noncompliance with the Contract Documents, all testing and subsequent retesting occasioned by the noncompliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.

PART 3 - EXECUTION

3.1 TAKING SPECIMENS

A. Except as may be specifically otherwise approved by the Engineer, have the testing laboratory secure and handle all samples and specimens for testing.
3.2 COOPERATION WITH TESTING LABORATORY

A. Provide access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

B. Furnish casual labor and facilities:
   1. To obtain and handle samples at the site or at the source of the product to be tested.
   2. To facilitate testing operations.
   3. For laboratory's exclusive use for storage and curing of test samples on site.

C. Notify the testing agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of its operations.

D. Provide the testing laboratory with copies of approved relevant shop drawings.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes construction facilities and temporary controls required for the Work.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Comply with pertinent safety requirements and regulations for temporary facilities and controls.
   3. Equipment normally furnished by the individual trades in execution of their own portions of the Work is not part of this Section.
   4. Permanent installation and hookup of the various utility lines are described in other Sections.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner’s property certify their awareness of and familiarity with the requirements of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.
1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

1.7 REQUIREMENTS

A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
   1. Sanitary facilities.
   2. Enclosures such as fencing, tarpaulins, barricades, and canopies.
   3. Fire extinguishers.
   4. Dust and mud control.

PART 2 - PRODUCTS

2.1 UTILITIES AND SERVICES DURING CONSTRUCTION

A. Electricity:
   1. Provide necessary temporary wiring and, upon completion of the Work, remove such temporary facility.
   2. Provide and pay for electricity used in construction.

B. Heating: Provide and maintain heat necessary for proper conduct of operations needed in the Work.

2.2 SANITARY FACILITIES

A. Provide temporary sanitary facilities meeting federal, state, and local health department requirements.
   1. Maintain in a sanitary condition at all times.

2.3 ENCLOSURES

A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

2.4 FIRE EXTINGUISHERS

A. Provide and maintain not less than two fire extinguishers, multi-purpose dry chemical type with UL rating of 4A-60 B:C, 10-pound capacity, Amerex Model ABC, or equal, enclosed in suitable protecting cabinets and conveniently located for proper protection.
PART 3 - EXECUTION

3.1 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Engineer.

3.2 DUST AND MUD CONTROL

A. Take necessary precautions to control dust and mud associated with the Work, subject to the approval of the Engineer.
   1. In dry weather, spray dusty areas daily with water in order to control dust.
   2. Apply calcium chloride having a minimum chemical content of 77 percent calcium chloride at an application rate of 3 pounds per square yard of surface covered at locations as directed by the Engineer.

B. Take necessary steps to prevent the tracking of mud onto adjacent streets and highways.
   1. Wash mud resulting from the construction traffic off the adjacent streets and highways.
   2. Clean all permanent roadways used for construction activities by using motorized street sweeper that utilizes vacuum and water to pick up debris, when directed by Engineer.

3.3 SECURITY

A. Take whatever measures are necessary to protect the safety of the public, workmen, and materials.
   1. Provide inspection of work area daily.
   2. Provide the security of the site, both day and night.

END OF SECTION
SECTION 01 61 01
GENERAL EQUIPMENT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY
A. This Section describes the general equipment requirements applicable to all equipment and supplements the detailed equipment specifications.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
1. (Reserved).

1.2 SUBMITTALS
A. Provide Attachment 01 61 01-1, Manufacturer’s Certificate of Inspection; Attachment 01 61 01-2, Contractor’s Verification of Equipment Inspection; and Attachment 01 61 01-3, Contractor’s Equipment Guarantee for equipment as identified in Part 1 of the particular equipment specifications.

B. Provide field service reports as specified below.

C. Comply with pertinent provisions of Sections 01 33 01.

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 LUBRICANTS
A. Provide lubricants of the type recommended by the equipment manufacturer for each item of equipment in sufficient quantity for start-up and initial operation of equipment.
B. Provide lubrication fittings readily accessible from the outside of all equipment without removing covers or guards.

2.2 SAFETY GUARDS

A. Cover all drive belts, chains and couplings with suitable guard fabricated of 14 gauge or heavier steel designed for easy installation and removal, unless otherwise specified.

2.3 ANCHORS

A. Provide the size and number of anchor bolts, mechanical anchors and adhesive anchors determined by the equipment manufacturer unless otherwise indicated on the Drawings.

B. Provide Type 316 stainless steel anchor bolts, threaded rods, nuts, washers, mechanical anchors, adhesive anchors, and other fastener parts for installing equipment, complying with ASTM F593 and F594.

PART 3 - EXECUTION

3.1 SHOP ASSEMBLY AND MATCHMARKING

A. Assemble, inspect, and test equipment in the manufacturer's shop as far as is practical.

B. Provide accurate shopmarking and identification for items to be field erected in accordance with erection details furnished with the equipment.

C. Provide all fasteners and miscellaneous small parts to be field erected individually packaged for shipment, and identify as to location in accordance with a schedule of fasteners with the equipment.

3.2 INSTALLATION, INSPECTION, TESTING AND OPERATOR INSTRUCTIONS

A. Provide the services of a qualified field service technician from the manufacturer of each piece of equipment to:
   1. Inspect the equipment installation including alignment, clearances, field erection where applicable, and initial lubrication where applicable.
   2. Ascertain that equipment has been installed in accordance with the manufacturer's recommended procedures and is ready for operation.

B. For each site visit of the manufacturer's field service technician, submit a field service report from the field service technician within five (5) working days of the visit.
C. After the installation has been completed in accordance with the manufacturer's recommendations and in the presence of the manufacturer's field service technician, test the equipment and its appurtenances for proper operating condition and for performance in accordance with these Specifications.

D. Provide three (3) copies of the Manufacturer's Certificate of Inspection and the Contractor's Verification of Equipment Inspection to the Engineer certifying and verifying that the equipment and all appurtenances supplied with it have been installed in accordance with the manufacturer's recommendations and that the test operation was satisfactory.
   1. Use the forms, Attachment 01 61 01-1 and Attachment 01 61 01-2.

E. Instruct the Owner's personnel in the proper operation and maintenance of the equipment in accordance with the manufacturer's recommendations.

3.3 EQUIPMENT GUARANTEE

A. Guarantee all equipment, motors, electrical controls, and other mechanical devices to operate in accordance with the requirements of these Specifications and replace and repair any guaranteed item found to be defective within two years, or longer period if specifically stated for any particular item, from the date of the Owner's acceptance for use of the equipment without additional expense to the Owner for labor or materials.
   1. After obtaining Owner Authorized Representative's signature, provide three (3) copies of a Contractor’s Equipment Guarantee WITH ORIGINAL SIGNATURES to the Engineer, using the form, Attachment 01 61 01-3.

END OF SECTION
MANUFACTURER’S CERTIFICATE OF INSPECTION

Date of Inspection: ________________________________

Project Name: ________________________________

Contractor: ________________________________

Equipment Manufacturer: ________________________________

Equipment Specification: ________________________________

Equipment Type & Name: ________________________________

This will certify that I, the manufacturer’s representative, have completely checked and inspected the installation of this equipment and it has been properly installed in accordance with our instructions and requirements. I also certify that the equipment has been satisfactorily tested and is now ready for normal operation and use.

I have instructed the Owner’s personnel in the proper operation and maintenance of the equipment which we have furnished for this project.

____________________________________
Manufacturer’s Representative’s Signature

Name and Title

Attendees:

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature

Name and Title ________________________________ Signature
CONTRACTOR’S VERIFICATION OF EQUIPMENT INSPECTION

Date of inspection: ________________________________
Project Name: ___________________________________

Contractor: _____________________________________
Equipment Manufacturer: ___________________________
Equipment Specification: ___________________________
Equipment Type & Name: ___________________________

We, the Contractor for the subject project, hereby verify that the equipment manufacturer’s serviceman has inspected and tested the installation of this equipment within the last 30 days and has certified that the equipment which we have furnished and installed for this project is now ready for normal operation and use by the Owner.

______________________________
Contractor’s Representative’s Signature

______________________________
Name and Title
CONTRACTOR'S EQUIPMENT GUARANTEE

Date: ________________________________

Project Name: ________________________________

Contractor: ________________________________

Equipment Manufacturer: ________________________________

Equipment Specification: ________________________________

Equipment Type & Name: ________________________________

We, the Contractor for the subject project, hereby guarantee this equipment for a period of ___ years from the date of the Owner's acceptance and use of this equipment, and shall replace or repair the equipment or any parts thereof which become defective or do not function properly during normal operation and maintenance without any additional expense to the Owner for labor or materials.

__________________________________________
Contractor’s Representative’s Signature

__________________________________________
Name and Title

ACCEPTED this ______ day of ____________, 20___, for Owner's use and initiation of Contractor's Equipment Guarantee. The Owner hereby accepts responsibility for operation and maintenance of said equipment as of this date.

__________________________________________
Owner’s Representative’s Signature

__________________________________________
Name and Title
PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes product options available to bidders and the Contractor, plus procedures for securing approval of proposed substitutions.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Form 00 43 23 in the Bidding Documents provides space for Bidders to list proposed alternate major equipment and materials to those items listed in Form 00 43 33 and specified in the Specifications for which a substitute or "or equal" item of equipment and materials may be allowed if acceptable to the Engineer.
   3. Make submittals after Effective Date of the Agreement in accordance with pertinent provisions of Section 01 33 01.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).
1.6 MAINTENANCE – (Reserved).

1.7 PRODUCT OPTIONS

A. The Contract is based on standards of quality established in the Contract Documents.
   1. In agreeing to the terms and conditions of the Contract, the Contractor has accepted a responsibility to verify that the specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
   2. Neither the Owner nor the Engineer has agreed to the substitution of materials or methods called for in the Contract Documents, except as they may specifically otherwise state in writing.

B. Materials and/or equipment specified by name:
   1. Where materials and/or equipment are specified by naming one single manufacturer and/or model number, followed by words that indicate no substitution is permitted, only the material and/or equipment named is approved for incorporation into the Work.
   2. Should the Contractor demonstrate to the approval of the Engineer that a specified material or method was ordered in a timely manner and will not be available in time for incorporation into this Work, the Contractor shall submit to the Engineer such data on proposed substitute materials and/or equipment as are needed to help the Engineer determine suitability of the proposed substitution.

C. Where materials and/or equipment are specified by name and/or model number, followed by the words "or equal":
   1. The material and/or equipment specified by name establishes the required standard of quality.
   2. Materials and/or equipment proposed by the Contractor to be used in lieu of materials and/or equipment so specified by name shall in all ways equal or exceed the qualities of the named materials and/or equipment.
   3. Major equipment and materials as listed in Form 00 43 33: After Effective Date of the Agreement, if the Engineer decides to evaluate any proposed alternate major equipment and materials listed in Form 00 43 23, the Contractor shall submit sufficient information in accordance with Paragraph 6.05.A.2 "substitute items" of the General Conditions for the Engineer's review.
      a. The Engineer will not evaluate any proposed "substitute" or "or equal" items for the major equipment and material items not listed in Form 00 43 23.
      b. The Engineer will evaluate the proposed alternate major equipment and materials listed in Form 00 43 23 as "substitute" items.
   4. Non-major equipment (items not listed in Form 00 43 33): The Contractor may propose "substitute" or "or equal" items for non-major equipment in accordance with Paragraph 6.05 of the General Conditions.
a. If in the Engineer's sole discretion an item of material or equipment proposed by the Contractor does not qualify as an "or equal" item, the Engineer will notify the Contractor in writing that the item will be considered as a "substitute" item. If the Contractor wishes for the Engineer to continue the evaluation, the Contractor shall submit additional information in accordance with Paragraph 6.05.A.2 of the General Conditions.

5. The Engineer will record all time used by the Engineer to evaluate proposed substitute items. Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent evaluating proposed substitute items and deduct such costs from payments due the Contractor. Costs associated with review of proposed "or equal" items will not be charged to the Contractor.

D. Products specified by reference to standard specifications such as ASTM and similar standards do not require submittal except for interface within the Work.

1.8 DELAYS

A. Delays in construction arising by virtue of the non-availability of a specified material and/or method will not be considered by the Engineer as justifying an extension of the agreed Contract Time.

END OF SECTION
SECTION 01 66 11

STORAGE AND PROTECTION OF MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Additional procedures also may be prescribed in other Sections of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS – (Reserved).

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 14 11 for Contractor's storage area.

B. Comply with the requirements of this Section for off-site storage.
   1. The Engineer reserves the right to visit and observe the off-site storage areas.

C. Store equipment and materials in accordance with the manufacturer's instructions.

D. Provide temporary weathertight enclosures to protect products from damage by the elements.

E. Protect finished surfaces through which equipment and materials are handled.

F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.
H. Do not store plant maintenance equipment, furniture, and laboratory equipment on site until they are needed by the Owner or for progress of work.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

1.7 MANUFACTURERS’ RECOMMENDATIONS
   A. Except as otherwise approved by the Engineer, determine and comply with manufacturers’ recommendations on product handling, storage, and protection.

1.8 PACKAGING
   A. Deliver products to the job site in their manufacturer’s original container, with labels intact and legible.
      1. Maintain packaged materials with seals unbroken and labels intact until time of use.
      2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
   B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality, and other pertinent information.

1.9 REPAIRS AND REPLACEMENTS
   A. In event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.
   B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the Contract Time of Completion.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:
   1. Make the several parts fit properly.
   2. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
   3. Remove and replace work not conforming to requirements of the Contract Documents.
   4. Remove and replace defective work.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. In addition to other requirements specified, upon the Engineer's request uncover work to provide for inspection by the Engineer of covered work, and remove samples of installed materials for testing.
   3. Do not cut or alter work performed under separate contracts without the Engineer's written permission.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Request for Engineer's consent:
   1. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
   2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Engineer and secure his written permission and the required Change Order prior to proceeding.
F. Notices to the Engineer:
   1. Prior to cutting and patching performed pursuant to the Engineer’s instructions, submit cost estimate to the Engineer. Secure the Engineer’s approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
   2. Submit written notice to the Engineer designating the time the Work will be uncovered, to provide for the Engineer’s observation.

1.2 QUALITY ASSURANCE – (Reserved).
1.3 DELIVERY, STORAGE, AND HANDLING – (Reserved).
1.4 SITE CONDITIONS – (Reserved).
1.5 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 MATERIALS
   A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS
   A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to a written Change Order, after claim for such reimbursement is submitted by the Contractor. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS
   A. Inspection:
      1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
      2. After uncovering the work, inspect conditions affecting installation of new work.
   B. Discrepancies:
      1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
      2. Do not proceed until unsatisfactory conditions are corrected.

CUTTING AND PATCHING
01 73 29-2 (181040.40)
3.2 PREPARATION PRIOR TO CUTTING

A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

3.3 PERFORMANCE

A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.

B. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.

C. Perform fitting and adjusting of products to provide finished installation complying with the manufacturer's recommendations for specified equipment, products, tolerances, and finishes.

D. Perform slight alterations needed to make adjustable parts fit to fixed parts to provide a complete installation.

E. Refinish surfaces as necessary to match adjacent finishes.

END OF SECTION
SECTION 01 74 23

FINAL CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. In addition to standards described in this Section, comply with requirements for cleaning as described in other pertinent Sections of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General:
   1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
   2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
   3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
   4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.

B. Site:
   1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
   2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of Paragraph 3.1 A. 1. above.
   3. Maintain the site in a neat and orderly condition at all times.

C. Structures:
   1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
   2. Weekly, and more often if necessary, sweep interior spaces clean.
      a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
   3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness.

FINAL CLEANING
01 74 23-2 (181040.40)
recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
   a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.

3.2 FINAL CLEANING

A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Paragraph 3.1 above.

C. Site:
   1. Unless otherwise specifically directed by the Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
   2. Completely remove resultant debris.

D. Structures:
   1. Exterior:
      a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
      b. Remove all traces of splashed materials from adjacent surfaces.
      c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
      d. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.
   2. Interior:
      a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
      b. Remove all traces of splashed material from adjacent surfaces.
      c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
   4. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

E. Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean Work.

FINAL CLEANING
01 74 23-3 (181040.40)
3.3 CLEANING DURING OWNER’S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Engineer in accordance with the General Conditions of the Contract.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes an orderly and efficient transfer of the completed Work to the Owner.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Activities relative to Substantial Completion and Contract closeout are described in the General Conditions.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Prior to requesting that the Engineer issue a certificate of Substantial Completion in accordance with Paragraph 14.04 or 14.05 of the General Conditions, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for a joint inspection by Owner, Contractor, and Engineer.

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
1.7 PROCEDURES

A. Substantial Completion:
   1. Prepare and submit the list required by the first sentence of Paragraph 14.04.A of the General Conditions and submit it along with a written request that Engineer issue a certificate of Substantial Completion.
   2. Within a reasonable time after receipt of the list, Owner, Contractor and Engineer will jointly inspect the Work to determine status of completion.
   3. Should the Engineer determine that the Work is not substantially complete:
      a. The Engineer will so notify the Contractor, in writing, giving the reasons therefore.
      b. Remedy the deficiencies and notify the Engineer when ready for reinspection.
      c. Owner, Contractor and Engineer will reinspect the Work.
   4. When the Engineer concurs that the Work is substantially complete:
      a. The Engineer will prepare a tentative "Certificate of Substantial Completion," accompanied by the Contractor's list of items to be completed or corrected, as verified by the Engineer.
      b. The Engineer will submit the tentative Certificate to the Contractor for acceptance.
      c. After Contractor signs and returns the tentative Certificate to Engineer, Engineer will submit the tentative Certificate to Owner accompanied by a tentative list of items to be completed or corrected before final payment.
      d. Owner will have seven days after receipt of the tentative Certificate during which to make objection to Engineer as to any provisions of the Certificate on attached list.
         (1) If Owner objects, Engineer will consider Owner’s objections. If, after considering Owner’s objections, Engineer concludes that the Work is not substantially complete, Engineer will, within fourteen days after submission of the tentative Certificate to Owner, notify Contractor in writing, stating reasons therefore. If, after considering Owner’s objections, Engineer considers the Work substantially complete, Engineer will within said fourteen days execute and deliver to Owner and Contractor, a definitive Certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative Certificate as Engineer believes justified after consideration of any objections of Owner.
         (2) If Owner has no objections, Engineer will within fourteen days after submission of the tentative Certificate to Owner and Contractor issue a definitive Certificate of Substantial Completion.
      e. At the time of delivery of the tentative Certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security,
operation, safety, maintenance, heat, utilities, insurance, warranties, and guarantees. Unless Owner or Contractor advise the Engineer in writing of any objections within seven days after delivery of the tentative Certificate of Substantial Completion, the Engineer’s aforesaid recommendation will be binding on Owner and Contractor until final payment.

B. Final Completion:
1. Prepare and submit the notice required by the first sentence of Paragraph 14.06A of the General Conditions.
2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 14.07.A of the General Conditions.
3. Certify that:
   a. Contract Documents have been reviewed.
   b. Work has been inspected for compliance with the Contract Documents.
   c. Work has been completed in accordance with the Contract Documents.
   d. Equipment and systems have been tested as required, and are operational.
   e. Work is completed and ready for final inspection.
4. Owner, Contractor, and Engineer will make a joint inspection to verify status of completion.
5. Should the Engineer determine that the Work is incomplete or defective:
   a. The Engineer will so notify the Contractor, in writing, listing the incomplete or defective work.
   b. The Contractor will remedy the deficiencies promptly, and notify the Engineer when ready for reinspection.
6. When the Engineer determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

C. Closeout submittals include, but are not necessarily limited to:
1. Project Record Documents described in Section 01 78 39.
2. Manufacturer’s Certificate of Inspection, Contractor’s Verification of Equipment Inspection, and Contractor’s Equipment Guarantee for each item of equipment as required in Section 01 61 01.
3. Warranties and bonds.
4. Section 00 65 36 Warranty Form.
5. Section 00 65 36.03 Contractor’s Affidavit Letter.
7. Spare parts and materials extra stock.
8. Evidence of compliance with requirements of governmental agencies having jurisdiction including but not necessarily limited to:
   a. Certificates of Inspection.
   b. Certificates of Occupancy.
9. Certificates of Insurance for products and completed operations.
10. Evidence of payment and release of liens.

CONTRACT CLOSEOUT
01 77 01-3 (181040.40)
11. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.

D. Final adjustment of accounts:
   1. Submit a final statement of accounting to the Engineer, showing all adjustments to the Contract Price.
   2. If so required, the Engineer will prepare a final Change Order showing adjustments to the Contract Price which have not been made by previous Change Orders.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide operation and maintenance manuals described in pertinent Sections of these Specifications and as specified herein.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Submit Operation and Maintenance Manuals electronically to the Engineer as a single .pdf file set.
   1. Attach, as the first page of each Operation and Maintenance Manual, a completely executed Contractor’s Submittal Transmittal Form Attachment 01 33 01.

B. Revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section.

C. In cases where Electronic Operation and Maintenance Manual files exceed a size that is practical for electronic transmission via electronic mail or through an FTP site, the Contractor may and will be required to submit up to five (5) .pdf file Operation and Maintenance Manuals on separate compact discs or removable USB storage, if requested, plus the quantity of discs or removable USB storage that will be required to be returned to the Contractor.

D. Upon completion of the Engineer’s review of the electronic Operation and Maintenance Manual, one electronic .pdf file will be returned to the Contractor for their distribution.
   1. Submitted Manuals found to not be in compliance will be returned with the Engineer’s comments for the Contractor’s revision and resubmission.
   2. Submitted Manuals found to be in compliance will be returned with the Engineer’s comments and marked “Submit Required Copies”, at which time the contractor shall provide the number of electronic .pdf Manuals on individual compact discs or removable USB storage and/or hard copy Manuals organized and bound as specified herein.
3. Upon the request of the Engineer or Owner at any time, the Contractor shall provide up to four (4) color, hard copy Operation and Maintenance Manuals.

4. Upon the request of the Engineer or Owner at any time, the Contractor shall provide up to four (4) .pdf file Operation and Maintenance Manuals on separate compact discs or removable USB storage.

E. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

A. Where operation and maintenance manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.

B. Hard copy format:

1. Size: 8½” x 11”.
3. Text: Neatly written or printed.
4. Drawings: 11” in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the manual and provide a drawing pocket inside rear cover or bind in with text.
5. Flysheets: Separate each portion of the manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the manual; 3-ring binders will be acceptable.
7. Provide front and back covers for each manual, using durable material, and clearly identified on or through the cover with at least the following information:
OPERATING AND MAINTENANCE MANUALS

( ) Name and address of Work
( ) Name of Contractor
( ) General subject of this Manual
( ) Engineer, and approval date

C. Electronic format:
1. Provide in .pdf format as a single document.
2. Provide an index and bookmarks for the sections.
3. Insert blank pages as required to permit two sided printing of the manual.
4. Format document for printing on 8½” x 11” and 11” x 17” paper size.

D. Contents: Include at least the following:
1. Index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.
2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
3. Complete nomenclature of all parts of the equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
5. Complete recommended schedule for maintenance of equipment and recommended schedule for replacement of parts and components.
6. Manufacturers' bulletins, cuts, operation and maintenance manuals, and descriptive data, where pertinent, clearly indicating by highlighting or boxout the precise items included in this installation and deleting by cross-out or elimination, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs., and cfm; and, where appropriate, provide additional measurements in the "International System of Units" (SI).
8. Such other data as required in pertinent other Sections of these Specifications.

PART 3 - EXECUTION

3.1 TIMING AND PAYMENT

A. Make submittals far enough in advance of scheduled dates for equipment installation to provide at least ten (10) working days for review by the Engineer following the Engineer's receipt of the submittal.
B. Submit required manuals for each item of equipment to the Engineer no later than 30 days following the Engineer's approval of shop drawings for said item of equipment.

C. Payment for the fabrication, delivery, or installation of any equipment will be withheld until the Engineer has received the required operation and maintenance manual(s).

END OF SECTION
SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Paragraph 3.1 below and, upon completion of the Work, submit the recorded changes as described in Paragraph 3.2 below.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
   2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Comply with pertinent provisions of Section 01 33 01.

F. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.

G. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.

H. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer and secure his approval.
1.3 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.

B. Accuracy of records:
   1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
   2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

D. Do not conceal any work until the required information is recorded.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.
   1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.
   2. In such case, provide replacements to the standards originally required by the Contract Documents.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS

A. Job set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Engineer at no charge to the Contractor one complete set of all Documents comprising the Contract.
PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.1 A. above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".

B. Preservation:
   1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set.
   2. Do not use the job set for any purpose except entry of new data and for review by the Engineer.
   3. Maintain the job set at the site of Work where designated by the Engineer.

C. Making entries on Drawings:
   1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
   2. Date all entries.
   3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
   4. In the event of overlapping changes, use different colors for the overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Engineer.

E. Conversion of schematic layouts:
   1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
      a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.
      b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
   2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in Paragraph 3.1 E. 1. above.

3.2 REVIEW AND SUBMITTAL

A. Submit the completed set of Project Record Documents to the Engineer as described in Paragraph 1.2 H. above.

B. Participate in review meetings as required.
C. Make required changes and promptly deliver the final Project Record Documents to the Engineer.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION
SECTION 02 41 53

DEMOLITION, REMOVAL AND ABANDONMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section describes demolition and removal of structures and parts of structures, removal of above grade and underground improvements, and abandonment of underground structures and pipelines as shown on the Drawings and specified in this Section.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
1.7 DEFINITIONS

A. Demolish – Raze and dispose of above grade structures; including, but not limited to walls, roofs, ceilings, and ground floor slabs and floors. Raze and dispose of all equipment, piping and plumbing, electrical and communications conduit, wires and cables, furniture, furnishings, windows, and doors in above grade and below grade structures.

B. Remove – Excavate structure foundations, tanks, underground pipes, etc. in their entirety.

C. Dispose – Transport or haul materials and equipment of any and all types to off-site location(s).

D. Abandon – Remove structure foundations, tanks, and underground pipes, etc within the following limits
   1. 5 feet horizontally from any proposed structure or pipe, and
   2. 3 feet vertically below the proposed finished grade or the outside edges of any proposed structure or pipe.

E. This work includes breaking up of below grade foundation slabs and sealing of underground pipes with mechanical plugs and/or concrete plugs.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the approval of the Engineer.

B. Grout for filling of abandoned pipes and structures:
   1. Cellular grout:
      a. Low density cellular concrete capable of being mixed on site and pumped into place through a 2-inch hose.
      b. Foaming agent complying with ASTM C869.
      c. Portland Cement: ASTM C150, Type I or Type II.
      d. Contents: Cement, fly ash, water and foaming agent.
      e. Minimum net density: 70 pcf.
      f. Acceptable manufacturer:
         (1) Mearl Geofoam Liquid Concentrate.
         (2) Or equal.
PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PROTECTION

A. Protect existing utilities indicated or made known.

B. Protect trees and shrubs, where indicated to remain, by plank wrappers securely wired in place or by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
   1. Do not permit any equipment to operate within 5 feet of any trees or shrubs that are to remain or in a manner as to harm overhanging branches.

C. Protection of persons and property:
   1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
   2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
   3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

E. Maintain access to the site at all times.

3.3 DEMOLITION

A. General:
   1. By careful study of the Contract Documents and visiting the site, determine the location and extent of demolition to be performed.
   2. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.

B. Demolition of existing structures:
   1. Demolish and remove existing structures, piping and equipment or parts thereof in a manner such as not to damage corresponding items which are to remain.
   2. In those areas in which structures or piping to be demolished and removed now occupy space to be used for proposed structures, remove the existing
structure or piping in total unless other instructions are included on the Drawings.

C. Existing equipment:
   1. Existing mechanical or electrical equipment, miscellaneous metals, pipe, fittings, valves, furniture, cabinets, and other materials of whatever nature are, and shall remain, the property of the Owner

3.4 DISPOSAL

A. General:
   1. Dispose of all debris from demolition work.
   2. Dispose away from the site in a legal manner.
   3. Do not store or accumulate debris at the job site.

B. Do not burn debris at the site.

C. Prepare documentation identifying the hauler, generator, place of origin of debris or soil, the weight or volume of debris or soil, and the location, owner, and operator of the facility where debris or soil was transferred, disposed, recycled or treated. Maintain documentation for three years.

3.5 UTILITIES

A. Coordinate with utility companies and agencies as required.

B. Where utility cutting, capping, or plugging is required, pay utility company to do the work, or perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

END OF SECTION
SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide low-voltage electrical power conductors and cables as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Product data including conductor sizes, number of strand, insulation thickness, overall diameter, etc. for each type of conductors to be installed.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
26 05 19-1 (181040.40)
PART 2 - PRODUCTS

2.1 GENERAL

A. Comply with the following standards:
   1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.
   2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and cross-linked thermosetting polyethylene insulated wire and cable.

B. Provide copper wire only.

C. No underground splices allowed unless approved by the Engineer.

2.2 WIRE AND CABLE IN RACEWAY

A. Power, light, and control conductors:
   1. Insulation: Rated for 600 volts.
      a. Use dual rated type THHN/THWN in temperature controlled indoor locations.
      b. Use Type XHHW in underground locations and unheated concrete structures.
   2. Use stranded wire for control conductors.

B. Variable Frequency Drive (VFD) Multi-conductor cable:
   1. Conductor: 3C-7 strand copper conductors to ASTM B8.
   2. Insulation: 600V, flame retardant, cross-linked polyethylene (FR XLPE), 90 degrees C, wet/dry (UL44) XHHW-2.
   3. Grounding conductors: 3 stranded bare copper grounds symmetrically located in continuous contact with a copper tape shield.
   4. Shielding: Dual copper tape shields helically wound with 50% overlap.
   5. Assembly: 3 phase conductors with symmetrically located tri-sectional grounding conductors in continuous contact with a copper tape shield.
   6. Overall jacket: 90C-25C flame retardant yellow PVC LAG (Low Acid Gas) sunlight resistant.
   7. Temperature: 90 degree C wet/dry.
   8. Voltage class: 600 volts.
   9. Approvals: IEEE 383, 70,000 BTU flame test; UL 1277 and UL 1581; tray cable rated (TC).
   10. Manufacturer:
       a. Belden VFD Cable.
       b. Or equal.

2.3 DIRECT BURIAL CABLE

A. General use direct burial cable:
   1. Conductors: No. 10 AWG minimum stranded copper, single or multiple conductor.
   2. Insulation: Type USE or UF rated for 600 volts.
3. Route in Schedule 80 PVC conduits or galvanize rigid steel conduit with water-tight coupling and fittings.

2.4 JOINTS, TAPS, SPLICES, AND TERMINATIONS

A. Conductors No. 10 AWG and smaller: Use twist type insulated wire nut solderless connectors.

B. Conductors No. 8 AWG and larger: Use solderless compression type connectors of type that will not loosen under vibration or normal strains.

C. Control and instrumentation conductors: Use crimp type spade connectors where control wires are connected to screw terminals of equipment.

D. Joints, taps, and splices located in enclosures subject to moisture: Use watertight splice kits.

2.5 PERMANENT WIRE MARKERS

A. Provide type-on, self-laminating vinyl, heat shrink polyolefin or nylon clip-sleeve, alpha-numeric, permanent wire markers.
   1. Use fine-line, black, permanent ink pens where field marking is necessary.
   2. Cloth tags are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install low-voltage electrical power conductors and cables in accordance with manufacturer's recommendations.

B. Install wire and cable in conduit unless otherwise shown on the Drawings.

C. Trench and backfill for direct burial cables:
   1. Install cable in rigid steel conduit under and 1-foot beyond all driveways and other pavement, and within a radius of 5 feet from all structures, trees, obstacles, etc.
   2. Provide suitable bracing for cable to withstand movement due to settlement where cable crosses a previous or new excavation.
   3. Seal all conduit entrances with watertight cable-conduit seals to prevent entrance of water into underground structures and caulk opposite end of conduit where conductors enter junction box, panel or electrical enclosure.
D. Install warning tape along and above direct buried cable.
   1. Use red plastic, 6-inch wide tape.
   2. Imprinted “CAUTION - ELECTRIC CABLE BELOW”.
   3. Bury approximately 1-foot below surface before final backfilling.

E. Maintain barrier or conduit separation between power conductors and instrumentation conductors to avoid magnetic interaction where such conductors enter and pass through same manhole, handhole, casing pipe, box, or enclosure.

F. Provide individual wiring compartments or barrier for separation between intrinsically safe and non-intrinsically safe conductors inside enclosures.

3.2 WIRE AND CABLE IDENTIFICATION

A. Install permanent wire markers on wire and cable in junction boxes, pull boxes, wireways, and wiring gutters of panels. Markers to identify wire or cable number.

B. Provide schedule identifying various power and lighting conductors from power source to equipment or device served.

3.3 FIXTURE OUTLETS

A. Use minimum AWG No. 12 wire for conductors supplying power to single fixture.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide control-voltage electrical power cables as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Product data including conductor sizes, number of strand, insulation thickness, overall diameter, etc. for each type of conductors to be installed.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Comply with the following standards:
   1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.
   2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and
      cross-linked thermosetting polyethylene insulated wire and cable.

B. Provide copper wire only.

2.2 WIRE AND CABLE

A. Shielded instrumentation cable:
   1. Conductors: Stranded No. 18 AWG tinned copper.
   2. Insulation: Polyethylene or fluorinated ethylene propylene (FEP), color
      coded, rated for 300 volts.
   3. Jacket: Polyvinyl chloride or FEP.
   4. Shielding: Aluminum polyester, 100 percent coverage.
      a. Includes stranded No. 20 AWG tinned copper drain wire.
   5. Provide Belden, or equal, copper instrumentation cable systems:
      a. For 2-conductor requirements:
         (1) Belden No. 8760 suitable for outdoor.
         (2) Belden No. 88760 suitable for outdoor & burial.
      b. For 3-conductor requirements:
         (1) Belden No. 8770 suitable for outdoor.
         (2) Belden No. 88770 suitable for outdoor & burial.
      c. For 2-twisted pair requirements: Belden No. 9552.
   6. UL Listed for use.
   7. Provide shielded instrumentation cable suitable for flooded burial and
      freeze/thaw conditions where installed in duct banks, underground
      conduits, or conduits in and on unheated structures.

B. Multi-conductor shielded instrumentation cable:
   1. Conductors: Stranded No. 16 or 18 AWG tinned copper.
   2. Insulation: Flame-retardant ethylene propylene rubber (EPR) Type II or
      cross-linked polyethylene (XLPE). Color code per ICEA Method 1; pair –
      black & white. One conductor in each pair is printed alpha-numerically for
      easy identification.
   3. Shield: Individual pairs shielded with aluminum/polyester in contact with
      stranded tinned copper drain wire and overall shielded is aluminum/polyester in contact with stranded tinned copper drain wire.
   4. Outer jacket: Flame-retardant thermoplastic chlorinated polyethylene
      (CPE).
   5. Volts: 300V or 600V.
   6. Conductors: Class B stranding per ASTM B8, tinned annealed copper per
      ASTM B33.
7. Application: In free air, raceways or direct burial in accordance with NEC. Permitted for use in Class I Div. 2 industrial hazardous locations per NEC Article 501-4(b) for UL Type PLTC cables.

8. Acceptable manufacturers:
   a. General Cable.
   b. Omni Cable.
   c. Or equal.

C. Multi-conductor thermostat cable, low voltage:
   1. Conductors: Solid No. 18 AWG copper.
      a. Minimum of 4 conductors per cable.
   2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use, rated for circuits operating at less than 50 volts.

D. Telephone cable:
      a. Minimum of 4 twisted pairs per cable.
   2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use.

E. Data cables:
   1. Verify unique cable requirements of individual data systems shown on Drawings with Systems Integrator.
   2. Provide Belden or equal, copper data cable systems:
      a. E/IP application:
         (1) Belden No. 7953A Cat 6 – 4 pair, bonded, indoor rated, stranded, shielded, 600 Volt rated.
         (2) Belden No. 7937A Cat 5e – 4 pair, bonded, burial rated, stranded, shielded, 300 Volt rated.
      b. Modbus application:
         (1) No. 9841 multi-conductor - low capacitance computer cable for EIA RS-485 applications, 1-pair conductors, 24 AWG, chrome PVC jacket, with overall foil/braid shield.
   3. Provide data cable suitable for flooded burial and freeze/thaw conditions where installed in duct banks, underground conduits, or conduits in and on unheated structures.
   4. Provide data cables UL listed for intended use.
   5. Crimped-on “male” connectors are not allowed for E/IP cable terminations. E/IP cables are to be “punched-down” in “key-stone” type jack that is to be supplied by panel manufacturer as specified in other cabinet/panel specifications.
   6. Utilize 600 Volt rated cable inside electrical enclosures that contain more than 300 Volts.

F. Fiber optic cables:
   1. Number of fibers in cable: 6 fibers.
   2. Type of fiber (optical): 9.2 micron Singlemode.
   3. Outer jacket:
      a. Polyethylene (PE).
4. Storage and operating properties: -40 to +70 deg C.
5. Rated for both indoor and outdoor application and burial in conduit.
6. Flame resistance UL 1666.
7. Strength Member Material: Aramid Yarn, Fiberglass Epoxy Rod.
8. Gel filled, loose tube construction.
   b. Buffer Tube Filling Material: Gel.
9. Minimum installation bend radius: 4.9”.
   a. Acceptable manufacturer:
      (1) Belden No. B9W045T.
      (2) Or equal.

2.3 JOINTS, TAPS, SPLICES, AND TERMINATIONS

A. Conductors No. 10 AWG and smaller: Use twist type insulated wire nut solderless connectors.
B. Control and instrumentation conductors: Use crimp type spade connectors where control wires are connected to screw terminals of equipment.
C. Joints, taps, and splices located in enclosures subject to moisture: Use watertight splice kits.

2.4 PERMANENT WIRE MARKERS

A. Provide type-on, self-laminating vinyl, heat shrink polyolefin or nylon clip-sleeve, alpha-numeric, permanent wire markers.
   1. Use fine-line, black, permanent ink pens where field marking is necessary.
   2. Cloth tags are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install control-voltage electrical power cables in accordance with manufacturer's recommendations.
B. Install wire and cable in conduit unless otherwise shown on the Drawings.
C. Maintain barrier or conduit separation between power conductors and instrumentation conductors to avoid magnetic interaction where such conductors enter and pass through same manhole, handhole, casing pipe, box, or enclosure.
D. Run instrumentation conductors into control cabinets or MCC only if terminated therein. Maintain separation of power and instrumentation conductors inside cabinets.

CONTROL-VOLTAGE ELECTRICAL POWER CABLES
26 05 23-4 (181040.40)
E. Provide individual wiring compartments or barrier for separation between intrinsically safe and non-intrinsically safe conductors inside enclosures.

F. Provide an LC type connector to terminate both ends of all fiber optic cables into a fiber optic patch panel.

3.2 WIRE AND CABLE IDENTIFICATION

A. Install permanent wire markers on wire and cable in junction boxes, pull boxes, wireways, and wiring gutters of panels. Markers to identify wire or cable number.

B. Provide schedule identifying various control and instrumentation circuit conductors based on equipment tag numbers.

END OF SECTION
SECTION 26 05 26
GROUNDING AND BONDING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide grounding and bonding of electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.
   3. Utility company providing electrical service.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Ground clamp fittings, connections, and joints:
   1. Provide interlocking listed clamp fabricated from high strength corrosion-resistant metal.
   2. Use high strength silicon bronze U-bolt, nuts, and lock washers.
   3. Use high strength cast bronze ground rod clamp listed for direct burial for ground rod.

B. Ground rods:
   1. Provide copper or copper-clad steel core.
   2. Use 5/8-inch diameter minimum and 10-foot long.

C. Ground wires:
   1. Use copper wire only.
   2. Size as shown on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding electrode system:
   1. Connect to existing grounding electrode system.
   2. Attach ground wire to a point ahead of water meter or service shut-off valve, when available.
   3. Attach ground wire to building steel where available.

B. Main and supplemental grounding electrode conductors:
   1. Install jumper or shunt around water meter and/or shut-off valve when applicable.
   2. Attach nonferrous metal tag at water pipe connection to warn against removal.

C. Install properly terminated equipment grounding conductor in all flexible conduits.

D. Where applicable, drive ground rod to a depth that allows for physical protection and concealment below finished floor or grade. Leave approximately 4 inches of rod exposed for inspection prior to concealment.

E. Make connections to ground rods with molded exothermic weld process, or a listed and approved ground rod clamp.
3.2 FIELD QUALITY CONTROL

A. Perform and record resistance-to-earth measurements witnessed by Engineer with all grounding electrode conductors.
   1. Isolate ground under test from other grounds.
   2. Measure in normally dry conditions not less than 48 hours after rainfall.
   3. Measure at each ground rod and other ground connections when applicable.

B. Maximum D.C. resistance allowable is 5 ohms.

C. Use the three-point method of measurement, unless specified otherwise.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide hangers and supports for electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL
A. Provide zinc galvanized, cadmium plated steel, or malleable iron supporting devices.
B. Provide factory PVC-coated metal supports, clamps, and hardware when PVC-coated, galvanized rigid steel conduit is used.
   1. Comply with Section 26 05 33.
C. Provide PVC supports, clamps and hardware for nonmetallic conduit system.
D. Provide drilled expansion insert type sleeve anchors, lag shields, or plastic anchors suitable for load and application.

2.2 SUPPORTING STRUCTURES
A. Provide rack supports of stainless steel channels with adequate feet for secure mounting.

2.3 MOUNTING PANELS
A. Provide adequately braced and sized equipment mounting panels where required to mount equipment.

2.4 CONDUIT SUPPORTS
A. Provide continuous or T-slot concrete insert channel.
B. Provide one-hole or two-hole conduit straps as required.

2.5 TRANSFORMER MOUNTING BRACKETS
A. Provide mounting brackets fabricated of galvanized steel channel section designed to support size of transformer.

PART 3 - EXECUTION

3.1 PREPARATION
A. Determine if ceiling channel system is adequately supported to receive and support lighting fixtures.
   1. Where deemed inadequate, provide additional support to prevent ceiling from sagging.

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
26 05 29-2 (181040.40)
3.2 INSTALLATION

A. Install hangers and supports for electrical systems in accordance with manufacturer's recommendations.

B. Do not use perforated hanger iron.

C. Pass conduit through pitch pocket at roof line when extending conduit through roof.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide raceway and boxes for electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide conduit system of the types of conduit as indicated in the Conduit Usage Schedule in Part 3 of this Section.
B. Provide junction boxes as necessary to facilitate pulling and/or splicing of wires.
C. Provide factory PVC-coated boxes of same coating thickness as conduit system where PVC-coated conduit is used (except hazardous classified areas).
D. Provide PVC boxes where non-metallic conduit system is used.

2.2 METAL RACEWAY AND FITTINGS

A. Galvanized rigid steel conduit (GRC) and fittings:
   1. Conduit: Comply with ANSI C80.1 and UL 6 standards.
   2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.
B. Intermediate metal conduit (IMC) and fittings:
   1. Conduit: Comply with ANSI C80.6 and UL 1242 standards.
   2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.
C. Electrical metallic tubing (EMT) and fittings:
   1. Conduit: Comply with ANSI C80.3 and UL 797 standards.
   2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.
D. Polyvinyl-chloride (PVC) coated galvanized rigid steel conduit and fittings.
   1. Conduit: Comply with ANSI C80.1, UL 6, and NEMA RN1 standards.
      a. Galvanized rigid steel conduit with full weight 40 mil thick PVC exterior coating.
      b. PVC bonding to galvanized metal shall be stronger than plastic tensile strength.
      c. Provide nominal 2 mil thick urethane, or equal, coating to inside of conduit.
   2. Fittings:
      a. Comply with UL 514B and NEMA RM1 standards.
      b. Threaded with full weight 40 mil thick PVC exterior coating.
      c. Inside coating: Nominal 2 mil thick urethane, or equal.
      d. Provide pressure sealing sleeves on all conduit openings.
   3. Accessories: Provide straps, clamps, and screws with full weight 40 mil thick PVC exterior coating.
   4. Provide factory-installed PVC coating on all components of PVC coated conduit system.
      a. Use coating in field only for touch-up of components.
E. Rigid aluminum conduit and fittings:
   1. Conduit: Comply with ANSI C80.5 and UL 6 standards.
   2. Fittings: Threaded, and in compliance with Comply with UL 514B and NEMA FB1 standards.

2.3 FLEXIBLE METAL RACEWAY AND FITTINGS

A. Liquidtight, flexible metal conduit and fittings:
   1. Conduit: Comply with UL 360 standards.
      a. Galvanized flexible steel core.
      b. Provide outer liquidtight, PVC sunlight resistant jacket.
   2. Fittings: Comply with UL 514B and NEMA FB1 standards.

B. Flexible metal conduit and fittings:
   1. Conduit: Comply with UL 1 standards.
   2. Fittings: Comply with UL 514B and NEMA FB1 standards.

2.4 NON-METALLIC RACEWAY AND FITTINGS

A. Rigid conduit: Comply with ANSI C80.3, ASTM F512, NEMA TC-2 and UL 651 standards.
   1. Use heavy wall, sunlight resistant, PVC Schedule 40 or 80 as shown on the Drawings.
   2. Rated for use with 90 degree C. conductors.

B. Liquid tight, flexible conduit: Comply with ANSI-79 and UL 1660 standards.
   1. Fittings: Liquid-tight.

C. Fittings:
   1. Comply with UL 514C and NEMA TC3 standards.
   2. Schedule 40 or 80 to match conduit.

2.5 CONDUIT BODIES

A. Metallic conduit bodies:
   1. Comply with ANSI C80.4 and C33.84, and UL 514 standards.
      a. Use galvanized or cadmium plated malleable iron, or copper-free aluminum material.
      b. Provide factory PVC-coated conduit bodies of same coating thickness as conduit where PVC-coated conduit is used.

B. Non-metallic conduit bodies:
   1. Comply with ASTM F512 and UL 514 and 651 standards.
      a. Compatible with Schedule 40 or 80 conduit.
      b. UL listed for use.

C. Provide removable cover with gasket and corrosion-resistant screws.
2.6 EXPANSION FITTINGS

A. Expansion fittings: Comply with UL 514 standards.
   1. Provide copper grounding strap and clamps.
   2. Use Crouse-Hinds Type XJ, or equal.

B. Expansion/deflection fitting:
   1. Comply with UL 514 and 467 standards.
   2. Use Crouse-Hinds Type XD, or equal.

C. Provide factory PVC-coated fittings of same coating thickness as conduit where PVC-coated conduit is used.

D. For non-metallic conduit system, use expansion fittings of material to match conduit installed.

2.7 DRAINS AND BREATHERS

A. Automatic drain-breather: Use Crouse-Hinds Type ECD, or equal.

B. Condensate drain: Use conduit outlet body, Type T.
   1. Provide threaded, galvanized plug with 3/16-inch drilled hole through plug.

C. Provide factory PVC-coated fittings of same coating thickness as conduit where PVC-coated conduit is used.

D. For non-metallic conduit system, use drains and breathers of material to match conduit system installed.

2.8 HAZARDOUS LOCATION SEALING FITTINGS

A. Comply with UL 886 standard.

B. Use malleable iron, zinc plated or copper-free aluminum fittings.

C. Use O-Z/Gedney Type EY, EZS, EYD, EYDX or equal.

D. Use O-Z/Gedney Type EYF fiber packing, or equal, to form dam inside fitting.

E. Use O-Z/Gedney Type EYC sealing compound, or equal.

2.9 FLEXIBLE SEALING COMPOUND

A. Use Panduit DS-5 duct sealing compound, or equal, where air and vapor tight conduit sealing is required.
2.10 OUTLET BOXES AND JUNCTION BOXES

A. Flush mounted: Provide galvanized steel boxes and accessories suitable for application and type construction.

B. Surface mounted: Provide corrosion-resistant single or multiple gang malleable iron or aluminum Type FS or FD cast boxes with threaded hubs, or pressed steel boxes as permitted under Part 3 of this Section.

C. Weatherproof boxes: Provide gasketed covers and corrosion-proof fasteners.

2.11 PULL BOXES AND SPECIAL PURPOSE OUTLET BOXES

A. Provide pull boxes with covers held in place by corrosion-resistant machine screws, and of type or NEMA rating as shown on the Drawings.

B. Provide special purpose outlet boxes furnished with fixtures and devices where standard outlets are not applicable.

2.12 HAZARDOUS LOCATION JUNCTION BOXES AND PULL BOXES

A. Comply with UL 886 standard.

B. Provide surface mounted, corrosion-resistant, malleable iron or aluminum boxes properly sized for wire fill, listed for Class I, Division 1, Group D locations, and suitable for wet locations where required and shown on Drawings with (XP) symbol.

PART 3 - EXECUTION

3.1 INSTALLATION - RACEWAY

A. Install raceway and boxes for electrical systems in accordance with manufacturer's recommendations.

B. Run exposed conduits parallel to or at right angles with lines of building or structure.

C. Route conduit runs above suspended panel ceilings so as not to interfere with panel removals.

D. Keep conduit plugged, clean and dry during construction.

E. Install wall sleeves as shown on the Drawings where conduits pass through foundation walls below grade.

F. Install expansion fittings in the following locations:
1. Conduit runs crossing structural expansion joint.
2. Conduit runs attached to two separate structures.
3. Conduit runs where movement perpendicular to axis of conduit may be encountered.

G. Conduit runs extending through areas of different temperature or atmospheric conditions, or partly indoors and partly outdoors must be sealed, drained, and installed in a manner preventing drainage of condensed or entrapped moisture into cabinets, boxes, fixtures, motors, or equipment enclosures.

H. For conduits that are installed in the top of cabinets, junction boxes, pull boxes, fixtures, motors, or equipment enclosures: position the conduit openings so any moisture/condensation from the conduit, cables and conductors does not fall on to any electrical components within. Do not install openings directly above electrical equipment in any cabinet, junction box, pull box, fixture, motor, or equipment enclosure.

I. Conduits run in concrete structures:
   1. Comply with applicable provisions of ACI 318 for conduits embedded in structural frame slab.
   2. Install conduits parallel to each other spaced on center of at least three times conduit trade diameter with minimum 2-inch concrete covering.
   3. Conduits over 1½ inches may not be installed in slab without approval of Engineer.

J. Install bushings with ground lugs and integral plastic linings at equipment with open-bottom conduit entrances.

K. In precast areas, run conduits in roof insulation space. Use 3/4-inch maximum conduit size.

L. Exterior underground conduit:
   1. Provide conduits or ducts terminating below grade with means to prevent entry of dirt or moisture.

3.2 INSTALLATION – BOXES

A. Install boxes in accordance with manufacturer's recommendations.

B. Use weatherproof boxes for interior and exterior locations exposed to weather or moisture.

C. Do not install boxes back to back or through wall. Off set outlet boxes on opposite sides of wall minimum 12 inches.

D. Set outlet boxes parallel to construction.

E. Thoroughly clean boxes prior to installing wiring devices.
3.3 CUTTING AND PATCHING

A. Make provisions for openings, holes, and clearances through walls, floors, ceilings, and partitions in advance of construction.

B. Cut and patch in accordance with Section 01 73 29.

C. Core drill through reinforced concrete with approval of Engineer.

3.4 RESTRICTIONS

A. Cross high temperature piping or ducts with 12-inch clearance.

B. Do not route conduit over boiler, incinerator, or other high temperature equipment, piping, or ducts.

C. Do not route exposed conduit below and parallel to, or adjacent to water piping.

D. Do not use EMT indenter-type fittings on EMT conduit.

3.5 EXISTING CONDUIT

A. The Drawings show the approximate location of existing conduit as indicated by available existing records. The proposed work may require crossing, relocating, and, in some cases, connecting to the existing conduits.

B. Expose carefully the existing conduits throughout the area of proposed work.
   1. All existing conduits to remain undisturbed and in uninterrupted use until such time as a change is approved by the Engineer.

C. Where the conduits are to cross or be connected to existing conduit, make a field check to determine whether any conflict will be encountered in laying the new conduit.
   1. Adjust the location of new conduits, if necessary, as authorized by the Engineer, to avoid conflict with existing conduits.

D. Where new conduits are to connect to existing conduits, provide all fittings required to complete the connection, and do the work as expeditiously and carefully as possible.
   1. Inspect and clean existing conduit prior to installing new wire.

E. Remove and replace existing conduits, fittings, boxes, and all appurtenances as shown on the Drawings.
   1. Do not remove and replace existing items shown to remain unless approved by the Engineer.
3.6 CONDUIT USAGE SCHEDULE

A. Install coated GRC or PVC when in contact with earth or fill unless otherwise shown on the Drawings.

B. Install GRC or IMC in the following locations unless otherwise shown on the Drawings:
   1. Concealed in poured concrete walls and floor or roof slabs.
   2. Concealed in insulation above poured or precast concrete roof slabs.
   3. Exposed.

C. EMT conduit may be installed in the following locations unless otherwise shown on the Drawings:
   1. Above suspended ceilings.
   2. In attic spaces.
   3. Concealed in walls, hollow metal or wood framed floors, ceilings, soffits, and overhangs.
   4. Concealed by counter base cabinets.
   5. Inside exterior electrical enclosures.

D. Install liquidtight flexible metal conduit and fittings for connections to motors, instrumentation, and equipment subject to vibration and at locations shown on the Drawings.

E. Install PVC coated galvanized rigid steel conduit, rigid aluminum conduit, and rigid non-metallic conduit only when shown on the Drawings.

3.7 EXPOSED OUTLET AND JUNCTION BOXES

A. Use cast boxes up to 45 inches above floor.

B. Pressed steel boxes acceptable over 45 inches above floor in dry, indoor locations.

C. Install weatherproof outlet, switch, and junction boxes outdoors and in any area where Drawings show weatherproof (WP) wiring devices.

3.8 OUTLET BOX ACCESSORIES

A. Provide outlet box accessories and mounting devices as required for each installation.

3.9 LIGHTING FIXTURE OUTLET BOXES

A. Securely mount with approved type bar hangers spanning structural members to support weight of fixture.
3.10 OUTLET BOX LOCATIONS

A. Location of outlets and equipment is approximate. Exact location to be verified and determined by:
   1. Conflict with equipment of other trades.
   2. Equipment manufacturer’s drawings.
   3. Engineer in field.

B. Minor modification in location of outlets and equipment is considered incidental up to distance of 10 feet with no additional compensation, providing necessary instructions are given prior to roughing-in of outlet boxes and equipment.

C. Nominal mounting heights for devices and equipment to be measured from either above finished floor (AFF) or above finished grade (AFG) to center line of device and, unless otherwise shown on the Drawings, are as follows:
   1. Switches: 48 inches AFF OR AFG.
   2. AC receptacles and telephone outlets: 48 inches AFF or AFG.
   3. Thermostats: 60 inches above floor.

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide identification for electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 NAMEPLATES AND TAGS

A. Provide nameplates or tags for identification of panels, panel components, and field mounted devices with the following requirements.
   1. Engraved laminated plastic.
2. White or black letters on background of opposite color. Match and coordinate color of nameplate or tag background with other panels.

B. Panel nameplates to have 1/2-inch high letter engraving.

C. Device and component nameplates or tags to have 3/16-inch high letter engraving.

D. Engravings include the following:
   1. Alpha-numeric number.
   2. Descriptive title.
   3. Range, where applicable.
   4. Engineering units, where applicable.

2.2 ARC FLASH INCIDENT ENERGY STUDY AND ARC FLASH WARNING LABELS

A. An Arc Flash incident energy study shall be done in accordance with the IEEE 1584, “IEEE Guide for Performing Arc Flash Hazard Calculations” for the following per NEC Article 110.16: Switchboards, Switchgear, Panelboards, Industrial Control Panels (3-Phase), Meter Socket Enclosures, and Motor Control Centers.

B. Based on the results of the incident energy study, install Personal Protective Equipment (PPE) warning labels for each piece of equipment as specified above, in accordance with ANSI Z535.4.
   1. The label shall include the following information:
      a. PPE category.
      b. Equipment name.
      c. Limited, restricted, and prohibited Approach/Flash Hazard Boundaries (inches).
      d. Arc Flash Incident energy value (cal/cm²) and working distance (inches).
      e. Voltage rating of equipment.
      f. Upstream protective device.
      g. Study report issue date.

2.3 AVAILABLE FAULT CURRENT AND SERVICE ENTRANCE LABELS

A. Label service equipment with maximum available fault current per NEC article110.24 (A).

B. The contractor is responsible for obtaining the Available Fault Current from the power company.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install nameplates and tags on enclosures, panel mounted components, and field mounted devices.

END OF SECTION
SECTION 26 09 13
ELECTRICAL POWER MONITORING AND CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Provide electrical power monitoring and control as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Submit shop drawings in compliance with pertinent provisions of Section 01 33 01 including electrical ratings, and manufacturer's detailed specifications.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide a microprocessor based power monitor and protection instrument.
   1. Front panel mounting style.
   2. Compatible with PLC communication protocol as shown on the Drawings.

B. Provide multi-function, 3 phase monitor that measures and displays the following power system information:
   1. True RMS currents, including neutral current.
   2. Voltages, both line-to-line and line-to-neutral.
   3. KVA, KW, and KVAR.
   4. Power factor.
   5. Frequency.
   6. KW hour and KVAR hour.
   7. KW demand and amps demand.

C. Provide non-volatile memory for set-up parameters and historical data storage.

2.2 MULTI-FUNCTION POWER MONITOR AND PROTECTION INSTRUMENT

A. Provide a multi-function power monitor and protection instrument that includes:
   1. Three (3) Form C alarm relay outputs.
   2. Minimum accuracies as follows:
      a. Voltage and current: 0.35 percent.
      b. Power: 0.5 percent.
      c. Power factor: 1.0 percent.
      d. Frequency: ±0.2 Hertz.

B. Acceptable manufacturers:
   1. Square D, Model PM800 Series.
   3. Power Measurement, Ltd., Model 3710 ACM.
   5. Or equal.

2.3 THREE PHASE DIGITAL MONITOR

A. Provide a dual-display, multi-function meter for measuring 3 phase volts and amps.

B. Acceptable manufacturers:
   1. Electro Industries/Gaugetech, Model DMVA-100.
   2. Or equal.
2.4 COMMUNICATIONS MODULE

A. Provide communication module as required to allow integration into a PLC
communication network as shown on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install electrical power monitoring and control instrument in accordance with
manufacturer's recommendations.

B. Program setpoints to activate alarm relays as follows:
   1. Overvoltage: 110 percent.
   2. Undervoltage: 90 percent.
   3. Voltage unbalance: 7 percent.
   4. Phase reversal.

END OF SECTION
SECTION 26 09 17
GROUND DETECTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Provide ground detection system as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Electrical schematic, physical dimensions, and manufacturer’s detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts:
   1. Twelve (12) pilot light lamps.
   2. Three (3) fuses.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide ground detector system for each 480 volt, 3 phase, 3 wire, ungrounded electrical service.

B. Acceptable manufacturers:
   1. Erickson Electrical Equipment Co.
      a. Model YXVAP-480 ground detector.
      b. Model GDFB fuse box.
   2. Or equal.

2.2 GROUND DETECTOR

A. Provide a factory prewired ground detector and ground detector fuse box as follows:
   1. Red pilot light to indicate fault condition.
   2. Normally open dry contacts for remote signaling of fault condition.
   3. Pushbutton labeled "Alarm Acknowledge" to reset dry contacts.
      a. When a ground occurs, the red pilot light will light and the dry contacts will close.
      b. Depressing the alarm acknowledge pushbutton will release the dry contacts, but the red pilot light will remain lit until the fault is corrected and the alarm circuit automatically resets.
   4. Three white push-to-test type pilot lights to indicate which phase is grounded.
      a. Under normal conditions, each white pilot light will glow dimly.
      b. When a ground occurs, the white pilot light connected to the grounded phase will dim, and the other two white pilot lights will burn brightly.
   5. 100,000 AIC, 600 volt primary fuse protection.
   6. Baked enamel finished, NEMA 1 enclosures.
   7. Panel mounting frame for ground detector.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer’s recommendations.

B. After power is available, test system for correct operation.

END OF SECTION

GROUND DETECTION SYSTEM
26 09 17-2 (181040.40)
SECTION 26 09 95

PUSHBUTTONS, SELECTOR SWITCHES, AND PILOT LIGHTS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide pushbuttons, selector switches, and pilot lights as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts:
   1. Two (2) pilot light lamps of each type.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70, National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL

A. Provide oil-tight, heavy duty NEMA 4 rated pushbutton switches, selector switches, and pilot lights.

B. Provide all devices with legend plates.
   1. Material: Non-tarnish metal or laminated plastic.
   2. Use white or black letters on background of opposite color for laminated plastic.

C. Use two-circuit contact blocks (one N.O. and one N.C. contact set) for pushbutton switches and selector switches.

2.2 PUSHBUTTON SWITCHES

A. Stop pushbuttons:
   1. Provide non-illuminated momentary operation type operators.
   2. Use red color button.

B. Start pushbuttons:
   1. Provide non-illuminated momentary operation type operators.
   2. Use black color button.

C. Stop-hold switches:
   1. Use stop pushbutton as specified above.
   2. Include sliding latch with padlock provision to engage stop button in the OFF position.

D. Provide pushbuttons for other functions as shown on the Drawings.

2.3 SELECTOR SWITCHES

A. Provide selector switches including the operating knob, operating cam and contact block(s).

B. Use black color operating knob.

C. Select operating cam and contact block combination to provide operating sequence as required.

2.4 PILOT LIGHTS

A. Provide pilot lights with colored plastic lens as shown on the Drawings.

B. Provide 120 volt or 24 Vdc, push-to-test type with LED lamp.
2.5 ENCLOSURES

A. Provide for individual remote control or monitor stations the following type enclosure:
   1. Indoor locations: NEMA 1.
   2. Outdoor or wet locations: NEMA 3R or NEMA 4 steel construction.
   4. Hazardous locations: NEMA 7/9 cast iron, or copper free cast aluminum alloy.

B. Provide nameplate on enclosure for device being controlled.
   1. Provide engraved laminated plastic type.
   2. Use 3/16-inch high white or black letters on background of opposite color.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install pushbutton switches, selector switches, and pilot lights in accordance with manufacturer's recommendations.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide low voltage distribution transformers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Physical dimensions, nameplate data, electrical ratings, and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 GENERAL PURPOSE TRANSFORMERS

A. Provide transformers manufactured and tested to meet or exceed NEMA ST 20, UL 1562, ANSI C57.12, and IEEE standards.

B. Provide KVA rating and voltages as shown on the Drawings.

C. Provide overload capacity of not less than 10 percent for intermittent operation.

D. Construct transformer to include:
   1. Below 30 KVA: Class F or better insulation having a 115 degree C. rise average maximum over a 40 degree C. ambient temperature.
   2. 30 KVA and above: Class H or better insulation having a 150 degree C. rise average maximum over a 40 degree C. ambient temperature.
   3. High grade, non-aging cores with sheet silicone steel laminations having core plating insulation on both sides of each lamination.
   4. Two 2-1/2 percent primary taps above and below nominal voltage.

E. Provide enclosure for transformer mounted outside of motor control center (MCC):
   1. Provide sheet steel, phosphatized having one prime coat and two finish coats of baked enamel finish.
   2. Maximum temperature for top of enclosure not to exceed 90 degrees C.

2.2 STEP-UP TRANSFORMERS

A. Provide UL listed transformers designed to handle high in-rush currents associated with contactors and relays.

B. Provide Step-Transformer as shown on drawings.

C. Provide continuous VA rating: Size for 1.25 times capacity required for all components in circuit.

D. Acceptable Manufacturer:
   1. Hammond Power Solutions Inc.,
   2. Or Equal.

2.3 CONTROL TRANSFORMERS

A. Provide UL listed transformers designed to handle high in-rush currents associated with contactors and relays.

B. Provide continuous VA rating: Size for 1.25 times capacity required for all components in circuit.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install low voltage distribution transformers in accordance with manufacturer's recommendations.

B. Install wall-mounted transformers on prefabricated brackets designed for purpose.

C. Install floor-mounted transformers on 4-inch concrete pad.

D. Adjust voltage taps for required system voltage when necessary.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide panelboards as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Cabinet dimensions.
   2. Nameplate nomenclature.
   3. Electrical ratings and characteristics.
   4. Type, amperage rating, listing, and position of circuit breakers in panelboard.
   5. Manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.
   3. Provide all panelboards of one manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).
1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 GENERAL

A. Comply with the following standards:
   1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
   2. NEMA FU 1 - Low Voltage Cartridge Fuses.
   3. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
   5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
   6. NEMA PB 1 - Panelboards.
   7. NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

B. Comply with the requirements of UL 50, 67, and NEMA PB1 standards.

C. Provide short circuit rating (integral equipment rating) for available fault current.

D. Provide panelboard construction with the following:
   1. Neutral bus with terminals.
   2. Plated or tinned copper bussing:
      a. Distributed phase sequence type.
      b. Ratings as shown on the Drawings, 100 ampere minimum.
   3. Branch circuit breakers:
      a. Comply with Section 26 28 00.
      b. Ratings as shown on the Drawings.
      c. UL Class A ground fault circuit protection (GFP) as required.
   4. Circuit directory:
      a. Directory card suitable for complete descriptions.
      b. Clear plastic cover.
      c. Card holder attached to inside of panel door.

E. Provide main lugs or main circuit breaker rated as shown on the Drawings.
   1. Main circuit breaker: Comply with Section 26 28 00.

F. Listed for non-linear loads.

2.2 MCC MOUNTED PANELBOARDS

A. Provide front to match MCC construction and painting, including the following:
   1. Dead front safety type.
   2. Concealed adjustable trim clamps.
3. Concealed hinges.

B. Provide nameplate to match MCC nameplates identifying panelboard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with manufacturer's recommendations.

3.2 RESTRICTIONS

A. Separation of hot wires and respective neutral wires where they enter a panelboard is not permitted.
   1. All ungrounded and grounded (hot and neutral) conductors of each feeder circuit and each branch circuit must be grouped together where they enter through knock-outs or slots into a panelboard gutter area.
   2. Comply with N.E.C. Section 300.20.

3.3 FIELD QUALITY CONTROL

A. Energize each circuit and check for complete and correct function.

END OF SECTION
SECTION 26 24 19

MOTOR-CONTROL CENTERS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide motor control centers (MCC) as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Schematic diagrams for each compartment.
   2. Wiring and interconnection diagrams.
   3. Frontal elevation and dimension drawings.
   4. Listing of ratings, sizes and style of all components, including bus work.
   5. Nameplate listings.
   6. Manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved.)
1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 GENERAL

A. Comply with the requirements of UL 845 and NEMA ICS-18.

B. Rating: 480 volt AC, 3 phase, 3 wire, 60 Hertz unless otherwise shown on the Drawings.

C. Provide individual units in MCC sized and rated as shown on the Drawings and specified herein. Maximum size must not exceed existing MCC dimensions.

D. Acceptable manufacturers:
   2. Or Equal – Must meet dimensions constraint.

2.2 MATERIAL AND EQUIPMENT

A. Provide structure as follows:
   1. Sectionalized construction of one or more totally enclosed, dead front, vertical sections joined together to form a rigid, free-standing assembly.
   2. Steel base channels and steel lifting angles per manufacturer's standard.
   3. NEMA 1A 20-inch wide by 20-inch deep basic sections with gasketing. Other widths and depths for special sections as required.
   5. Laminated plastic engraved tag number identification nameplate on each MCC with 1/2-inch high white or black letters on background of opposite color.
   6. Prime coated, baked enamel finish.
   7. Open bottom and removable top plate on each section for conduit entry.
   8. Overall size not to exceed allocated space or maximum dimensions shown on the Drawings.
   9. Labeled to indicate suitability for use as service entrance equipment when Drawings show service wires terminated to MCC.

B. Provide bus bars and terminations as follows:
   1. Front accessible, silver or tin plated copper over entire length, braced to withstand a fault current of 42,000 RMS symmetrical amperes.
   2. Minimum 600 amp continuous horizontal bus or greater as determined from frame size of protective device feeding bus.
   3. Minimum 300 amp continuous vertical bus or greater to accommodate total connected load with all connected circuit breakers or fuses considered at full rating.
4. Bus barriers with plug-in openings at 1/2 space factor intervals and snap-in closing plates for unused openings.
5. Bottom covers over vertical bus.
6. Continuous horizontal ground bus in bottom of MCC sized at 28 percent minimum of main horizontal bus cross-sectional area.
7. Provide line and load terminations accessible from front, suitable for the size, number of conductors, and conductor material as shown on the Drawings.

C. Provide wiring as follows:
1. Provide complete wire labeling per Section 26 05 19 3.2 and Section 26 05 23 3.2. Label all wiring/cables in the MCC at both ends of each cable run.
2. NEMA Class II, Type B wiring.
3. Track-mounted, pull apart terminals in unit.
4. Vertical wireway with separate door in each section, isolated from bus and control units.
5. Continuous horizontal wireway, top and bottom, throughout entire length.

D. Provide MCC units as follows:
1. Combination across-the-line starters:
   b. Use draw out type through NEMA Size 3 inclusive.
2. Combination reduced-voltage starters:
   a. Comply with Section 26 29 13.16.
3. Molded case thermal magnetic circuit breakers: Comply with Section 26 28 00.
4. Operating handles for unit-mounted circuit breakers and disconnect switches:
   a. Engaged with device at all times.
   b. Up and down motion with down as OFF.
   c. Interlocked with unit door.
   d. Position for padlocking in off position.
5. Fuses: Comply with Section 26 28 00.
6. Transformers: Comply with Section 26 22 13.
7. Panelboards: Comply with Section 26 24 16.
8. Pushbuttons, selector switches, and pilot lights: Comply with Section 26 09 95.
9. Self-aligning, silver or tin plated, plug-on connections to vertical bus.
10. Doors:
    a. Pan type.
    b. Rugged concealed hinges.
    c. 1/4 turn latches or captive knurled thumb screws engaging with cage nuts.
11. Padlock provision to lock unit with plugs disengaged from bus. Units supported and guided by unit support pan:
    a. Pan easily relocated without tools.
    b. Unit manufacturer's identification tag fastened to unit saddle.

MOTOR-CONTROL CENTERS
26 24 19-3 (181040.40)
12. Engraved laminated plastic unit identification nameplates:
   a. Use 3/16-inch high white or black letters on background of opposite color.
   b. On each unit.
13. Unit compartments enclosed and isolated from adjacent units, busses, and wireways except for openings for conductor entrance into units.
14. General purpose relays, time delay relays, timers and power control relays
15. Current metering relays and current metering transformers
16. Motor protectors
17. Lighting contactors

PART 3 - EXECUTION

3.1 INSTALLATION

   A. Install MCC in accordance with manufacturer's recommendations.

   B. Install on concrete pad as shown on the Drawings, and secure with steel bolts.

3.2 ADJUSTMENT AND CLEANING

   A. Furnish to Owner one can spray paint matching original finish for future touch-up as required.

END OF SECTION
1.1 SUMMARY

A. Provide low-voltage circuit protective devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Electrical ratings, physical size, interrupt ratings, trip curves, \( I^2t \) curves, and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – Provide the following spare parts to the Owner that match items specified:
   1. In three phase circuits: Three (3) fuses of each type and rating.
   2. In single phase circuits: Two (2) fuses of each type and rating.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.
   3. Provide overcurrent protective devices by same manufacturer for each type of device.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).
1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 FUSES

A. General purpose fuses for protection of motors, transformers, feeders and main service:
   1. Use UL Class RK-1 fuses:
      a. Single end rejection or to fit mountings specified.
      b. 0-600 ampere rating.
      c. 200,000 ampere interrupting capacity.
      d. Dual element, time delay.
      e. Use Bussman Low Peak LPN-RK, or equal: 250 volt rating.
      f. Use Bussman Low Peak LPS-RK, or equal: 600 volt rating.
   2. Use UL Class L fuses:
      b. 601-6,000 ampere rating.
      c. 200,000 ampere interrupting capacity.
      d. Time delay.
      e. Use Bussman HI-CAP, KRP-C, or equal: 600 volt rating.

B. Acceptable manufacturers:
   1. Bussman.
   2. Littelfuse.
   3. Mersen.
   4. Or equal.

C. General purpose fuses for protection of motor control circuits, lighting ballasts, control transformers, and street lighting fixtures:
   1. Use UL Class CC, fast acting, single element fuses.
   2. Rated for 0-30 amperes.
   3. Provide 200,000 ampere interrupting capacity.
   4. Use Bussman Limitron KTK-R, or equal: 600 volt rating.

2.2 MOLDED CASE CIRCUIT BREAKERS

A. General:
   1. Comply with UL 489 requirements.
   2. Provide thermal and magnetic protection.

B. Provide permanent trip lighting panel circuit breakers as follows:
   1. UL listed SWD (switching duty) on 120 volt circuits where switched circuits are indicated.
   2. Short circuit rating (integrated equipment rating):
      a. Up to 240 volt: 10,000 RMS symmetrical amps minimum.
      b. Up to 480 volt: 14,000 RMS symmetrical amps minimum.
C. Provide permanent trip power panel and MCC circuit breakers as follows:
   1. Single magnetic trip adjustment.
   2. Bolt-on type.
   3. Short circuit rating (integrated equipment rating):
      a. Main: 42,000 RMS symmetrical amps minimum.
      b. Branch: 14,000 RMS symmetrical amps minimum.

PART 3 - EXECUTION

3.1 INSTALLATION
   A. Install low-voltage circuit protective devices in accordance with manufacturer's recommendations.

3.2 ADJUSTMENT
   A. Set and record adjustable settings on circuit breakers to provide selective coordination and proper operation.

END OF SECTION
SECTION 26 28 00.13
PROTECTIVE RELAY

PART 1 - GENERAL

1.1 SUMMARY

A. Provide Solid State Protective Relay as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Documentation showing final wiring configuration and interconnection with the existing Protective Relay.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Provide factory operational test and reports.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).
1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Provide a solid-state Protective Relay as indicated on the Drawings. Relay to be a numeric multifunction Protection System (communicating microprocessor-based relay) for the protection of feeder circuits. The relay system shall have a 7-year warranty. The relay system shall provide protection, monitoring, local and remote control, and standard automation protocols. Relay self-checking functions shall be included.

2.2 OPERATION

A. The Protective Relay is to have the following IEEE Device Functions: 21, 24, 25, 25A, 27, 32, 37, 40, 43, 46, 47, 48, 49RTD, 49TC, 50, 51, 51TF, 55, 59, 60, 62, 64G, 66, 67, 78V, 78OOS, 79, 81, 86, 87, 87N, and 101 BF.

2.3 MANUFACTURERS

A. Approved manufacturers:
   1. Basler BE1 series.
   2. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install Relay as shown on the Drawings and in accordance with manufacturer's recommendations.

B. Coordinate parameter settings and wiring with manufacturer.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization as follows:
   1. Megger check wire insulation levels (do not megger check solid state equipment).
   2. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide calibration and operational testing.

B. Set operating parameters as required.

END OF SECTION

PROTECTIVE RELAY
26 28 00.13-2 (181040.40)
PART 1 - GENERAL

1.1 SUMMARY

A. Provide across the line motor controllers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Documentation showing final configuration of each solid state (electronic) overload relay if applicable.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

B. Provide all motor starters of one manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.
1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide motor starters as follows:
   1. Comply with NEMA ICS-2 Standards.

B. Provide overloads sized to match motor nameplate full load amps (FLA) rating.

2.2 MAGNETIC MOTOR STARTER

A. Minimum acceptable short circuit withstand rating in combination with motor circuit protective device: 22,000 symmetrical amps.

B. Provide magnetic motor starter:
   1. Mounted in vertical position, gravity dropout.
   2. Double break silver alloy contacts.
   3. Solid state (electronic) overload relay:
      b. Visible trip indication.
      c. Use NEMA Class 20 adjustment for general applications.
      d. Use NEMA Class 10 adjustment for submersible pump motors.
      e. Provide communication module to transfer data on PLC communication network as shown on the Drawings.
   4. NEMA Size 1 minimum or as shown on the Drawings.
   5. Compatible with Allen Bradley CENTERLINE 2100 Motor Control Center.
   6. Provide I/O communication module for:
      a. Ethernet communications.
      b. H-O-A switch.
      c. DSACW signal from auxiliary contact in safety disconnect switch.

2.3 CONTROL CIRCUITS

A. Provide maximum 120 Vac, 60 Hertz.

B. Size transformer for 1.25 times capacity required for all components in circuit.

2.4 CONTROLS

A. Provide running time meter mounted in enclosure cover when shown on Drawings as follows:
   1. 6-digit, non-resettable.
2. Registered in hours and tenths of hour.

2.5 ENCLOSURES

A. Provide motor starter enclosures as follows:
   1. Indoor locations: NEMA 1 steel construction.
   2. Outdoor or wet locations: NEMA 3R or NEMA 4 steel construction.
   4. Hazardous locations: NEMA 7/9 cast iron or copper free cast aluminum.

2.6 NAMEPLATES

A. Provide engraved laminated plastic type.

B. Use 3/16-inch high white or black letters on background of opposite color.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install across the line motor controllers in accordance with manufacturer’s recommendations.

B. Coordinate electronic overload parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization as follows:
   1. Megger check wire insulation levels (do not megger check solid state equipment).
   2. Record and provide results of tests to Engineer.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide 2400V Solid State Reduced Voltage Starters (SSRVS) as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Documentation showing final configuration of each SSRVS.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   2. Local codes and ordinances.
   3. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.
PART 2 - PRODUCTS

2.1 GENERAL

A. Design programmable microprocessor controlled SSRVS utilizing a thyristor (SCR) bridge consisting of at least two SCRs per phase to control starting and stopping of industry standard motors.

B. Protect driven motor from solid state component failure by means of isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted thyristor.

C. All protective features and deceleration control options to be available even when a shorting contactor is employed.

D. Provide complete with magnetic only circuit breaker for Type 1 short circuit protection. Short circuit withstand rating shall be based on the motor horsepower as defined in UL 508.

E. Acceptable manufacturers:
   1. EATON/ Cutler-Hammer
   3. Siemens
   4. Square D Company.
   5. Or equal.

2.2 RATINGS

A. Provide SSRVS with the following ratings:
   1. Ambient temperature range: 0 to 40 degrees C.
   2. Humidity: 93% @ 40 degrees C, non-condensing.
   3. Voltage tolerance: +/- 10% of nominal rating.
   4. Frequency tolerance: +/- 5% starting, +5% or -15% steady state operation.
   5. Capable of supplying 300% rated full load current for 30 seconds at maximum ambient temperature.
   6. SCR P.I.V. rating: 1400 VAC (minimum).

2.3 ADJUSTMENTS AND CONFIGURATIONS

A. Provide accessibility to all display units, configuration switches and adjustment potentiometers on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments is prohibited.
B. Provide digital indication of the following as a minimum:
   1. SSRVS status – ready, starting/stopping, run.
   3. Fault status.

C. Provide SSRVS specifically designed to reduce surges during starting and stopping of centrifugal pumps.

D. Provide built-in keypad to configure the following operating parameters.
   1. Motor full load amps.
   2. Current limitation on starting.
   3. Torque ramp.
   4. Initial torque.
   5. Torque limit.
   6. Maximum start time.
   7. Selection of freewheel, soft stop, or braking.
   8. Adjustable soft stop torque ramp time.
   9. Selection of Class 10 and 20 motor thermal overload protection.

2.4 INPUTS AND OUTPUTS

A. Provide the following output relays:
   1. One Form A and one Form B minimum for indication of fault or control of an isolation contactor.
   2. One Form A for indication that torque ramp is complete and current is below 130% motor FLA (End of start).
   3. One Form A for indication of FAULT status to remote Pump Control Panel.

B. Provide the following additional I/O:
   1. One logic input for force to freewheel, indication of external fault, force to local control, or external motor overload reset.
   2. One analog output for 4-20 or 0-20 milliamp indication of motor current, torque, thermal state or power factor.

C. Provide relay and I/O functions listed above isolated with respect to common.

2.5 PROTECTION

A. Provide microprocessor controlled thermal protection system which continuously calculates the temperature-rise of the motor and SSRVS and provides:
   1. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 110%.
   2. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.
   3. An analog electronic circuit with a time constant adjustable to the motor's thermal cooling time constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.
B. Provide phase loss, phase reversal, under-load, stall, and jam protection

2.6 CONTROLS

A. Provide control transformer within the enclosure to operate soft start control circuitry 120 Vac, 60 Hz.

B. Provide door-mounted operator devices as shown on the Drawings.

C. Provide Ethernet/IP communication module to communicate with PLC.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install SSRVS in electrical enclosures or motor control centers as shown on the Drawings and in accordance with manufacturer’s recommendations.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization per manufacturers recommendations.

B. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide programming, calibration and operational testing.

B. Set operating parameters as required.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide variable frequency motor controllers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation. Contractor to limit total dimensions of VFD assembly with filters must fit within existing VFD drive cabinets location.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer’s detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Harmonic distortion analysis which includes the following:
      a. Calculations of percent voltage distortion with respect to the fundamental voltage on the line side bus.
      b. Comparison of calculations with IEEE-519 standards for acceptable harmonic distortions.
   2. Documentation showing final configuration of each motor drive.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Provide factory operational test, heat test, and reports for motor loading at various speeds simulating field loading.
1.3 QUALITY ASSURANCE
A. Comply with the following requirements:
   2. Local codes and ordinances.
   4. FCC 15J.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 GENERAL
A. Design programmable microprocessor based, pulse width modulated (PWM) IGBT type variable frequency AC drives to provide adjustable speed control of 3-phase motors.

B. Acceptable manufacturers:
   1. Yaskawa, U1000 series or equal.
   2. ABB, ACS880 series or equal.
   3. Allen-Bradley, PowerFlex 755 or equal.
   4. Siemens, Sinamics series
   5. Or equal.

2.2 VARIABLE FREQUENCY DRIVE (VFD)
A. Provide VFD as follows:
   1. Design for constant torque motor or variable torque motor application as required by equipment load or manufacturers direction. Input power: 480 volt, 3 phase, 60 Hz.
      a. Able to withstand voltage variations of +/-10 percent, and 3 percent maximum phase imbalance without affecting performance.
      b. Displacement power factor to be 0.95 lagging, minimum.
      c. Performance to be unaffected by line notching, transients, and harmonics on incoming line.
      d. Minimum efficiency at rated load to be 97 percent.
   2. Output power: Capable of horsepower rating and service factor of motors furnished.
      a. To include automatic function that will modify the volts/Hertz curve based on light load characteristics to minimize power consumption.

VARIABLE-FREQUENCY MOTOR CONTROLLERS
26 29 23-2 (181040.40)
3. Removable Human Interface Module (HIM) with keypad and LCD display to be used for all setup, operation, parameter adjustment, and monitoring.

4. Control Interface:
   a. Provides means of interfacing discrete signals to drive.
   b. Voltage Rating: 120VAC or 24VDC as required for application.

5. Communication module:
   a. Compatible with communication protocol as shown on the Drawings.
   b. Able to accept four (4) additional discrete inputs.

   a. Provide extra contact blocks for remote indication of selector switch position (Hand and Auto).

7. Pilot lights for drive status as shown on the Drawings.

8. Combination type having main circuit breaker, or fused disconnect switch as shown on the Drawings.
   a. Include SCR fuses when recommended by manufacturer.


10. Input terminals for connection of motor winding heat sensor control wires and remote stop switch control wires.
    a. Jumper on input terminals when heat sensors and/or user supplied stop pushbuttons are not shown on the Drawings.

11. Programmable time delay to restart the drive when power is restored.

B. Provide VFD with the following as shown on the Drawings:
   1. Bypass contactor and “Drive/Off/Bypass” switch when shown on the Drawings.
   2. Line reactor.
   4. Provide I/O communication module for:
      a. Ethernet/IP communications.
      b. H-O-A switch.
      c. DSACW signal from auxiliary contact in safety disconnect switch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install variable frequency motor controllers as shown on the Drawings and in accordance with manufacturer's recommendations.

B. Coordinate parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization as follows:
1. Megger check wire insulation levels (do not megger check solid state equipment).
2. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide programming, calibration, and operational testing.
B. Set operating parameters as required.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide variable frequency motor controllers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Harmonic distortion analysis which includes the following:
      a. Calculations of percent voltage distortion with respect to the fundamental voltage on the line side bus.
      b. Comparison of calculations with IEEE-519 standards for acceptable harmonic distortions.
   2. Documentation showing final configuration of each motor drive.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Provide factory operational test, heat test, and reports for motor loading at various speeds simulating field loading.

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   2. Local codes and ordinances.
1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 GENERAL

A. Design programmable microprocessor based, pulse width modulated (PWM) IGBT type variable frequency AC drives to provide adjustable speed control of 3-phase motors.

B. Acceptable manufacturers:
   1. Allen-Bradley, PowerFlex 755 (35 to 400 HP).
   2. Or equal.

2.2 VARIABLE FREQUENCY DRIVE (VFD)

A. Provide VFD as follows:
   1. Design for constant torque motor or variable torque motor application as required by equipment load or manufacturers direction. Input power: 480 volt, 3 phase, 60 Hz.
      a. Able to withstand voltage variations of +/- 10 percent, and 3 percent maximum phase imbalance without affecting performance.
      b. Displacement power factor to be 0.95 lagging, minimum.
      c. Performance to be unaffected by line notching, transients, and harmonics on incoming line.
      d. Minimum efficiency at rated load to be 97 percent.
   2. Output power: Capable of horsepower rating and service factor of motors furnished.
      a. To include automatic function that will modify the volts/Hertz curve based on light load characteristics to minimize power consumption.
   3. Removable Human Interface Module (HIM) with keypad and LCD display to be used for all setup, operation, parameter adjustment, and monitoring.
   4. Control Interface:
      a. Provides means of interfacing discrete signals to drive.
      b. Voltage Rating: 120VAC or 24VDC as required for application.
   5. Communication module:
      a. Compatible with communication protocol as shown on the Drawings.
b. Able to accept four (4) additional discrete inputs.

   a. Provide extra contact blocks for remote indication of selector switch position (Hand and Auto).

7. Pilot lights for drive status as shown on the Drawings.

8. Combination type having main circuit breaker, or fused disconnect switch as shown on the Drawings.
   a. Include SCR fuses when recommended by manufacturer.


10. Input terminals for connection of motor winding heat sensor control wires and remote stop switch control wires.
    a. Jumper on input terminals when heat sensors and/or user supplied stop pushbuttons are not shown on the Drawings.

11. Programmable time delay to restart the drive when power is restored.

B. Provide VFD with the following as shown on the Drawings:
   1. Bypass contactor and “Drive/Off/Bypass” switch when shown on the Drawings.
   2. Line reactor.
   4. VFD located inside MCC, check compatibility with Allen Bradley CENTERLINE 2100 Motor Control Center.
   5. Provide I/O communication module for:
      a. Ethernet communications.
      b. H-O-A switch.
      c. DSACW signal from auxiliary contact in safety disconnect switch.

2.3 INVERTER-DRIVEN MOTOR SHAFT GROUNDING RING

A. Provide a motor shaft grounding ring for all motors controlled by variable frequency drives (VFD) and which are non explosion-proof. The grounding ring is to be installed to divert current away from the motor bearings.

B. All motors operated on variable frequency drives shall be equipped with a maintenance free, conductive micro fiber shaft grounding ring with a minimum of two rows of circumferential micro fibers to discharge damaging shaft voltages away from the bearings to ground.

C. Application Note: Motors up to 100 HP shall be provided with one shaft grounding ring installed on either the drive end or non-drive end. Motors over 100 HP shall be provided with an insulated bearing on the non-drive end and a shaft grounding ring on the drive end of the motor. Grounding rings shall be provided and installed by the motor manufacturer or contractor and shall be installed in accordance with the shaft grounding ring manufacturer’s recommendations.

D. Provide motor shaft grounding ring as follows:
   1. Provide shaft grounding ring on all ½ hp and larger motors.
2. Provide one insulated bearing on 125 hp and larger motors.

E. Grounding ring shall be integral to the motor or factory installed. If the grounding ring is not factory installed, an independent third party test must be performed to ensure the grounding ring is installed per manufacturers recommendations.

F. Grounding ring must be solidly bolted to the motor frame. Adhesive mounting alone will not be allowed. If adhesive is used, it shall be a conductive silver epoxy type approved by the manufacturer.

G. Provide a warranty against VFD induced bearing damage or failure for the life of the motor.

H. Acceptable manufacturers:
   1. Aegis SGR Bearing Protection Ring.
   2. SKF Group.
   4. Or equal.

2.4 INVERTER-DRIVEN MOTOR HIGH FREQUENCY COMMON MODE CORE SYSTEM

A. Provide a High-frequency common-mode (HF-CM) core system for the output cables from each VFD.

B. Cores are to be nanocrystalline magnetic type. They are to act as a common-mode inductor (between phases and ground).

C. Installed around the three motor phases to reduce high frequency common-mode currents.

D. Provide size and quantity of cores per manufacturers recommendations. Provide at VFD and at motor if required by manufacturer.

E. Acceptable manufacturers:
   1. Danfoss VLT.
   2. MH&W International Corporation Cool Blue.
   3. Or equal.

2.5 INVERTER-DRIVEN MOTOR HIGH FREQUENCY CASE BONDING

A. All motors operated on variable frequency drives shall be bonded from the motor foot to system ground with a high-frequency ground strap made of flat braided, tinned copper with terminations to accommodate motor foot and system ground connection.

B. Application Note: High-frequency grounding straps must be used to ensure the proper grounding of all inverter-driven induction motor frames.
C. Acceptable manufacturers:
   1. Aegis HF Ground Strap.
   2. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install variable frequency motor controllers as shown on the Drawings and in accordance with manufacturer's recommendations.

B. Coordinate parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization as follows:
   1. Megger check wire insulation levels (do not megger check solid state equipment).
   2. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide programming, calibration, and operational testing.

B. Set operating parameters as required.

END OF SECTION
SECTION 26 29 26
HARMONIC FILTER

PART 1 - GENERAL

1.1 SUMMARY

A. Provide harmonic filters as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. This specification defines the requirements for harmonic filter systems in order to meet IEEE-519-1992 electrical system requirements for harmonic current limits. The active harmonic filter shall maintain power factor between 0.95 and 0.999 lagging when operated within limits.

C. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

D. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.

B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
   1. Harmonic distortion analysis which includes the following:
      a. Calculations of percent voltage distortion with respect to the fundamental voltage on the line side bus.
      b. Comparison of calculations with IEEE-519 standards for acceptable harmonic distortions.
   2. Documentation showing final configuration of each motor drive.

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

E. Provide factory operational test, heat test, and reports for motor loading at various speeds simulating field loading.

HARMONIC FILTER
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1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   2. Local codes and ordinances.
   3. IEEE The active harmonic filter system shall be designed in accordance with the applicable sections of the following documents.
   4. ANSI IEEE std 519.
   5. UL 508.
   6. The products shall include third party approvals by cULus.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Voltage: 480/600 Volts, 60 Hz, 3 phase, 3 wire plus ground.

B. Current Rating: Provide the rated current as indicated on the Drawings.

C. Current Transformers:
   1. Two current transformers are required and mounted on phases A & C.
   2. Current transformers are an integral part of the active harmonic filter. When current transformers are installed external to the active harmonic filter equipment, the contractor shall be responsible for the installation of manufacturer provided current transformers.
   3. Current ratings of the current transformers shall be according to full load current of the circuit on which installed. Primary rating or 500A, 1000A, 3000A, or 5000A with a secondary rating of 5A are acceptable.
   4. Current transformers rated for 400 hertz shall be used.
   5. The current transformers shall be placed as close as possible to the non-linear load to be conditioned, within manufacturer guidelines.

2.2 OPERATION

A. The active harmonic filter shall electronically supply the non-fundamental current demanded by the non-linear load that results in a near sinusoidal current being drawn from the supply.
2.3 PERFORMANCE REQUIREMENTS

A. Response Time:
   1. In a steady state condition, the active harmonic filter shall have a response time of less than one (1) line cycle.
   2. In the event of a load change or transient condition, the response time shall be within three (3) line cycles.

B. Input Power:
   1. Voltage: 480 Volt, 3 phase, 3 wire plus ground.
   2. Voltage Tolerance: +/- 10% of nominal.
   3. Frequency: automatically adapted to 60Hz, +/- 3%.
   4. Input Circuit Breaker: 100k AIC Rated.

C. Output Performance:
   1. Performance of the active harmonic filter shall be independent of the impedance of the power source. All performance levels shall be attained whether on the AC lines, backup generator, or output of UPS.
   2. Harmonic Correction:
      a. Limit the 2nd through 50th order harmonic current to <5% TDD at each installed location indicated herein. Levels for individual harmonic orders shall comply with respective levels established in ANSI/IEEE std 519-1992, Table 10-3.
      b. Limit the THD (V) added to the electrical system immediately upstream of the active line conditioner location(s) to less than or equal to 5%. The active harmonic filter shall not correct for utility supplied voltage distortion levels.
   3. Reactive Current Compensation shall improve power factor to be to between 0.95 and 0.999 lagging.

2.4 ENVIRONMENTAL CONDITIONS

A. The active harmonic filter shall be able to withstand the following environmental conditions without damage or degradation of operating characteristics or life.
   1. Operating Ambient Temperature: 0°C to 40°C.
   2. Operating Ambient Temperature for selected open chassis units: -20°C to 50°C.
   3. Storage Temperature: -40°C to 65°C.
   4. Relative Humidity: 0 to 95%, non-condensing.
   5. Altitude: Operating to 1000 meters (3300 ft.).

2.5 ENCLOSURE

A. Each filter shall be provided in a UL Type 1 rated enclosure.
B. All UL Type 1 enclosed units shall have means to prevent the door from being opened when the unit is energized. This can be achieved by either:
   1. A door-interlocked circuit breaker that provides power interruption when the door is opened. The circuit breaker shall be lockable in the power-off position. Units shall be disconnected from the power source by a disconnect device or circuit breaker contained in the power distribution center as defined by local and national codes for branch circuit protection. OR
   2. A mechanism that locks the door when the unit is energized. The unit may be fed using an external disconnect or breaker.
C. Freestanding units shall include lifting provisions by forklift truck and lifting lugs. Wall mount units weighing more than 80 pounds shall be equipped with a means of lifting, such as lifting lugs.
D. Door Mounted Digital HMI Operator Interface.
E. All units shall be provided with a grounding lug. Grounding by the contractor is to be performed according to local and national standards.
F. The paint shall be the manufacturer's standard type and color.
G. All enclosed units shall have a door-interlocked disconnect for power interruption when the door is opened.

2.6 OPERATOR CONTROLS and INTERFACE
A. The active harmonic filter shall require minimal field programming.
B. The active harmonic filter shall contain a color touch screen display with the following features:
   1. A minimum display size of 5.6 inches, 65k colors, and LED backlight.
   2. Easily navigable screens, including Home, Status, Fault and Setup screens.
   3. Display voltage and current waveform data along with RMS metering data.
   4. A gauge based indicator of active filter current usage, from 0 to 100% of capacity. Dual state indications of nominal operation and “at capacity” operation.
   5. An alarm history buffer saved in non-volatile. Buffer information shall persist between power outages, with a minimum of 128 event entries.
   6. Ability to set the end user Line/Load CT ratio of the active harmonic filter system.
   7. The Operator Interface shall show THD, Power Factor, RMS Current, RMS Voltage, and Fault History.
C. The active harmonic filter shall have the ability to operate in three (3) modes: i) harmonic correction only mode, ii) power factor correction only mode, or iii) combination harmonic and power factor mode. All three control modes shall be configurable from the local operator color touch screen display.
D. The active harmonic filter shall have a configurable relay based run/stop command input in addition to the manual and auto run/stop commands. The active filter shall have a configurable relay based fault output. Each contact shall be rated for 0.4 Amperes at 125 volts.

E. The filter shall have a configurable network based run/stop command input in addition to the manual and auto run/stop commands.

F. The filter shall have the ability to load and save operational parameters in non-volatile persistent memory and the ability to revert to factory default parameter settings.

G. The filter shall possess an integrated industry standard serial TIA/EIA-485 /RS-485 fieldbus slave network connection such as Modbus RTU for remote monitoring and operation of the active filter.

H. The filter shall have the ability to communicate over a standard industrial Ethernet communications network such as Ethernet/IP.

I. The unit shall automatically begin to correct harmonic currents after power up without the need for operator intervention.

J. The unit shall have the ability to display trend history data for four variables selectable by the user.

2.7 DESIGN

A. All active harmonic filters shall be defined as power electronic devices which consist of power semiconductors and a DC bus that acts to inject current into the AC line that will cancel undesirable harmonic currents drawn by the load. A DC bus shall store power for power semiconductor switching. A digital microcontroller shall control the operation of the power converter.

B. The active harmonic filter shall feature fully digital synchronous frame controls for selected harmonics to enhance drive load compatibility.

C. The active harmonic filter shall feature a fully digital, broadband current regulator with progressive gains to eliminate system resonance tuning issues and simplify startup and commissioning.

D. The active harmonic filter shall feature single processor control of all power electronic devices per a single active filter to reduce fault response latency and harmonic correction loop times.

E. Each unit shall be designed with over-current and current limiting self-protection. Operation shall continue indefinitely at manufacturer defined safe operating levels without trip off or destruction of the active harmonic filter.
F. Large units (capacity>150A) shall have built in redundancy so at least one half of the corrective current capacity is available after a normal single point fault.

G. All inductive elements in the power circuit of active harmonic filter shall be coreless, in order to maintain constant inductance and avoid saturation at high current levels.

H. Two distinct levels of faults shall be employed: Critical and Non-critical levels Non-critical level faults will provide automatic restart and a return to normal operation upon automatic fault clearance. Critical level faults stop the function of the unit and await operator action to restart.
   1. Faults such as AC line power loss shall be automatically restarted upon power restoration. Upon removal of these fault conditions, the active line conditioner shall restart without user action.
   2. All other faults shall be considered critical faults and stop the active harmonic filter. The run relay shall be disabled and the fault relay enabled. User shall be required to initiate a power reset (cycle power off and on) to restart the active harmonic filter.

I. The logic of the active harmonic filter shall monitor the load current by utilizing two (2) current transformers (CTs) mounted on phases A and C to direct the function of the power electronic converter.

J. Multiple active harmonic filters may be installed in parallel to inject current. The units will function independently. If one unit is stopped or faulted, the remaining units will continue to operate normally.

K. Individual unit characteristics, including sample drawings, weight, and watts loss, can be found in the Installation, Operation, and Maintenance Manual.

L. Approved manufacturers:
   1. TCI.
   2. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install harmonic filters in electrical enclosures or motor control centers as shown on the Drawings and in accordance with manufacturer's recommendations.

B. Coordinate parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization as follows:
   1. Megger check wire insulation levels (do not megger check solid state equipment).

HARMONIC FILTER
26 29 26-6 (181040.40)
2. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide calibration and operational testing.

B. Set operating parameters as required.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Provide surge protective devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals:
   1. Manufacturer’s detailed specifications.

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 SURGE PROTECTION – SERVICE ENTRANCE

A. Design surge-protective device to protect AC secondary power line from line transients and other damaging voltage spikes.

B. Provide surge-protective device with the following requirements:
   1. Meets or exceeds the following standards:
      b. UL 1449.
   2. Suitable for service entrance, Category C.
   3. Suitable for operation on 480Y/277 volt, 3 phase, 4 wire system, at 60 Hertz.
   4. Capable of repeated operations.
   5. Replaceable modular protection.
   7. 200,000 amperes per phase surge current capacity.
   8. Monitoring of normal operation, protection event and protection reduced through indication lamps.
   9. Suitable for mounting in service entrance equipment.

C. Acceptable manufacturers:
   1. Square D EMA series.
   2. MCG Electronics, Inc.
   3. LEA International.
   4. Or equal.

2.2 SURGE ARRESTOR – SERVICE ENTRANCE

A. Design surge-protective device to protect AC secondary power line from line transients and other damaging voltage spikes.

B. Provide surge-protective device with the following requirements:
   1. Meets or exceeds the following standards:
      b. UL 1449.
   2. Suitable for service entrance, Category C.
   3. Suitable for operation on 2400 volt, 3 phase, 3 wire system, at 60 Hertz.
   4. Capable of repeated operations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install surge-protective devices in accordance with manufacturer's recommendations.

END OF SECTION

SURGE-PROTECTIVE DEVICES
26 43 00-2 (181040.40)
PART 1 - GENERAL

1.1 SUMMARY

A. This section is provided for reference in selecting equipment with adequate fault current withstanding rating.

B. Related work:
   1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.

C. References:
   1. (Reserved).

1.2 SUBMITTALS

A. Shop Drawing Submittals – (Reserved).

B. Operation and Maintenance Manuals – (Reserved).

C. Certificates and Guarantees – (Reserved).

D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE

A. Comply with the following requirements:
   1. NFPA 70 National Electrical Code (NEC).
   2. Local codes and ordinances.
   3. Utility Company providing service.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).
PART 2 - PRODUCTS

2.1 ELECTRIC POWER SERVICE

A. Well No. 6: 245 Lennox Dr.
   1. Existing low voltage electrical service for the site (472074H9): 200 ampere, 480 volt, 3 phase, 3 wire, ungrounded service, provided by ComEd.
   2. Existing medium voltage electrical service for the site (472074M6): 600 ampere, 2400 volt, 3 phase, 3 wire, ungrounded service, provided by ComEd.

B. Well No. 8: 3700 Grove Rd.
   1. Existing electrical service for the site: 800 ampere, 480Y/277 volt, 3 phase, 4 wire, provided by ComEd.

2.2 POWER COMPANY CONTACT

A. Electrical service for the site is provided by ComEd.

B. Contact:
   1. Lane Sibley
      Customer Project Engineer (CPE)
      ComEd – New Business
      2001 Aucutt Road, Montgomery, IL 60538
      630.723.2397 (cell)
      630.723.2336 (fax)
      lane.sibley@comed.com

2.3 AVAILABLE FAULT CURRENT

A. Well No. 6:
   1. The available fault current at the power company's transformer 472074H9 is: 7,800 AIC 3-phase, 7,700 AIC 1-phase.
   2. The available fault current at the power company’s transformer 472074M6 is: 13,45000 AIC 3-phase, 7,700 AIC 1-phase.

B. Well No. 8:
   1. The available fault current at the power company’s transformer 472204D3 is: 32,400 AIC 3-phase, 30,000 AIC 1-phase.

PART 3 - EXECUTION - (Reserved).

END OF SECTION

ELECTRICAL SERVICE
26 60 20-2 (181040.40)
CONTRACT

This contract is entered into this _____ day of ________ 2020, by and between the Village of Oswego (Village) and _________________________________________________(Contractor).

The entire Bid package together with all Exhibits and attachments and following sections apply to all bids requested and accepted by the Village and become a part of the contract unless otherwise specified. The Village assumes that submission of a bid means that the person submitting the bid has familiarized himself with all conditions and intends to comply with them unless noted otherwise.

1. **Definitions:** The definitions set forth in the Bid Packet are incorporated herein.

2. **Conditions:** The Contractor is responsible for being familiar with all conditions, instructions, warranties, and documents governing this project and Bid. Failure to make such investigation and preparations shall not excuse the Contractor from the performance of the duties and obligations imposed under the terms of this contract.

3. **Retainage During Guarantee Period:** Out of the amount representing the total amount due upon completion of work in any month, the Village shall deduct ten percent (10%) and shall hold such sum for a guarantee period which shall expire not less than ninety (90) days after the completion of the last work done in the Contract Work Period of each year.

4. **Billing/Invoicing:** All billing and invoicing will be at the completion of the job with detailed itemized billing. Billing will include the date, the work performed, and the total cost. After receipt of a correct invoice, payments shall be due and owing by the Village in accordance with the terms and provisions of the Local Government Prompt Payment Act, Illinois Compiled Statutes, Ch. 50, Sec. 505, et. seq.;

If, in the opinion of the Village, the Contractor has not or is not satisfactorily performing the work covered by this specification, and within forty-eight (48) hours of receipt of a written demand from the Village, for performance, has not cured any defect in performance specifically itemized in such demand, the Village may, at its option:

A. Withhold payment.
B. Consider all or any part of this contract breached and terminate the contractor, or
C. May hire another contractor to cure any defects in performance or complete all work covered by this specification for the remaining term of this contract.
D. Any demand for performance shall be specifically delivered to the contractor by personal delivery, certified or registered mail.

The Village will make periodic inspections and follow up as needed with the contractor to discuss any issues, etc.

5. **Insurance and Bond Requirements:** Contractor shall procure and maintain for the duration of the Agreement insurance against claims for injuries to persons, damages to property,
and/or other applicable damages that may arise in connection with the performance of work and/or services under this Agreement as follows:

A. Minimum Scope of Insurance – The insurance coverage to be procured and maintained by Contractors shall be at least as broad as the following:

   i. **Commercial General Liability Insurance.** Commercial general liability insurance with minimum coverage amounts of $2,000,000 general aggregate; $2,000,000 products-completed operations aggregate; and $1,000,000 each occurrence for bodily injuries, death, and property damage, and personal injury resulting from any one occurrence, including the following endorsements, coverages, and/or conditions:

      1. Shall name the Village as an additional insured in accordance with the obligations and conditions set forth below.
      2. Blanket contractual liability coverage, to the extent permitted under Illinois law, including, but not limited to, Contractor’s contractual indemnity obligations under the Agreement.
      4. Broad form property damage coverage.
      5. Personal injury coverage.
      6. Must be endorsed as Primary and Non-Contributory as to any other insurance of the Additional Insureds.
      7. If the Additional Insureds have other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis to any Subcontractor’s policy.

   ii. **Comprehensive Automobile Liability Insurance.** Comprehensive automobile liability insurance with minimum coverage amounts of $1,000,000 any one accident for bodily injuries, death, and property damage resulting from any one occurrence, including all owned, hired, and non-owned vehicles.

   iii. **Workers’ Compensation and Employers Liability Insurance.** Statutory Workers’ Compensation coverage complying with the law of the State of Illinois and Employers’ Liability Insurance with minimum limits at $1,000,000 each accident, including occupational disease coverage with a limit of $1,000,000 per employee, subject to policy minimum limit of $1,000,000 per annum.

   iv. **Umbrella / Excess Liability Insurance.** Umbrella or excess liability insurance is written over the underlying employer’s liability, commercial general liability, and automobile liability insurance described above with minimum coverage amounts of $2,000,000 per occurrence and $2,000,000 general aggregate, with coverage at least as broad as the underlying policies.

   v. **Professional Liability Insurance.** Contractor shall procure and maintain professional liability insurance coverage: Each Occurrence: $1,000,000.00. Such professional liability coverage shall be maintained for at least two years after completion of work and/or services under the Agreement. Evidence of such insurance shall be provided upon request from the Village during this two-year period.
B. Deductibles and Self-Insured Retentions - Any deductibles or self-insured retentions must be declared to and approved by the Village. At the option of the Village, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Village, its officials, employees, agents, and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigation, claim administration and defense expenses.

C. Contractor’s Obligations - The Contractor shall have the following obligations with regard to required insurance under the Agreement:

i. The insurance policies required under this Agreement shall be endorsed to contain the following provisions: the Village and its officers, officials, employees, agents, and volunteers are to be covered as additional insureds on each of the policies with respect to liability arising out of ongoing and completed operations performed by or on behalf of the Contractor, including materials, parts, or equipment furnished in connection with such work or operations and automobiles, owned, leased, hired or borrowed by or on behalf of the Contractor. General liability coverage shall be provided in the form of an endorsement to Contractor’s insurance at least as broad as ISO Form CG 20 10 11 85, or if not available, through both ISO Form CG 20 10, or CG 20 26, or CG 20 33; and CG 2037; 10 01 Edition date. All additional insured coverage shall be for both ongoing and completed operations.

ii. The Contractor shall provide evidence of the required insurance coverages under this Agreement by providing a copy of the actual policy/policies, endorsement(s) and certificates of insurance evidencing such coverages. All certificates of insurance required to be obtained by the Contractor shall provide that coverages under the policies named shall not be canceled, modified, reduced or allowed to expire without at least thirty (30) days prior written notice given to the Village. All certificates evidencing coverage extended beyond the date of final payment shall be provided at the time of the final Pay Request.

iii. The Contractor shall provide immediate notice to the Village upon the cancelation of any insurance policy or policies required hereunder.

iv. All insurance required of the Contractor shall state that it is Primary and Non-Contributory Insurance as to all additional insureds with respect to all claims arising out of operations by or on their behalf. If the Village has other applicable insurance coverages, those coverages shall be regarded as excess over the additional insured coverage. Contractor shall, with respect to all insurance required under this Agreement, endorse or require each policy to waive any and all rights of subrogation for losses and or damages arising from the work and/or services provided by the Contractor against the Village or other Additional Insured except where not permissible by law.

v. The Contractor shall require that every Subcontractor of any tier working on the Project associated with this Agreement to obtain insurance of the same types and amounts as that required of Contractor, naming the same as additional insureds subject to the same restrictions and obligations as set forth in the Contractor’s insurance required under the Agreement, including waivers of subrogation in favor of the Village.
Under no circumstances shall the Village be deemed to have waived any of the insurance requirements of this agreement by any act or omission, including, but not limited to:

1. Allowing work by the Contractor or any Subcontractor of any tier to start before receipt of the required insurance policy, endorsement, and/or certificates of insurance; or
2. Failure to examine, or to demand the correction of any deficiency, of any insurance policy, endorsement, and/or certificate of insurance received.

The Contractor agrees that the obligation to provide insurance is solely the responsibility of the Contractor and the Subcontractors of any tier and cannot be waived by any act or omission of the Village.

The purchase of insurance by the Contractor under this Agreement shall not be deemed to limit the liability of the Contractor in any way, for damages suffered by the Village in excess of policy limits or not covered by the policies purchased by the Contractor.

The Contractor shall notify the Village, in writing, of any possible or potential claim for personal injury or property damage arising out of the work and/or services of this Agreement promptly whenever the occurrence giving rise to such a potential claim becomes known to the Contractor.

The Contractor further agrees to cause contractual liability endorsements to be issued by the insurance companies and attached to the above-mentioned policies to include under the coverage therein an extended obligation on the part of the insurers to insure against Contractor’s contractual liability hereunder and to indemnify the Village and its agents against loss, liability, costs, expenses, attorneys’ fees and court costs, and further agrees that said coverage shall be afforded therein against all claims arising out of the operation of any structural work law or law imposing liability arising out of the use of scaffolds, hoists, cranes, stays, ladders, supports or other mechanical contrivances.

All insurance and performance and payment bonds required hereunder shall be placed with an insurer or insurers authorized to conduct business in the State of Illinois with a current A.M. Best’s rating of no less than A, unless otherwise acceptable to the Village.

6. **Indemnification:** To the fullest extent permitted by Illinois law, Contractor shall indemnify, defend, save and hold the Village, their trustees, officers, employees, agents, attorneys and lenders harmless from and against all claims, damages, losses, and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the work and/or services under the Agreement, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, anyone directly or indirectly employed by Contractor, or anyone for whose acts Contractor may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section.
4. **Force Majeure:** Whenever a period of time is provided for in this Agreement for the Contractor or the Village to do or perform any act or obligation, neither party shall be liable for any delays or inability to perform if such delay is due to a cause beyond its control and without its fault or negligence including, without limitation: a) Acts of nature; b) Acts or failure to act on the part of any governmental authority other than the Village or Contractor, including, but not limited to, enactment of laws, rules, regulations, codes or ordinances subsequent to the date of this Agreement; c) Acts or war; d) Acts of civil or military authority; e) Embargoes; f) Work stoppages, strikes, lockouts, or labor disputes; g) Public disorders, civil violence, or disobedience; h) Riots, blockades, sabotage, insurrection, or rebellion; i) Epidemics or pandemics; j) Terrorist acts; k) Fires or explosions; l) Nuclear accidents; m) Earthquakes, floods, hurricanes, tornadoes, or other similar calamities; n) Major environmental disturbances; or o) Vandalism. If a delay is caused by any of the force majeure circumstances set forth above, the time period shall be extended for only the actual amount of time said the party is so delayed. Further, either party claiming a delay due to an event of force majeure shall give the other party written notice of such event within three (3) business days of its occurrence, or it shall be deemed to be waived.

5. **Liquidated Damages:** Time is of the essence of the contract. Should the Contractor fail to complete the work within the specified time stipulated in the contract or within such extended time as may have been allowed, the Contractor shall be liable and shall pay to the Village the amount of $500.00, not as a penalty but as liquidated damages, for each day of overrun in the contract time or such extended time as may have been allowed. The liquidated damages for failure to complete the contract on time are approximate, due to the impracticability of calculating and proving actual delay costs. These deductions are for the cost of delay to account for administration, engineering, inspection, supervision, and other costs and expenses during periods of extended and delayed performance. The costs of delay represented by this schedule are understood to be a fair and reasonable estimate of the costs that will be borne by the Village during an extended and delayed performance by the Contractor of the work.

6. **Contract Term:** The contract will commence as of the date of this contract and expire on April 30, 2021.

7. **Change Orders:** After the contract is awarded, additional purchases or modifications may be made under the contract, or the terms of the contract may be extended, without rebidding the materials, supplies, services or equipment involved, provided that the change order:
   A. Is not of such a size or nature as to undermine the integrity of the original Bidding process; and
   B. Is germane to the original contract; and
   C. Does not exceed twenty percent (20%) of the contracted amount; and
   D. Is approved by the Board of Trustees or by the Village Administrator, or his/her designee for change orders that are not greater than fifteen thousand dollars ($25,000.00).

8. **Compliance with Laws and Regulations:** In addition to the Bid and performance bonds set forth above, the contractor must furnish and pay for satisfactory any other security required
by law or by the specifications for this particular project. Upon receipt of the performance bond, the Village will return the Bid bond to the contractor.

A. The Contractor must comply with all applicable laws prerequisite to doing business in the state.
B. The Contractor must have a valid Federal Employer Tax Identification Number or Tax Identification Number (for individuals).
C. The Contractor must provide a Statement of Compliance with provisions of the State and Federal Equal Opportunity Employer requirements.
D. The Contractor must provide evidence of any professional or trade license required by law or local ordinance for any trade or specialty area in which the Contractor is seeking a contract award. Additionally, the Contractor must disclose any suspension or revocation of such license held by the company, or of any director, officer or manager of the company. Any material changes to the Contractor’s status, at any time, must be reported in writing to the Village within 14 days of its occurrence. Failure to comply with this requirement is grounds for the Contractor to be deemed non-responsible.

9. **Independent Contractor:** There is no employee/employer relationship between the Contractor and the Village. Contractor is an independent contractor and not the Village’s employee for all purposes, including, but not limited to, the application of the Fair Labors Standards Act minimum wage and overtime payments, Federal Insurance Contribution Act, the Social Security Act, the Federal Unemployment Tax Act, the Worker’s Compensation Act (820 ILCS 305/1, et seq.). The Village will not (i) provide any form of insurance coverage, including but not limited to health, worker’s compensation, professional liability insurance, or other employee benefits, or (ii) deduct any taxes or related items from the monies paid to Contractor. The performance of the services described herein shall not be construed as creating any joint employment relationship between the Contractor and the Village, and the Village is not and will not be liable for any obligations incurred by the Contractor, including but not limited to unpaid minimum wages and/or overtime premiums, nor does there exist an agency relationship or partnership between the Village and the Contractor.

10. **Approval and Use of Subcontractors:** The Contractor shall perform the Services with its own personnel and under the management, supervision, and control of its own organization unless otherwise approved by the Village in writing. All subcontractors and subcontracts used by the Contractor shall be in the discretion of the Village and in advance by the Village. The Village’s approval of any subcontractor or subcontract shall not relieve the Contractor of full responsibility and liability for the provision, performance, and completion of the Work in full compliance with, and as required by or pursuant to, this Contract. If the Contractor chooses to use subcontractors to perform any of the Work, the Work performed under any subcontract shall be subject to all of the provisions of this Contract in the same manner as if performed by employees of the Contractor. Every reference in this Contract to “Contractor” shall be deemed to also apply to all subcontractors of the Contractor. Every subcontract entered into by the Contractor to provide the Work, or any part thereof shall include a provision binding the subcontractor to all provisions of this Contract.
If any personnel or subcontractor fail to perform the part of the Work undertaken by it in a manner satisfactory to the Village, the Contractor shall immediately upon notice from the Village remove and replace such personnel or subcontractor. The Village shall have no claim for damages, for compensation in excess of the contract price, or for a delay or extension of the contract time as a result of any such removal or replacement.

11. **Assignment:** Neither the Village nor the Contractor shall assign or transfer any rights or obligations under this Agreement without the prior written consent of the other party.

12. **Governing Law:** This Contract and the rights of Owner and Contractor under this Contract shall be interpreted according to the internal laws of the State of Illinois. The venue for any action related to this Contract will be in the Circuit Court of Kendall County, Illinois.

13. **Changes in Law:** Unless otherwise explicitly provided in this Contract, any reference to laws shall include such laws as they may be amended or modified from time to time.

14. **Time:** The Contract Time is of the essence of this Contract. Except where otherwise stated, references in this Contract to days shall be construed to refer to calendar days.

15. **Termination:** The Village shall have the right at any time and for any reason (without any penalty) to terminate, in whole or in part, this Contract, provided that the Village shall provide Contractor at least thirty (30) days’ prior written notice of such termination whereupon this Agreement shall automatically terminate immediately after the 31st day.
   A. When this contract, or any portion hereof, is terminated or canceled by the Village, and the Contractor released before all items of work included in this contract has been completed, payment may be made be prorated as a percentage of completion of the actual work at contract unit prices, and no claims for loss of anticipated profits or other damages will be made and are hereby waived.
   B. Termination of a contract, as stated above, will not relieve the Contractor or his/her surety of the responsibility of replacing defective work or materials.

16. **Piggybacking Clause:** This contract may be used to purchase supplies, equipment or perform any work on facilities or properties under the jurisdiction of the Village of Oswego including, but not limited to, interior and exterior building renovations and repairs, site work, electrical, plumbing, HVAC, concrete, masonry, maintenance of bridges, roofing replacement and/or repairs, streetscape repairs and improvements to Village sites. This Contract may also be used as a joint purchase agreement between the Village, Oswego Community School District 308, Oswegoland Park District, Oswego Library District, Oswego Township, Oswego Fire Protection District, as well as any other agencies at the discretion of the Village.

17. **Additional Items:** The Village and Contractor further agree that:
   A. Certifies that it is not barred from Bidding or contracting with the Village as a result of a violation of either Paragraph 33E-3 (Bid rigging) or 33E-4 (Bid rotating) of Act 5, Chapter 720 of the Illinois Complied Statutes regarding criminal interference with public contracting; and
B. Swears under oath that it is not delinquent in the payment of any tax administered by the Illinois Department of Revenue as required by Chapter 65, Act 5, paragraph 11-42.1 of the Illinois Complied Statutes; and

C. States that it has a written sexual harassment policy as required by the Illinois Human Rights Act (775 ILCS 5/2-105(A)(4)) a copy of which shall be provided to the Village upon request; and

D. Agrees to comply with the requirements of the Illinois Human Rights Act regarding Equal Employment Opportunities as required by Section 2-105 of the Illinois Human Rights Act (775 ILCS 5/2-105) and agrees to comply with the Equal Employment Opportunity Clause, Section 750, Part 750, Chapter X, Subtitle B of Title 44 of the Illinois Administrative Code incorporated herein by reference; and

E. Agrees to comply with the civil rights standards set forth in Title VII of the Civil Rights Act as mandated in Executive Order No. 11246, U.S.C.A. Section 2000e n.114 (September 24, 1965); and

F. Agrees to comply with the Substance Abuse Prevention on Public Works Projects Act (820 ILCS 265/1 et seq.) if this project is a “public work” within the meaning of the Illinois Prevailing Wage Act (820 ILCS 130/01 et seq.) and prohibit substance abuse while performing such work and has a substance abuse prevention program; and

G. Agrees to provide a drug-free workplace pursuant to the Drug-Free Workplace Act (30 ILCS 580/1 et seq.) (25 or more employees under a contract of more than $5,000 or for individuals only when greater than $5,000); and

H. Agrees to comply with the Employment of Illinois Workers on Public Works Act (30 ILCS 570/0.01 et seq.) and employ Illinois laborers if at the time of this contract is executed or if during the term of this contract there is excessive unemployment in Illinois as defined in the Act.
# CONTRACT SIGNATURES

IN WITNESS WHEREOF the parties hereto have executed or caused to be executed by their duly authorized agents, this contract in DUPLICATE, each of which shall be deemed original, on the day and year first written.

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<th>Village of Oswego Administrator</th>
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<td>Printed Name of Authorized Representative</td>
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## SUBCONTRACTOR LISTING

Provide the name, contact information, and value of work for each and every subcontractor which will be employed on this project.

**Subcontractor No. 1**

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<th>Business Name</th>
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**Subcontractor No. 2**

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REFERENCES

General Information, the list below current business references for whom you have performed work similar to that required by this bid.

Reference No. 1

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CONTRACTOR BID AGREEMENT

TO:
Village of Oswego
100 Parker’s Mill
Oswego, IL 60543

The undersigned Bidder, in compliance with your advertisement for Bids for work as specified, and related documents prepared by or at the direction of the Village of Oswego, Owner, and being familiar with all conditions surrounding the work, including availability of labor and material, do hereby propose to furnish materials, labor, equipment and services and pay for same and shall perform all work required for the completion of the Project (Water System Improvements – Wells #6 And #8 Electrical Remodeling), in accordance with the Contract documents and at the price provided.

Bidder certifies this Bid to be for the project described in the Instruction to Bidders document and to be in accordance with plans, specifications, and Contract Documents, including the invitation for Bids.

In no event shall any delays or extensions of time be construed as cause or justification for payment of extra compensation to the Contractor. Any claims for an increase of the Contract time shall be made in writing to the Village within seven (7) days of the cause.

________________________________________
Company Name

________________________________________
Address        City, State, Zip Code

________________________________________
Phone Number        Email Address

________________________________________
Printed Name of Authorized Representative        Title

________________________________________
Signature of Authorized Representative        Date