PROJECT MANUAL

FOR

TOWERS FOR PUBLIC SAFETY COMMUNICATION SYSTEM

DOOR COUNTY, WI

November 8, 2012
Towers for Public Safety Communication System
Door County, WI

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END OF SECTION
Towers for Public Safety Communication System  
Door County, WI

DOCUMENT 00 11 16

INVITATION TO BID

Project: Towers for Public Safety Communication System  
Door County, WI

Owner: Door County, Wisconsin  
421 Nebraska Street  
Sturgeon Bay, WI 54235  
Contact: Tim Ullman

Architect/Engineer: Edge Consulting Engineers, Inc.  
624 Water Street  
Prairie du Sac, WI 53578  
Contact: Arlen Ostreng, P.E.

Date: November 8, 2012

To Prospective Bidders:

Sealed bids for the construction of the Towers for Public Safety Communication System, will be received until 4:30 p.m. on December 11, 2012 at the Door County Information Services Office, 421 Nebraska St., Sturgeon Bay, WI 54235. Bids will be opened in public and considered at the Door County Information Systems Committee’s December 12, 2012, meeting, which starts at 1:00p.m. The meeting will be held in the Door County Government Center located at 421 Nebraska St., Sturgeon Bay, WI 54235.

In an effort to expedite project award, Electronic (pdf) copies of each submitted bid shall also be provided by each Bidder. Bidders shall submit the electronic copy no sooner than 3:00PM or later than 11:30PM on December 12, 2012. The electronic copy shall be emailed to gary@gjtherkelsen.com. Bidders who are unable to comply shall notify engineer prior to the bid date to make other arrangements.

Scope of Work:
The project scope generally consists of work at three (3) communication tower sites throughout Door County, WI. **Andres Pit Tower** consists of the construction of a new 180’ self-support tower, prefabricated precast equipment shelter, LP fueled backup generator system, chain link fenced compound and other general site improvements.  
**Mill Road Quarry Tower** consists of the construction of a new 180’ self-support tower, prefabricated precast equipment shelter, LP fueled backup generator system, chain-link fenced compound and other general site improvements. **Robert LaSalle Park Tower** consists of the construction of a 80’ monopole tower, installation of an outdoor equipment enclosure, chain link fenced compound and other general site improvements.

General:  
Issuance of the Invitation to Bid does not confer any rights to any prospective bidder and does not obligate Door County (hereafter "County") to enter in to a contract. Any costs associated with the preparation of a response to the invitation to bid shall be the sole responsibility of the bidder.
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The County will use discretion with regards to disclosure of proprietary information contained in any bid proposal, but cannot guarantee that information will not be made public. As a governmental entity, the County is subject to Wisconsin’s Public Record Law. Any confidential or proprietary information should be clearly marked as such.

All pertinent documentation must be included with the bid/proposal submitted. Failure to comply may result in the determination of a bid/proposal being nonresponsive and be cause for the bid/proposal to be rejected.

Once submitted, the bids/proposals and any supplementary documents become the property of Door County.

Bid Bond:
Each bid/proposal must be accompanied by a certified check, cashier's check or a bid bond equal to at least 5% of the bid, payable to Door County as a guaranty that if the bid/proposal is accepted the bidder will execute the contract and file a performance/payment bond and insurance as required within thirty (30) days after award of the contract by Door County. If an intended awardee so executes the agreement and files bonds and insurance as required, the check or bid bond will be returned. In case the intended awardee fails to execute the contract and/or file bonds and insurance as required by the contract documents, the amount of the check or bid bond submitted with the bid shall be forfeited as liquidated damages.

Qualifications of Bidders:
Bidder shall be licensed, certified, accredited, and/or meet all of the necessary qualifications to perform the work contemplated. Door County may make that investigation as it deems necessary to determine the ability of the bidder to perform the work. Door County reserves the right to reject any bid/proposal if the bidder fails to satisfy the County that the individual or entity is qualified to perform the work contemplated.

Door County may, in its sole discretion, require bidders to submit sworn statements as to financial ability, equipment and experience in the work prescribed and other matters that the County requires for the protection and welfare of the public in the performance of a public contract. Persons or entities offering bids/proposals are strongly encouraged to incorporate such information in to their bids/proposals.

Consideration/Award of Contract:
Door County reserves the right to reject or accept any or all bids/proposals, or parts thereof, and/or waive technical defects and informalities.

Door County will consider all elements entering into the question determining the qualifications and responsibility of the bidder. The award of this contract shall be to the lowest qualified and responsible bidder offering a compliant bid/proposal. A qualified and responsible bidder is one who is not only financially able, but who is possessed of the judgment, skill, ability, capacity and integrity requisite and necessary to perform a public contract according to its terms.

Door County may supplement or change specifications during this process. Notice of supplementation or change shall be given through the issuance of an addendum. Any addendum will be forwarded to all persons who have requested a bid/proposal packet or submitted a bid/proposal.

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Door County and/or its designee may choose to conduct interviews of qualified and responsible bidders. Further, qualified and responsible bidders may be required to make presentation[s] to Door County or its designee.

Door County reserves the right to negotiate deductive changes in the lowest qualified bid / proposal.

The contract, if awarded, shall be completed in accordance with the timeline outlined in the Bid Form. Substantial Completion of all work shall be on or before May 31, 2013.

Laws and Regulations:
The successful individual or entity must be cognizant of and shall scrupulously adhere to all applicable federal, state, and municipal laws, orders, ordinances, regulations and rules. This includes, but is not limited to, non-discrimination laws, equal employment obligations, affirmative action mandates, labor standards, and the Americans with Disabilities Act.

Bids / proposals, any award of contract, and work hereunder are subject to Sections 59.52(29), 66.0901, 779.14 and/or 779.15 Wisconsin Statutes. Persons and entities submitting bids / proposals must be aware of and comply with all applicable statutory requirements.

Only those projects of public works with total estimated costs of completion that equal or exceed the thresholds set forth in Sections 66.0903 Wisconsin Statutes require a prevailing wage rate determination. The total estimated cost of this project is greater than these thresholds. The prevailing wage rate determination is attached.

Bid Documents:
Copies of the contract documents, including plans, specifications, bidding instructions, proposals and plan holder’s list shall be obtained through the office of the Engineer, Edge Consulting Engineers, Inc. of Prairie du Sac, Wisconsin. Bidders shall request bid documents or express interest in the project through the online form on Edge Consulting’s web site: http://edgeconsult.com/bids/. Bidders shall note their interest to be included on the project Plan Holder’s list when completing the form. Only Plan Holder’s will be notified of Addendums. All addendums will posted on the web site.

Copies of the contract documents, including plans, specifications, bidding instructions, and proposals may also be viewed at the Door County Information Services Department, 421 Nebraska Street, Sturgeon Bay, WI 54235 between the hours of 8-4:30, Monday through Friday. Contact Tim Ullman at 920-746-2304 to view the documents. Distribution of documents will not be made at this location.

Pre-Bid Meeting:
No pre-bid meeting is scheduled for this project, as all sites are accessible to the public. Bidders are encouraged to visit each to review site conditions prior to submitting bids.

END OF DOCUMENT
These Instructions to Bidders modify, change delete from or add to the AIA Document A701-1997 - Instructions to Bidders and other provisions of Bidding Documents and Contract Documents. Where any Article of the AIA Instructions to Bidders is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these Supplementary Instructions to Bidders, the unaltered provisions of that Article, Paragraph, Subparagraph or clause shall remain in effect.

ARTICLE 1 – DEFINITION
Add the following Paragraphs:

1.10 “PROJECT as used in these documents shall mean:

TOWERS FOR PUBLIC SAFETY COMMUNICATION SYSTEM
DOOR COUNTY, WI

1.11 The term “OWNER” as used in these documents shall mean:

DOOR COUNTY, WISCONSIN
421 NEBRASKA STREET
STURGEON BAY, WI 54235

1.12 “ARCHITECT/ENGINEER” and “A/E” as used in these documents shall mean:

EDGE CONSULTING ENGINEERS, INC.
624 WATER STREET
PRAIRIE DU SAC, WI 53578

ARTICLE 2 – BIDDER’S REPRESENTATIONS: No changes.

ARTICLE 3 – BIDDING DOCUMENTS:

In Subparagraph 3.1.1, delete the sentences, “The deposit will be refunded to Bidders who submit a bona fide Bid and return the bidding documents in good condition within 10 days after receipt of bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder’s deposit will be refunded.”

Delete Subparagraph 3.1.2 in its entirety.

In Subparagraph 3.3.2, delete the first sentence and insert in its place, “No substitution will be considered unless: (1) Written request for approval has been submitted by the Bidder and has been received by the A/E at least 10 days prior to the date for receipt of bids, or (2) written request for approval has been submitted by the successful Bidder and approved in writing by the A/E on AIA Form G710, Architect’s Supplemental Instructions, prior to the installation of such substitutions.”

Revise Subparagraph 3.3.3 to read as follows:
3.3.3 If the A/E approves any proposed substitutions during the bidding period, such approval will be set forth in an addendum.

.1 Proposed substitutions must be described in detail and supported by substantiating specifications and other data. Identify proposed substitutions by reference to the specific Project Specification section and paragraph related to the substitution. Provide any additional information required by the A/E necessary to determine conformity to specified requirements.

.2 Under no circumstances will the A/E be required to prove that an item proposed for substitution is not equal to the specified item. The decision of A/E on all requests for substitutions is final.

.3 The A/E will reject any materials and workmanship, either before or after installation is complete, which is substituted and has not been approved by the A/E in writing.

.4 Bidders shall not rely upon approvals made in any other manner.”

Delete Subparagraph 3.4.2 in its entirety and replace with the following:

3.4.2 Copies of Addenda will be made available for inspection at the offices of the Owner and Engineer. Copies of the Addenda will be provided to all bidders who have requested to Engineer to be on the Plan Holders List.

ARTICLE 4 – BIDDING PROCEDURES:

In Subparagraph 4.1.4, add the following sentences: “All changes shall be made on the bid form. Alterations placed on the exterior of the bid envelope will not be considered.”

In Subparagraph 4.4.2, add the following sentence: “Modifications to the bid shall be made on the Bid Form only.”

ARTICLE 5 – CONSIDERATION OF BIDS:

Add the following Subparagraph:

5.3.3 The award of contract will be made on the basis of the lowest dollar amount submitted by qualified responsible bidders on SEPERATE BASE BIDS for each described portion of the work; including accepted Alternates, or total COMBINED BID for all work including accepted Alternates, whichever is determined to be in the best interested of the Owner.

ARTICLE 6 – POST BID INFORMATION: - No Changes.

ARTICLE 7 – PERFORMANCE BOND AND PAYMENT BOND:

7.1.2 The Contractor shall furnish bonds as described below, covering the faithful performance of the Contract and the payments of all obligations arising thereunder. The bonds specified under the Article shall be issued by a bonding company licensed to do business in the state where the
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construction will take place.

7.1.3 Furnish both AIA A312 Performance bond and AIA A312 Payment Bond, each in the amount of 100% of the contract price.

After 7.1.3 add the following Subparagraphs:

7.1.4 Bond amounts shall not exceed the single bond limit for the Contractor’s bonding company as set forth in the Federal Register current as of the date.

7.1.5 The bonds shall be written with such sureties secured through the Contractor’s usual sources as may be agreeable to the parties. In addition, the sureties shall be authorized to conduct surety business in the state in which the Project is located and the sureties and any reinsuring companies shall be listed in the current Department of the Treasury circular No. 570 with an underwriting limitation equal to or greater than the penal sum of the bonds to be furnished.

7.1.6 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the attorney-in-fact’s power of attorney.

7.1.7 The Contractor shall submit the bond in triplicate to the Owner not later than 10 days after Notice of Award.

Delete Subparagraph 7.2.1 in its entirety and replace with the following:

7.2.1 The Bidder shall deliver the required bonds to the Owner not later than 10 days following the date of Notice of Award.

Delete Subparagraph 7.2.3 in its entirety and replace with the following:

7.2.3 The bonds shall be dated on or before the date of the Contract.

ARTICLE 8 – FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR: No changes.
Instructions to Bidders

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 DEFINITIONS
§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS
§ 2.1 The Bidder by making a Bid represents that:
§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder’s personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS
§ 3.1 COPIES
§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

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§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS
§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS
§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect’s decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA
§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.
ARTICLE 4  BIDDING PROCEDURES
§ 4.1 PREPARATION OF BIDS
§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter “No Change.”

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder’s refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent’s authority to bind the Bidder.

§ 4.2 BID SECURITY
§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS
§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder’s name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation “SEALED BID ENCLOSED” on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID
§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.
§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS
§ 5.1 OPENING OF BIDS
At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS
The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)
§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner’s judgment, is in the Owner’s own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION
§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT
Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor’s Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER’S FINANCIAL CAPABILITY
The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner’s obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS
§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

.1 a designation of the Work to be performed with the Bidder’s own forces;
.2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.
§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND
§ 7.1 BOND REQUIREMENTS
§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS
§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.
DOCUMENT 00 31 00

INFORMATION AVAILABLE TO BIDDERS

1.1 GENERAL

A. The following documents contain information about existing conditions, which are pertinent to the Work of this Project and are available for the general information of Bidders. The availability of such information shall not relieve any Bidder from responsibility to visit the Project Site, to become familiar with the local conditions under which the Work is to be performed and to correlate the Bidder’s observations with the requirements of the Bidding Documents.

1.2 SUMMARY

A. Document Includes:
   1. Geotechnical Investigation Reports.

B. Related Documents:
   1. Document 00 21 13 – Supplementary Instructions to Bidders.

1.3 GEOTECHNICAL INVESTIGATION REPORTS

A. A copy of the Geotechnical Report, Andres Pit Tower, Edge Project #7187 as prepared by Edge Consulting Engineers, Inc. is for Contractor’s reference. The Architect/Engineer does not certify its completeness or accuracy. The Contractor may do additional testing and evaluation to verify subsurface conditions. A copy of the report is bound separately from this Project Manual.

B. A copy of the Geotechnical Report, Mill Road Quarry Tower, Edge Project #7188 as prepared by Edge Consulting Engineers, Inc. is for Contractor’s reference. The Architect/Engineer does not certify its completeness or accuracy. The Contractor may do additional testing and evaluation to verify subsurface conditions. A copy of the report is bound separately from this Project Manual.

C. A copy of the Geotechnical Report, LaSalle Park Tower, Edge Project #7189 as prepared by Edge Consulting Engineers, Inc. is for Contractor’s reference. The Architect/Engineer does not certify its completeness or accuracy. The Contractor may do additional testing and evaluation to verify subsurface conditions. A copy of the report is bound separately from this Project Manual.

END OF DOCUMENT
1. BASE BIDS

Having examined the site(s) where the Work is to be executed and become familiar with local conditions affecting the cost of Work and carefully examined the Project Manual, the Project Drawings, all other Bidding Documents, Addenda and all matters referred to in the Instructions to Bidders thereto prepared by Edge Consulting Engineers, Inc. for the above mentioned project, we, the undersigned, hereby agree to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of All Work for the individual Base Bid stipulated sums or the Combined Base Bid stipulated sums as listed below:
Towers for Public Safety Communication System
Door County, WI

Base Bid 0: Andres Pit Tower Site

____________________________________________________Dollars ($___________________)

Base Bid 1: Mill Road Quarry Tower Site

____________________________________________________Dollars ($___________________)

Base Bid 2: Robert LaSalle Park Tower Site

____________________________________________________Dollars ($___________________)

Base Bid 3: Combined Base Bid 0 & 1 (Includes Base Bids (0 & 1)

____________________________________________________Dollars ($___________________)

Base Bid 4: Combined Base Bid 0, 1 & 2 (Includes Base Bids (0, 1 & 2)

____________________________________________________Dollars ($___________________)

We have included, the required Bid Bond as required by the Instruction to Bidders.

All applicable Federal, State of Wisconsin and local taxes are included are included in the Bid Sums.

We have included payment of and payroll tracking of applicable Wage Rates as outlined in the Wage Rate Determination for this project.
2. ALTERNATE BIDS

The undersigned further agrees to perform the alternative portions of the work as described in the Project Manual Section 01 23 00 Alternates, for the following additions to or deductions from the Base Bid sums stipulated above:

**Alternate Bid 0A: Install drywell at the Andres Pit Tower Site.**

(Add)___________________________________________  Dollars ($___________________.00)

**Alternate Bid 0B: Remove Kewaunee County Antenna & Line Installation from the Andres Pit Tower Site.**

(Deduct)_________________________________________  Dollars ($___________________.00)

**Alternate Bid 1A: Install drywell at the Mill Road Quarry Tower Site.**

(Add)___________________________________________  Dollars ($___________________.00)

**Alternate Bid 2A: Install drywell at the Robert LaSalle Park Tower Site.**

(Add)___________________________________________  Dollars ($___________________.00)

3. ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.

If this bid is accepted by the Owner within the time period stated above, we will:

- Execute the Agreement within ten days of receipt of acceptance of this bid.

- Furnish the required bonds within ten days of receipt of acceptance of this bid in the form described in Supplementary Conditions.

- Commence work within the time frame outlined for project completion.
Towers for Public Safety Communication System  
Door County, WI

If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required bonds, the bid security shall be forfeited as damages to the Owner by reason of our failure.

In the event our bid is not accepted within the time stated above, the required bid security will be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

4. CONTRACT TIME

If this Bid is accepted, we will:

- Commence Work on or before the **January 1, 2013**.
- Complete Tower & Equipment Shelter Foundations on or before the **March 1, 2013**.
- Substantially complete all work on or before the **May 31, 2013**.
- Fully Complete (Final Completion) all work on or before the **June 21, 2013**.

We understand that Liquidated Damages as described in the Supplementary Conditions will apply for not fully completing all Work by **June 21, 2013**.

5. ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.

Addendum No._____________________ Dated:____________________________

Addendum No._____________________ Dated:____________________________

Addendum No._____________________ Dated:____________________________
6. SUBCONTRACTORS/SUPPLIERS

If awarded this Contract, the Bidder declares the intent to employ the following Subcontractors/Suppliers as listed below:

<table>
<thead>
<tr>
<th>SUBCONTRACTOR/SUPPLIER NAME</th>
<th>CLASS OF WORK/MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Equipment Shelter Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Communication Equipment Enclosure Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Tower &amp; Shelter Foundations</td>
<td></td>
</tr>
<tr>
<td>Generator Supplier</td>
<td></td>
</tr>
<tr>
<td>Tower Erection</td>
<td></td>
</tr>
<tr>
<td>Electrical/Grounding</td>
<td></td>
</tr>
<tr>
<td>Site / Civil</td>
<td></td>
</tr>
<tr>
<td>Fencing</td>
<td></td>
</tr>
</tbody>
</table>

7. BID FORM SIGNATURES

The Corporate Seal of:

Name of Firm: _________________________________________________________________

Address: _________________________________________________________________ (Street, City, County, State, Zip)

Telephone: _________________________       Fax: ________________________

Signature: _______________________________________________________

(Authorized signing officer    Title)

If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF DOCUMENT
1.1 SUMMARY

A. Document Includes:
   1. Agreement.

B. Related Documents:
   1. Document 00 72 00 - General Conditions - AIA.
   2. Document 00 73 00 - Supplementary Conditions - AIA.

1.2 AGREEMENT

A. AIA Document A101-2007, Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum, forms the basis of Agreement between the Owner and Contractor.

B. The Agreement form will be provided by the Owner and shall be reviewed and completed by the successful Bidder and submitted to the Owner at the Owner’s direction following notification.

1.3 The following modifications, changes, deletions or additions will be incorporated into the “AIA Document A101-2007, Standard Form of Agreement between Owner and Contractor Where the Basis of Payment is a Stipulated Sum”.

ARTICLE 3 – DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

A. Dates will be as listed in the Bid Form.

ARTICLE 5 – PAYMENTS

B. The period covered by each Application for Payment shall be a minimum of one calendar month. Payments will be made by Owner within 65 calendar days of Application for Payment submittal.

C. Retainage in the amount of ten percent (10%) shall be held on each Application for Payment. Retainage will be held until Final Completion of the project. No reduction in retainage will be made over the course of the project.

ARTICLE 6 – DISPUTE RESOLUTION

D. For any Claim subject to, but not resolved by the initial decision maker pursuant to Section 15.2 of AIA Document A201-2007 the method of binding dispute resolution shall be by litigation in a court of competent jurisdiction.

END OF DOCUMENT
Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _______ day of _______ in the year _______.
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.
TABLE OF ARTICLES

1  THE CONTRACT DOCUMENTS
2  THE WORK OF THIS CONTRACT
3  DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4  CONTRACT SUM
5  PAYMENTS
6  DISPUTE RESOLUTION
7  TERMINATION OR SUSPENSION
8  MISCELLANEOUS PROVISIONS
9  ENUMERATION OF CONTRACT DOCUMENTS
10 INSURANCE AND BONDS

ARTICLE 1. THE CONTRACT DOCUMENTS
The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT
The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner’s time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement.
§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

<table>
<thead>
<tr>
<th>Portion of the Work</th>
<th>Substantial Completion Date</th>
</tr>
</thead>
</table>

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

ARTICLE 4  CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be Dollars ($ ), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Units and Limitations</th>
<th>Price per Unit ($0.00)</th>
</tr>
</thead>
</table>

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Price ($0.00)</th>
</tr>
</thead>
</table>

ARTICLE 5  PAYMENTS
§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent ( %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent ( %);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and

(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.
§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 3.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

§ 5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT
§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when
.1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION
§ 6.1 INITIAL DECISION MAKER
The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker. (If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 BINDING DISPUTE RESOLUTION
For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows: (Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2007

☐ Litigation in a court of competent jurisdiction

☐ Other: (Specify)
ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

§ 8.3 The Owner’s representative:

(Name, address and other information)

§ 8.4 The Contractor’s representative:

(Name, address and other information)

§ 8.5 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

<table>
<thead>
<tr>
<th>Document</th>
<th>Title</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
</table>

Init. /
§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
</table>

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
</table>

§ 9.1.6 The Addenda, if any:

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
</tr>
</thead>
</table>

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

1. AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

2. Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor’s bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

ARTICLE 10 INSURANCE AND BONDS
The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

<table>
<thead>
<tr>
<th>Type of Insurance or Bond</th>
<th>Limit of Liability or Bond Amount ($0.00)</th>
</tr>
</thead>
</table>
This Agreement entered into as of the day and year first written above.

OWNER (Signature)  CONTRACTOR (Signature)

(Printed name and title)  (Printed name and title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.
DOCUMENT 00 72 00

GENERAL CONDITIONS - AIA

1.1 SUMMARY

A. Document Includes:
   1. General Conditions.

B. Related Documents:
   1. Document 00 50 00 - Agreement - AIA.
   2. Document 00 73 00 - Supplementary Conditions - AIA.

1.2 GENERAL CONDITIONS


1.3 SUPPLEMENTARY CONDITIONS

A. Refer to Document 00 73 00 for modifications to General Conditions.

END OF DOCUMENT
1.1 SUMMARY

A. Document Includes:
   1. Supplementary Conditions.

B. Related Documents:
   1. Document 00 41 13 - Bid Form.
   2. Document 00 50 00 - Agreement - AIA.
   3. Document 00 72 00 - General Conditions - AIA.

1.2 SUPPLEMENTARY CONDITIONS

A. These Supplementary Conditions modify the General Conditions of the Contract for Construction, AIA Document A201-2007, and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.

B. The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, AIA Document A201-2007, have the meanings assigned to them in the General Conditions.

ARTICLE 1.1 - BASIC DEFINITIONS

Add the following subparagraphs:

| 1.1.9 | Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse. |
| 1.1.10 | Furnish: To supply and deliver, unload, inspect for damage. |
| 1.1.11 | Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, and make ready for use. |
| 1.1.12 | Provide: To furnish and install. |

ARTICLE 1.2 - CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following subparagraph:

| 1.2.4 | Sections of Division 01 - General Requirements govern the execution of the work of all sections of the specifications. |
ARTICLE 3.4 – LABOR AND MATERIALS

Add the following subparagraph:

3.5.1 Pursuant to s.103.49 Wisconsin Statutes, prevailing wage rates apply to this project. The prevailing wage rates and list of debarred contractors for this project follow these Supplementary Conditions.

ARTICLE 3.5 – WARRANTY

Add the following subparagraph:

3.5.1 Contractor shall provide a minimum overall one year warranty for all work performed and materials supplied under this contract from the date of final completion. Longer term warranties shall apply for individual items of the project as set forth in the specifications.

ARTICLE 8 - TIME

Add the following subparagraph:

8.1.5 Contract Time is identified in the Agreement.

ARTICLE 9 - PAYMENTS AND COMPLETION

Add the following paragraphs:

<table>
<thead>
<tr>
<th>9.11</th>
<th>Liquidated Damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.11.1</td>
<td>Liquidated damages in the amount of $1000 per calendar day per site shall accrue to the Owner for late completion of the Work after the Final Completion Date.</td>
</tr>
</tbody>
</table>

ARTICLE 11.1 - CONTRACTOR’S LIABILITY INSURANCE

The Contractor and any and all Sub-Contractors shall carry at minimum limits of liability insurance coverage amounts as listed below, or greater where required by State and/or Federal Laws and Regulations:

A. Workers Compensation and Employer’s liability with limits in compliance with the applicable provisions of the laws of the State of Wisconsin.

B. Comprehensive Motor Vehicle Liability with limits for vehicles owned, non-owned, or rented not less than: one hundred thousand dollars [$100,000.00] bodily injury per person.
and three hundred thousand dollars [$300,000.00] bodily injury per occurrence; and fifty thousand dollars [$50,000.00] property damage per occurrence. All employees shall be included as insured.

C. Comprehensive General Liability with coverage written on an “occurrence” basis and with limits no less than one million dollars [$1,000,000.00] and compulsory coverages including bodily injury liability and property damage liability. Such coverage shall include blanket contractual liability (i.e., must expressly cover this project and the indemnity provisions of this Contract).

D. Contemporaneous with Contractor’s execution of this contract, Contractor shall provide certificates and policies of insurance to the County evidencing the minimum insurance coverage and limits set forth above. Such policies shall be in a form, and from companies, acceptable to County. Such insurance shall provide that no change, modification in, or cancellation of any insurance shall become effective until the expiration of thirty (30) days after written notice thereof shall have been given by the insurance company to the County. Contractor shall, at all times while providing, performing, or completing the work maintain and keep in force, at Contractor’s expense, the minimum insurance coverage and limits set forth in this contract. County shall be an additional named insured (insured for the additional named insured’s conduct to the same extent as if the additional named insured was the policy holder) and an additional insured (insured for the additional insured’s liability that arises from the conduct of the policy holder and is not insured for liability that arises from the conduct of the additional insured).

ARTICLE 11.3 – PROPERTY INSURANCE

Delete subparagraph 11.3.1.1 and replace with the following:

| 11.3.1.1 | Property insurance shall be on an “all-risk” or equivalent policy from and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, windstorm, falsework, testing and startup and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss. |

ARTICLE 11.5 - PERFORMANCE BOND AND PAYMENT BOND

Add the following subparagraphs:

| 11.5.3 | The Contractor shall furnish bonds to the Owner in the following amounts: |
| 11.5.3.1 | Furnish a 100 percent Performance Bond on AIA Document A312 bond form. |
| 11.5.3.2 | Furnish a 100 percent Payment Bond on AIA Document A312 bond form. |

ARTICLE 13.1 – GOVERNING LAW
Add subparagraph 13.1.1 as follows:

| 13.1.1 | The Contractor must be cognizant of and shall scrupulously adhere to all applicable federal, state, and municipal laws, orders, ordinances, regulations and rules. This includes, but is not limited to, non-discrimination laws, equal employment obligations, affirmative action mandates, labor standards, and the Americans with Disabilities Act. |

ARTICLE 13.7 – TIME LIMITS ON CLAIMS

Delete subparagraph 13.7 and replace with the following:

| 13.7 | The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law. |

ARTICLE 15.2 – INITIAL DECISION

In subparagraph 15.2.5 – Delete references to mediation.

Delete subparagraph 15.2.6 and 15.2.6.1 in their entirety.

ARTICLE 15.3 – MEDIATION

Delete the entire article including all subparagraphs.

ARTICLE 15.4 – ARBITRATION

Delete the entire article including all subparagraphs.

END OF DOCUMENT
The department received an application for prevailing wage rate determination for the above-captioned project. The department conducted a survey to determine the prevailing wage rate for the trade(s) or occupation(s) needed to complete the project. The survey’s findings appear in the attached project determination.

If you believe that the wage rate for any trade or occupation does not accurately reflect the prevailing wage rate in the city, village or town where the project is located, you may ask the department to conduct an administrative review of such wage rate. You must submit this request in writing within 30 days from the date indicated above. Additionally, your request must include wage rate information from at least three similar projects in the city, village or town where the proposed project is located and on which some work has been performed by the contested trade(s) during the current survey period and was previously considered by the department in issuing the attached determination. See DWD 290.10 of the Wisconsin Administrative Code and either s. 66.0903(3)(br), s. 66.0904(4)(e), or s. 103.49(3)(c), Stats., for a complete explanation of the administrative review process.

Enclosures

It is hereby ordered that the prevailing wage rates set forth in the attached project determination shall only be applicable to the above referenced project. This order is a FINAL ORDER of the department unless a timely request for an administrative review is filed with the department.

ISSUED BY:

Equal Rights Division
Labor Standards Bureau
Construction Wage Standards Section
PO Box 8928 Madison, WI 53708-8928
(608)266-6861

Web Site: http://dwd.wisconsin.gov/er/
**PREVAILING WAGE RATE DETERMINATION**

Issued by the State of Wisconsin

Department of Workforce Development

Pursuant to s. 66.0903, Wis. Stats.

Issued On: 11/6/2012

<table>
<thead>
<tr>
<th>DETERMINATION NUMBER:</th>
<th>201202485</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPIRATION DATE:</td>
<td>Prime Contracts MUST Be Awarded or Negotiated On Or Before 5/5/2013. If NOT, You MUST Reapply.</td>
</tr>
<tr>
<td>PROJECT NAME:</td>
<td>TOWERS FOR PUBLIC SAFETY COMMUNICATION SYSTEM - DOOR COUNTY</td>
</tr>
<tr>
<td>PROJECT LOCATION:</td>
<td>UNION TOWN, DOOR COUNTY, WI</td>
</tr>
<tr>
<td>CONTRACTING AGENCY:</td>
<td>DOOR COUNTY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASSIFICATION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors are responsible for correctly classifying their workers. Either call the Department of Workforce Development (DWD) with trade or classification questions or consult DWD’s Dictionary of Occupational Classifications &amp; Work Descriptions on the DWD website at: dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm.</td>
</tr>
</tbody>
</table>

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<tr>
<th>OVERTIME:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time and one-half must be paid for all hours worked:</td>
</tr>
<tr>
<td>- over 10 hours per day on prevailing wage projects</td>
</tr>
<tr>
<td>- over 40 hours per calendar week</td>
</tr>
<tr>
<td>- Saturday and Sunday</td>
</tr>
<tr>
<td>- on all of the following holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25;</td>
</tr>
<tr>
<td>- The day before if January 1, July 4 or December 25 falls on a Saturday;</td>
</tr>
<tr>
<td>- The day following if January 1, July 4 or December 25 falls on a Sunday.</td>
</tr>
<tr>
<td>Apply the time and one-half overtime calculation to whichever is higher between the Hourly Basic Rate listed on this project determination or the employee’s regular hourly rate of pay. Add any applicable Premium or DOT Premium to the Hourly Basic Rate before calculating overtime.</td>
</tr>
<tr>
<td>A DOT Premium (discussed below) may supersede this time and one-half requirement.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FUTURE INCREASE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>When a specific trade or occupation requires a future increase, you MUST add the full hourly increase to the &quot;TOTAL&quot; on the effective date(s) indicated for the specific trade or occupation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PREMIUM PAY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the &quot;HOURLY BASIC RATE OF PAY&quot; indicated for such trade or occupation, wheenever such pay is applicable.</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>DOT PREMIUM:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This premium only applies to highway and bridge projects owned by the Wisconsin Department of Transportation and to the project type heading &quot;Airport Pavement or State Highway Construction.&quot; DO NOT apply the premium calculation under any other project type on this determination.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPRENTICES:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay apprentices a percentage of the applicable journeyperson's hourly basic rate of pay and hourly fringe benefit contributions specified in this determination. Obtain the appropriate percentage from each apprentice’s contract or indenture.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJOURNEY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjourney wage rates may be available for some of the trades or occupations indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer interested in using a subjourney classification on this project MUST complete Form ERD-10880 and request the applicable wage rate from the Department of Workforce Development PRIOR to using the subjourney worker on this project.</td>
</tr>
</tbody>
</table>
This document MUST BE POSTED by the CONTRACTING AGENCY in at least one conspicuous and easily accessible place on the site of the project. A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document MUST remain posted during the entire time any worker is employed on the project and MUST be physically incorporated into the specifications and all contracts and subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-6861.

The following statutory provisions apply to local governmental unit projects of public works and are set forth below pursuant to the requirements of s. 66.0903(8), Stats.

s. 66.0903 (10) RECORDS; INSPECTION; ENFORCEMENT.
(a) Each contractor, subcontractor, or contractor's or subcontractor's agent performing work on a project of public works that is subject to this section shall keep full and accurate records clearly indicating the name and trade or occupation of every person performing the work described in sub. (4) and an accurate record of the number of hours worked by each of those persons and the actual wages paid for the hours worked.

s. 66.0903 (11) LIABILITY AND PENALTIES.
(a) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided under subd. 2., 3., whichever is applicable.

2. If the department determines upon inspection under sub. (10) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages as provided in the order.

3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.

5. No employee may be a party plaintiff to an action under subd. 3. unless the employee consents in writing to become a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.
Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

### SKILLED TRADES

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Acoustic Ceiling Tile Installer</td>
<td>29.06</td>
<td>15.16</td>
<td>44.22</td>
</tr>
<tr>
<td>102</td>
<td>Boilermaker</td>
<td>35.31</td>
<td>20.03</td>
<td>55.34</td>
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<tr>
<td>103</td>
<td>Bricklayer, Blocklayer or Stonemason</td>
<td>30.76</td>
<td>16.42</td>
<td>47.18</td>
</tr>
<tr>
<td></td>
<td>Future Increase(s): Add $.50/hr on 6/1/2012; Add $.80 on 6/1/2013</td>
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<td>104</td>
<td>Cabinet Installer</td>
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<td>44.22</td>
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<td>Carpenter</td>
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<td>15.16</td>
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<td>106</td>
<td>Carpet Layer or Soft Floor Coverer</td>
<td>29.06</td>
<td>15.16</td>
<td>44.22</td>
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<tr>
<td>107</td>
<td>Cement Finisher</td>
<td>30.76</td>
<td>16.42</td>
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<td></td>
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<td>Drywall Taper or Finisher</td>
<td>20.00</td>
<td>6.75</td>
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<td>Electrician</td>
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<td>16.99</td>
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<td>25.48</td>
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<td>Fence Erector</td>
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<td>Fire Sprinkler Fitter</td>
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<td>Glazier</td>
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<td>Heat or Frost Insulator</td>
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<td>115</td>
<td>Insulator (Batt or Blown)</td>
<td>23.62</td>
<td>11.55</td>
<td>35.17</td>
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<td>116</td>
<td>Ironworker</td>
<td>27.48</td>
<td>21.54</td>
<td>49.02</td>
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Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<td>44.22</td>
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<td>Line Constructor (Electrical)</td>
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<td>18.08</td>
<td>54.05</td>
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<td>16.02</td>
<td>47.18</td>
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<tr>
<td>120</td>
<td>Marble Mason</td>
<td>31.16</td>
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<tr>
<td>121</td>
<td>Metal Building Erector</td>
<td>20.47</td>
<td>2.99</td>
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<td>122</td>
<td>Millwright</td>
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<td>123</td>
<td>Overhead Door Installer</td>
<td>18.00</td>
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<td>22.86</td>
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<td>124</td>
<td>Painter</td>
<td>21.00</td>
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<tr>
<td>125</td>
<td>Pavement Marking Operator</td>
<td>26.00</td>
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<tr>
<td>126</td>
<td>Piledriver</td>
<td>29.56</td>
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<td>127</td>
<td>Pipeline Fuser or Welder (Gas or Utility)</td>
<td>30.52</td>
<td>18.84</td>
<td>49.36</td>
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<tr>
<td>129</td>
<td>Plasterer</td>
<td>30.76</td>
<td>16.42</td>
<td>47.18</td>
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<tr>
<td></td>
<td>Future Increase(s): Add $.50/hr on 6/1/2012; Add $.80 on 6/1/2013</td>
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<tr>
<td>130</td>
<td>Plumber</td>
<td>32.01</td>
<td>15.93</td>
<td>47.94</td>
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<td></td>
<td>Future Increase(s): Add $.75/hr on 6/4/2012; Add $.85/hr on 6/03/2013</td>
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<tr>
<td>132</td>
<td>Refrigeration Mechanic</td>
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<td>15.93</td>
<td>47.94</td>
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<tr>
<td></td>
<td>Future Increase(s): Add $.75/hr on 6/4/2012; Add $.85/hr on 6/4/2013</td>
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<tr>
<td>133</td>
<td>Roofer or Waterproofer</td>
<td>20.00</td>
<td>3.65</td>
<td>23.65</td>
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<tr>
<td>134</td>
<td>Sheet Metal Worker</td>
<td>29.24</td>
<td>19.81</td>
<td>49.05</td>
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<td>Future Increase(s): Add $.50/hr on 6/1/2012; Add $.60/hr on 6/1/2013.</td>
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<tr>
<td>135</td>
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<td>32.01</td>
<td>15.93</td>
<td>47.94</td>
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<td>Future Increase(s): Add $.75/hr on 6/4/2012; Add $.85 on 6/3/2013</td>
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<tr>
<td>137</td>
<td>Teledata Technician or Installer</td>
<td>21.26</td>
<td>11.75</td>
<td>33.01</td>
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<tr>
<td>138</td>
<td>Temperature Control Installer</td>
<td>31.65</td>
<td>15.04</td>
<td>46.69</td>
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<tr>
<td>139</td>
<td>Terrazzo Finisher</td>
<td>18.00</td>
<td>5.35</td>
<td>23.35</td>
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<tr>
<td>140</td>
<td>Terrazzo Mechanic</td>
<td>30.76</td>
<td>16.42</td>
<td>47.18</td>
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<tr>
<td></td>
<td>Future Increase(s): Add $.50/hr on 6/1/2012; Add $.80 on 6/1/2013</td>
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<tr>
<td>141</td>
<td>Tile Finisher</td>
<td>24.09</td>
<td>15.09</td>
<td>39.18</td>
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</table>
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>Code</th>
<th>Trade or Occupation</th>
<th>Hourly Basic Rate of Pay</th>
<th>Hourly Fringe Benefits</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>142</td>
<td>Tile Setter</td>
<td>30.76</td>
<td>16.42</td>
<td>47.18</td>
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<tr>
<td>143</td>
<td>Tuckpointer, Caulker or Cleaner</td>
<td>31.16</td>
<td>10.90</td>
<td>42.06</td>
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<tr>
<td>144</td>
<td>Underwater Diver (Except on Great Lakes)</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
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<tr>
<td>146</td>
<td>Well Driller or Pump Installer</td>
<td>25.32</td>
<td>15.30</td>
<td>40.62</td>
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<tr>
<td>147</td>
<td>Siding Installer</td>
<td>36.00</td>
<td>16.37</td>
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<tr>
<td>150</td>
<td>Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>27.42</td>
<td>15.10</td>
<td>42.52</td>
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<td>151</td>
<td>Light Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>28.78</td>
<td>15.16</td>
<td>43.94</td>
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<tr>
<td>152</td>
<td>Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>17.80</td>
<td>9.00</td>
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<tr>
<td>153</td>
<td>Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>23.38</td>
<td>12.48</td>
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<tr>
<td>154</td>
<td>Groundman - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>21.30</td>
<td>10.97</td>
<td>32.27</td>
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### TRUCK DRIVERS

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<th>Code</th>
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<th>Hourly Fringe Benefits</th>
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<tbody>
<tr>
<td>201</td>
<td>Single Axle or Two Axle</td>
<td>32.32</td>
<td>10.76</td>
<td>43.08</td>
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<tr>
<td>203</td>
<td>Three or More Axle</td>
<td>23.50</td>
<td>4.28</td>
<td>27.78</td>
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<tr>
<td>204</td>
<td>Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>31.89</td>
<td>17.98</td>
<td>49.87</td>
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<tr>
<td>205</td>
<td>Pavement Marking Vehicle</td>
<td>19.25</td>
<td>10.84</td>
<td>30.09</td>
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<tr>
<td>207</td>
<td>Truck Mechanic</td>
<td>23.50</td>
<td>4.28</td>
<td>27.78</td>
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### LABORERS

<table>
<thead>
<tr>
<th>Code</th>
<th>Trade or Occupation</th>
<th>Hourly Basic Rate of Pay</th>
<th>Hourly Fringe Benefits</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>301</td>
<td>General Laborer Future Increase(s): Add $.50/hr. on 06/04/2012; Add $.75/hr. on 06/03/2013 Premium Increase(s): Add $1.00/hr for certified welder and pipelayer; Add $.25/hr for mason tender</td>
<td>23.41</td>
<td>13.43</td>
<td>36.84</td>
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<tr>
<td>302</td>
<td>Asbestos Abatement Worker</td>
<td>15.00</td>
<td>0.71</td>
<td>15.71</td>
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<tr>
<td>303</td>
<td>Landscaper</td>
<td>21.00</td>
<td>0.82</td>
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### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
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<th>CODE</th>
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<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>310</td>
<td>Gas or Utility Pipeline Laborer (Other Than Sewer and Water)</td>
<td>19.29</td>
<td>12.20</td>
<td>31.49</td>
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<tr>
<td>311</td>
<td>Fiber Optic Laborer (Outside, Other Than Concrete Encased)</td>
<td>17.09</td>
<td>8.72</td>
<td>25.81</td>
</tr>
<tr>
<td>314</td>
<td>Railroad Track Laborer</td>
<td>23.96</td>
<td>12.88</td>
<td>36.84</td>
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### HEAVY EQUIPMENT OPERATORS

SITE PREPARATION, UTILITY OR LANDSCAPING WORK ONLY

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>501</td>
<td>Air Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfgr's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width &amp; Over, or Tractor Mounted, Towed &amp; Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Crane, Shovel, Dragline, Clamshells; Forklift (Machinery Moving or Steel Erection, 25 Ft &amp; Over); Gradall (Cruz-Aire Type); Grader or Motor Patrol; Master Mechanic; Mechanic or Welder; Robotic Tool Carrier (With or Without Attachments); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor (Scraper, Dozer, Pusher, Loader); Trencher (Wheel Type or Chain Type Having Over 8 Inch Bucket).</td>
<td>32.42</td>
<td>17.93</td>
<td>50.35</td>
</tr>
<tr>
<td>502</td>
<td>Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Environmental Burner; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Jeep Digger; Screed (Milling Machine); Skid Rig; Straddle Carrier or Travel Lift; Stump Chipper; Trencher (Wheel Type or Chain Type Having 8 Inch Bucket &amp; Under). Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>31.89</td>
<td>17.98</td>
<td>49.87</td>
</tr>
<tr>
<td>503</td>
<td>Air Compressor (&amp;/or 400 CFM or Over); Augers (Vertical &amp; Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width &amp; Under, or Tractor Mounted, Towed &amp; Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&amp;/or 150 KW or Over); Greaser; High Pressure Utility Locating Machine (Daylighting Machine); Mulcher; Oiler; Post Hole Digger or Driver; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>31.89</td>
<td>17.98</td>
<td>49.87</td>
</tr>
<tr>
<td>504</td>
<td>Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
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</tbody>
</table>
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
</table>
| 505  | Work Performed on the Great Lakes Including Crane or Backhoe Operator; Assistant Hydraulic Dredge Engineer; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder; 70 Ton & Over Tug Operator.  
   Premium Increase(s):  
   Add $.50/hr for friction crane, lattice boom or crane certification (CCO). | 37.45 | 19.45 | 56.90 |
| 506  | Work Performed on the Great Lakes Including Deck Equipment Operator or Machinerman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery. | 26.80 | 18.52 | 45.32 |
| 507  | Work Performed on the Great Lakes Including Deck Equipment Operator, Machinerman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY. | 27.75 | 19.15 | 46.90 |

### HEAVY EQUIPMENT OPERATORS

EXCLUDING SITE PREPARATION, UTILITY, PAVING LANDSCAPING WORK

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
</table>
| 508  | Boring Machine (Directional); Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.  
   Future Increase(s):  
   Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.  
   Premium Increase(s):  
   Add $.50/hr at 200 ton; Add $1.00/hr. at 300 ton; Add $1.50/hr at 400 ton; Add $2.00/hr at 500 ton. | 34.62 | 17.98 | 52.60 |
| 509  | Backhoe (Track Type) Having a Mgr's Rated Capacity of 130,000 Lbs. or Over; Boring Machine (Horizontal or Vertical); Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Pile Driver; Versi Lifts, Tri-Lifts & Gantrys (20,000 Lbs. & Over).  
   Future Increase(s):  
   Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.  
   Premium Increase(s):  
   Add $.25/hr for cranes with lifting capacity of 45 ton or over. | 33.62 | 17.98 | 51.60 |
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tr>
<td>510</td>
<td>Backhoe (Track Type) Having a Mfgr.’s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb &amp; Gutter Machine; Concrete Spreader &amp; Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft &amp; Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type). Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>32.42</td>
<td>17.98</td>
<td>50.40</td>
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<tr>
<td>511</td>
<td>Air, Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width &amp; Over, or Tractor Mounted, Towed &amp; Light Equipment); Concrete Pump (46 Meter &amp; Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantry (Under 20,000 Lbs.); Grader or Motor Patrol; High Pressure Utility Locating Machine (Daylighting Machine); Manhoist; Material or Stack Hoist; Mechanic or Welder; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tining or Curing Machine; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>31.89</td>
<td>17.98</td>
<td>49.87</td>
</tr>
<tr>
<td>512</td>
<td>Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width &amp; Under, or Tractor Mounted, Towed &amp; Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Fireman (Pile Driver &amp; Derrick NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket &amp; Under); Winches &amp; A-Frames.</td>
<td>37.47</td>
<td>19.10</td>
<td>56.57</td>
</tr>
<tr>
<td>513</td>
<td>Air Compressor (&amp;/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical &amp; Horizontal); Boatmen (NOT Performing Work on the Great Lakes); Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Elevator; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket &amp; Under); Winches &amp; A-Frames. Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>29.19</td>
<td>17.98</td>
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<td>CODE</td>
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<td>HOURLY BASIC RATE OF PAY</td>
<td>HOURLY FRINGE BENEFITS</td>
<td>TOTAL</td>
</tr>
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<td>------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td>------------------------</td>
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<tr>
<td>514</td>
<td>Gas or Utility Pipeline, Except Sewer &amp; Water (Primary Equipment). Add $2/hr. on 1/1/2013.</td>
<td>34.89</td>
<td>19.68</td>
<td>54.57</td>
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<tr>
<td>515</td>
<td>Gas or Utility Pipeline, Except Sewer &amp; Water (Secondary Equipment).</td>
<td>30.32</td>
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<td>516</td>
<td>Fiber Optic Cable Equipment</td>
<td>24.39</td>
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</table>
Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).

### SKILLED TRADES

<table>
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<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tr>
<td></td>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>103</td>
<td>Bricklayer, Blocklayer or Stonemason</td>
<td>31.16</td>
<td>16.02</td>
<td>47.18</td>
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<tr>
<td></td>
<td>Premium Increase(s):</td>
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<td>DOT PREMIUM: Pay two times the hourly basic rate on</td>
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<td></td>
<td>Sunday, New Year's Day, Memorial Day, Independence</td>
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<tr>
<td></td>
<td>Day, Labor Day, Thanksgiving Day &amp; Christmas Day</td>
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<tr>
<td>105</td>
<td>Carpenter</td>
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<td>DOT PREMIUMS: 1) Pay two times the hourly basic rate on</td>
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<tr>
<td></td>
<td>Sunday, New Year's Day, Memorial Day, Independence Day,</td>
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<td></td>
<td>Labor Day, Thanksgiving Day &amp; Christmas Day.</td>
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<td></td>
<td>2) Add $1.40/hr when the Wisconsin Department of</td>
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<td></td>
<td>Transportation or responsible governing agency requires</td>
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<td></td>
<td>that work be performed at night under artificial</td>
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<td></td>
<td>illumination with traffic control and the work is</td>
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<tr>
<td></td>
<td>completed after sunset and before sunrise.</td>
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</tr>
<tr>
<td>107</td>
<td>Cement Finisher</td>
<td>30.68</td>
<td>15.68</td>
<td>46.36</td>
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<tr>
<td></td>
<td>Future Increase(s):</td>
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<td></td>
<td>Add $1.86 on 6/1/12; Add $1.87 on 6/1/13; Add $1.87</td>
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<tr>
<td></td>
<td>on 6/1/14; Add $1.87 on 6/1/15; Add $1.75 on 6/1/16.</td>
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<td>Premium Increase(s):</td>
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<td>DOT PREMIUMS: 1) Pay two times the hourly basic rate on</td>
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<tr>
<td></td>
<td>Sunday, New Year's Day, Memorial Day, Independence Day,</td>
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<td>Labor Day, Thanksgiving Day &amp; Christmas Day.</td>
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<td>2) Add $1.40/hr when the Wisconsin Department of</td>
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</tr>
<tr>
<td>109</td>
<td>Electrician</td>
<td>29.02</td>
<td>20.49</td>
<td>49.51</td>
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<tr>
<td>111</td>
<td>Fence Erector</td>
<td>25.50</td>
<td>0.00</td>
<td>25.50</td>
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<tr>
<td>116</td>
<td>Ironworker</td>
<td>31.31</td>
<td>21.59</td>
<td>52.90</td>
</tr>
<tr>
<td>118</td>
<td>Line Constructor (Electrical)</td>
<td>35.97</td>
<td>18.08</td>
<td>54.05</td>
</tr>
<tr>
<td>125</td>
<td>Pavement Marking Operator</td>
<td>26.00</td>
<td>0.00</td>
<td>26.00</td>
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<tr>
<td>126</td>
<td>Piledriver</td>
<td>29.56</td>
<td>15.16</td>
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<td>130</td>
<td>Plumber</td>
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<td>15.04</td>
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<td>Steamfitter</td>
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<td>15.04</td>
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<td>137</td>
<td>Teledata Technician or Installer</td>
<td>21.26</td>
<td>11.75</td>
<td>33.01</td>
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<td>143</td>
<td>Tuckpointer, Caulker or Cleaner</td>
<td>31.16</td>
<td>10.90</td>
<td>42.06</td>
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<tr>
<td>144</td>
<td>Underwater Diver (Except on Great Lakes)</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
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<tr>
<td>146</td>
<td>Well Driller or Pump Installer</td>
<td>24.22</td>
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<td>150</td>
<td>Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION</td>
<td>27.42</td>
<td>15.10</td>
<td>42.52</td>
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<tr>
<td></td>
<td>ONLY</td>
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### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>151</td>
<td>Light Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>28.78</td>
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<td>43.94</td>
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<td>152</td>
<td>Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
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<td>9.00</td>
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<tr>
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<td>Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>23.38</td>
<td>12.48</td>
<td>35.86</td>
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<tr>
<td>154</td>
<td>Groundman - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>21.30</td>
<td>10.97</td>
<td>32.27</td>
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#### TRUCK DRIVERS

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<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>201</td>
<td>Single Axle or Two Axle</td>
<td>23.00</td>
<td>8.64</td>
<td>31.64</td>
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<tr>
<td>203</td>
<td>Three or More Axle</td>
<td>17.54</td>
<td>13.41</td>
<td>30.95</td>
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<tr>
<td>204</td>
<td>Articulated, Euclid, Dumpton, Off Road Material Hauler</td>
<td>22.50</td>
<td>16.19</td>
<td>38.69</td>
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<tr>
<td></td>
<td>Future Increase(s):</td>
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<td>Add $1.75/hr on 6/1/2012; Add $1.85/hr on 6/1/2013.</td>
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<tr>
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<td>Premium Increase(s):</td>
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<tr>
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<td>DOT PREMIUM: Pay two times the hourly basic rate on Sunday,</td>
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<tr>
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<td>New Year's Day, Memorial Day, Independence Day, Labor Day,</td>
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<tr>
<td></td>
<td>Thanksgiving Day &amp; Christmas Day.</td>
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<tr>
<td>205</td>
<td>Pavement Marking Vehicle</td>
<td>19.25</td>
<td>10.84</td>
<td>30.09</td>
</tr>
<tr>
<td>207</td>
<td>Truck Mechanic</td>
<td>17.54</td>
<td>13.41</td>
<td>30.95</td>
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</tbody>
</table>

#### LABORERS

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>General Laborer</td>
<td>25.03</td>
<td>13.44</td>
<td>38.47</td>
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<tr>
<td></td>
<td>Future Increase(s):</td>
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<tr>
<td></td>
<td>Add $.70/hr. on 06/04/2012; Add $.80/hr. on 06/03/2013</td>
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<tr>
<td></td>
<td>Premium Increase(s):</td>
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<tr>
<td></td>
<td>Add $.20 for blaster, bracer, manhole builder, caulker,</td>
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<tr>
<td></td>
<td>bottomman and power tool; Add $.55 for pipelayer; Add</td>
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<tr>
<td></td>
<td>$1.00 for 0-15 lbs. compressed air; Add $2.00 for 15-30</td>
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<tr>
<td></td>
<td>lbs. compressed air; Add $3.00 for over 30 lbs.</td>
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<tr>
<td></td>
<td>compressed air.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>303</td>
<td>Landscaper</td>
<td>21.00</td>
<td>0.82</td>
<td>21.82</td>
</tr>
<tr>
<td>304</td>
<td>Flagperson or Traffic Control Person</td>
<td>22.50</td>
<td>12.90</td>
<td>35.40</td>
</tr>
<tr>
<td>311</td>
<td>Fiber Optic Laborer (Outside, Other Than Concrete Encased)</td>
<td>17.09</td>
<td>8.72</td>
<td>25.81</td>
</tr>
<tr>
<td>314</td>
<td>Railroad Track Laborer</td>
<td>23.96</td>
<td>12.88</td>
<td>36.84</td>
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</table>
### HEAVY EQUIPMENT OPERATORS
#### SEWER, WATER OR TUNNEL WORK

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>521</td>
<td>Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &amp;/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Master Mechanic; Pile Driver. Future Increase(s): Add $2.05/hr on 6/4/2012. Premium Increase(s): Add $.25/hr for operating tower crane.</td>
<td>34.69</td>
<td>18.55</td>
<td>53.24</td>
</tr>
<tr>
<td>522</td>
<td>Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Boring Machine (Directional); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Spreader &amp; Distributor; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &amp;/or Jib Lengths Measuring 175 Ft or Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under; Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. &amp; Under; Dredge (NOT Performing Work on the Great Lakes); Milling Machine; Skid Rig; Telehandler; Traveling Crane (Bridge Type). Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>32.42</td>
<td>17.98</td>
<td>50.40</td>
</tr>
<tr>
<td>523</td>
<td>Air Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Boring Machine (Horizontal or Vertical); Bulldozer or Endloader (Over 40 hp); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Concrete Pump (46 Meter &amp; Under), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb &amp; Gutter Machine; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Manhoist; Material or Stack Hoist; Mechanic or Welder; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket).</td>
<td>32.42</td>
<td>17.71</td>
<td>50.13</td>
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</table>
## Fringe Benefits Must Be Paid On All Hours Worked

<table>
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<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>524</td>
<td>Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width &amp; Over, or Tractor Mounted, Towed &amp; Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Environmental Burner; Fireman (Pile Driver &amp; Derrick NOT Performing Work on the Great Lakes); Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Hoist (Tugger, Automatic); Grout Pump; Jeep Digger; Lift Slab Machine; Mulcher; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Tining or Curing Machine; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket &amp; Under); Winches &amp; A-Frames.</td>
<td>30.89</td>
<td>18.12</td>
<td>49.01</td>
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<tr>
<td>525</td>
<td>Air Compressor (&amp;/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical &amp; Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width &amp; Under, or Tractor Mounted, Towed &amp; Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Generator (&amp;/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Loading Machine (Conveyor); Post Hole Digger or Driver; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack.</td>
<td>29.19</td>
<td>19.20</td>
<td>48.39</td>
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<tr>
<td>526</td>
<td>Boiler (Temporary Heat); Forklift; Greaser; Oiler.</td>
<td>29.19</td>
<td>17.96</td>
<td>47.15</td>
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<tr>
<td>527</td>
<td>Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
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<tr>
<td>528</td>
<td>Work Performed on the Great Lakes Including 70 Ton &amp; Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
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<tr>
<td>529</td>
<td>Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.</td>
<td>26.80</td>
<td>18.52</td>
<td>45.32</td>
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<tr>
<td>530</td>
<td>Work Performed on the Great Lakes Including Deck Equipment Operator; Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under), Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.</td>
<td>26.80</td>
<td>18.52</td>
<td>45.32</td>
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</tbody>
</table>
Includes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or agricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

**SKILLED TRADES**

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<tr>
<th>CODE</th>
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<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL $</th>
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<tr>
<td>103</td>
<td>Bricklayer, Blocklayer or Stonemason</td>
<td>31.16</td>
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<td>Carpenter</td>
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<td>Cement Finisher</td>
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<td>Add $.50/hr. effective 06/04/2012.</td>
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<td>DOT PREMIUM: Pay two times the hourly basic rate on</td>
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<td>Fence Erector</td>
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<td>27.48</td>
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<td>118</td>
<td>Line Constructor (Electrical)</td>
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<td>Painter</td>
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<td>Roofer or Waterproofer</td>
<td>20.00</td>
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<td>Teledata Technician or Installer</td>
<td>21.26</td>
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<td>Tuckpointer, Caulker or Cleaner</td>
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<td>144</td>
<td>Underwater Diver (Except on Great Lakes)</td>
<td>36.20</td>
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<td>55.01</td>
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<td>Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION</td>
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<td>12.90</td>
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<tr>
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<td>Light Equipment Operator - ELECTRICAL LINE CONSTRUCTION</td>
<td>29.64</td>
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</tr>
<tr>
<td></td>
<td>Premium Increase(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DOT PREMIUM: Pay two times the hourly basic rate on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunday, New Year’s Day, Memorial Day, Independence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>152</td>
<td>Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>25.18</td>
<td>13.07</td>
<td>38.25</td>
</tr>
<tr>
<td>153</td>
<td>Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>23.38</td>
<td>12.48</td>
<td>35.86</td>
</tr>
<tr>
<td>154</td>
<td>Groundman - ELECTRICAL LINE CONSTRUCTION ONLY</td>
<td>21.30</td>
<td>10.97</td>
<td>32.27</td>
</tr>
</tbody>
</table>
### TRUCK DRIVERS

Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY $</th>
<th>HOURLY FRINGE BENEFITS $</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Single Axle or Two Axle</td>
<td>15.00</td>
<td>0.00</td>
<td>15.00</td>
</tr>
<tr>
<td>203</td>
<td>Three or More Axle</td>
<td>18.00</td>
<td>6.35</td>
<td>24.35</td>
</tr>
<tr>
<td>204</td>
<td>Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add $1/hr on 6/3/2012; Add $1/hr on 6/2/2013.</td>
<td>31.89</td>
<td>17.98</td>
<td>49.87</td>
</tr>
<tr>
<td>205</td>
<td>Pavement Marking Vehicle</td>
<td>19.25</td>
<td>10.84</td>
<td>30.09</td>
</tr>
<tr>
<td>206</td>
<td>Shadow or Pilot Vehicle</td>
<td>15.00</td>
<td>0.00</td>
<td>15.00</td>
</tr>
<tr>
<td>207</td>
<td>Truck Mechanic</td>
<td>18.00</td>
<td>6.35</td>
<td>24.35</td>
</tr>
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</table>

### LABORERS

Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY $</th>
<th>HOURLY FRINGE BENEFITS $</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>General Laborer</td>
<td>26.92</td>
<td>13.45</td>
<td>40.37</td>
</tr>
</tbody>
</table>

Future Increase(s):
- Add $1.60/hr on 6/1/2012; Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014.

Premium Increase(s):
- Add $.10/hr for topman, air tool operator, vibrator or tamper operator (mechanical hand operated), chain saw operator and demolition burning torch laborer; Add $.15/hr for bituminous worker (raker and luteman), formsetter (curb, sidewalk and pavement) and strike off man; Add $.20/hr for blaster and powderman; Add $.25/hr for bottomman; Add $.35/hr for line and grade specialist; Add $.45/hr for pipelayer.

DOT PREMIUMS:
1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY $</th>
<th>HOURLY FRINGE BENEFITS $</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>303</td>
<td>Landscaper</td>
<td>26.92</td>
<td>13.45</td>
<td>40.37</td>
</tr>
<tr>
<td></td>
<td>Future Increase(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Add $1.60/hr on 6/1/12; Add $1.70/hr on 6/1/13; Add $1.60/hr on 6/1/14.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Premium Increase(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day &amp; Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Flagperson or Traffic Control Person</td>
<td>23.55</td>
<td>13.45</td>
<td>37.00</td>
</tr>
<tr>
<td></td>
<td>Future Increase(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Add $1.60/hr on 6/1/2012; Add $1.70/hr on 6/1/2013; Add $1.60/hr on 6/1/2014.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Premium Increase(s):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day &amp; Christmas Day. 2) Add $1.25/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Fiber Optic Laborer (Outside, Other Than Concrete Encased)</td>
<td>17.09</td>
<td>8.72</td>
<td>25.81</td>
</tr>
<tr>
<td>314</td>
<td>Railroad Track Laborer</td>
<td>23.96</td>
<td>12.88</td>
<td>36.84</td>
</tr>
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</table>
**HEAVY EQUIPMENT OPERATORS**

**CONCRETE PAVEMENT OR BRIDGE WORK**

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
</table>
| 541  | Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.  
Future Increase(s):  
Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.  
Premium Increase(s):  
DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period). | 34.22                    | 18.90                   | 53.12                |
| 542  | Backhoe (Track Type) Having a Mfr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. & Under; Crane, Tower Crane Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver.  
Future Increase(s):  
Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.  
Premium Increase(s):  
DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period). | 33.72                    | 18.90                   | 52.62                |
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY $</th>
<th>HOURLY FRINGE BENEFITS $</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>543</td>
<td>Air Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Boring Machine (Directional, Horizontal or Vertical); Bridge (Bidwell) Paver; Bulldozer or Endloader; Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Conveyor System; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump, Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb &amp; Gutter Machine; Concrete Spreader &amp; Distributor; Crane (Carr Tuck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Straddle Carrier or Travel Lift; Tractor (Scrapper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches &amp; A-Frames.</td>
<td>33.22</td>
<td>18.90</td>
<td>52.12</td>
</tr>
</tbody>
</table>

**Future Increase(s):**
- Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.

**Premium Increase(s):**
- DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).
### Fringe Benefits Must Be Paid On All Hours Worked

<table>
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<th>HOURLY BASIC RATE OF PAY $</th>
<th>HOURLY FRINGE BENEFITS $</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>544</td>
<td>Backfiller; Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed &amp; Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Pile Driver &amp; Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine. Future Increase(s): Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day &amp; Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).</td>
<td>33.22</td>
<td>18.90</td>
<td>52.12</td>
</tr>
<tr>
<td>545</td>
<td>Air Compressor (&amp;/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Automatic Belt Conveyor &amp; Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&amp;/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack.</td>
<td>30.42</td>
<td>17.58</td>
<td>48.00</td>
</tr>
<tr>
<td>546</td>
<td>Fiber Optic Cable Equipment.</td>
<td>24.39</td>
<td>5.39</td>
<td>29.78</td>
</tr>
<tr>
<td>547</td>
<td>Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
</tr>
<tr>
<td>548</td>
<td>Work Performed on the Great Lakes Including 70 Ton &amp; Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.</td>
<td>36.20</td>
<td>18.81</td>
<td>55.01</td>
</tr>
<tr>
<td>549</td>
<td>Work Performed on the Great Lakes Including Deck Equipment Operator or Machineman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or more); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.</td>
<td>26.80</td>
<td>18.52</td>
<td>45.32</td>
</tr>
<tr>
<td>550</td>
<td>Work Performed on the Great Lakes Including Deck Equipment Operator; Machineman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.</td>
<td>26.80</td>
<td>18.52</td>
<td>45.32</td>
</tr>
</tbody>
</table>
### HEAVY EQUIPMENT OPERATORS
#### ASPHALT PAVEMENT OR OTHER WORK

<table>
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<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL $</th>
</tr>
</thead>
<tbody>
<tr>
<td>551</td>
<td>Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.</td>
<td>34.62</td>
<td>17.96</td>
<td>52.58</td>
</tr>
<tr>
<td>552</td>
<td>Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity Of 4,000 Lbs. &amp; Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &amp;/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver.</td>
<td>33.72</td>
<td>18.90</td>
<td>52.62</td>
</tr>
<tr>
<td></td>
<td>Future Increase(s):</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Add $2/hr on 6/1/12; Add $2/hr on 6/1/13; Add $1.75/hr on 6/1/14.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Premium Increase(s):</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day &amp; Christmas Day. 2) Add $1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>553</td>
<td>Air, Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Asphalt Heater, Planer &amp; Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Bituminous (Asphalt) Plant &amp; Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Laser/Screed; Concrete Slipform Placer Curb &amp; Gutter Machine; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches &amp; A-Frames.</td>
<td>24.65</td>
<td>16.90</td>
<td>41.55</td>
</tr>
</tbody>
</table>
Fringe Benefits Must Be Paid On All Hours Worked

<table>
<thead>
<tr>
<th>CODE</th>
<th>TRADE OR OCCUPATION</th>
<th>HOURLY BASIC RATE OF PAY</th>
<th>HOURLY FRINGE BENEFITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>554</td>
<td>Backfiller; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed &amp; Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver &amp; Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self-Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler.</td>
<td>24.65</td>
<td>16.90</td>
<td>41.55</td>
</tr>
<tr>
<td>555</td>
<td>Air Compressor (&amp;/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical &amp; Horizontal); Automatic Belt Conveyor &amp; Surge Bin; Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Generator (&amp;/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack.</td>
<td>24.65</td>
<td>16.90</td>
<td>41.55</td>
</tr>
<tr>
<td>556</td>
<td>Fiber Optic Cable Equipment.</td>
<td>24.39</td>
<td>5.39</td>
<td>29.78</td>
</tr>
</tbody>
</table>

*************************************************************** END OF RATES ***************************************************************
Towers for Public Safety Communication System
Door County, WI

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 PROJECT LOCATION

A. Andres Pit Tower: 698 Pleasant Ridge Road, Union, WI 54205
B. Mill Road Tower: 7796 Center Road, Forestville, WI 54235
C. Robert La Salle Park Tower: Intersection of CTH J & CTH U, Clay Banks, WI 54201

1.2 DESCRIPTION OF THE WORK

A. Andres Pit Tower

1. The project scope of work generally consists of the construction of a new 180 foot tall galvanized steel self-support communication tower. The new tower shall be furnished and installed as part of this work including associated hardware, foundation system, antenna mounts, line supports, ice bridges and grounding system as detailed in the plans and specifications. Site work includes installation of a prefabricated precast concrete equipment shelter, chain link fenced compound and other general site improvements.

2. All site clearing, grubbing, rough grading, culvert installation, driveway aggregate installation and restoration outside the compound limits will be completed by Others prior to project initiation. Contractor shall be responsible for all aggregate and fabric installation associated with construction of the fenced compound.

3. Contractor shall provide and install the tower, tower foundation, vertical transmission line ladder, climbing ladder, safety climb, tower base ground bar and air terminal and other required items specified for the tower as part of the project.

4. Contractor shall provide and install all proposed antennas and associated feedlines. Microwave dish and waveguide will be provided and installed by Others. All hardware and accessories required for installing of specified antennas and feed lines shall be provided by the Contractor including snap-in hangers, hoist grips, ground kits, ground bars, etc.

5. Contractor shall provide and install the prefabricated precast equipment shelter as part of the project. Contractor is responsible for hookup of utility connections/services to the shelter to insure a complete and fully functional shelter.

6. Contractor shall provide and install the 50 kW backup generator system, including transfer switch and 1,000 gallon LP tank. All necessary electrical work, inside and outside the shelter, shall be completed by Contractor to energize the shelter with the new power service. All electrical work shall be completed by a licensed electrician and in accordance with applicable codes.
Towers for Public Safety Communication System
Door County, WI

7. Contractor shall provide and install a multi-carrier utility rack which includes: 600A electric service, (3) electric meter sockets, telco distribution cabinet and associated conduit and wiring runs. The new electric service will be applied and paid for directly by the Owner. The Contractor shall include all required conduits, conductors and other items from the transformer into the site as required by the electric provider.

B. Mill Road Quarry Tower
   1. The project scope of work generally consists of the construction of a new 180 foot tall galvanized steel self-support communication tower. The new tower shall be furnished and installed as part of this work including associated hardware, foundation system, antenna mounts, line supports, ice bridges and grounding system as detailed in the plans and specifications. Site work includes installation of a prefabricated precast concrete equipment shelter, chain link fenced compound and other general site improvements.
   2. Contractor shall provide and install the tower, tower foundation, vertical transmission line ladder, climbing ladder, safety climb, tower base ground bar and air terminal and other required items specified for the tower as part of the project.
   3. Contractor shall provide and install all proposed antennas and associated feedlines. Microwave dish and waveguide will be provided and installed by Others. All hardware and accessories required for installing of specified antennas and feed lines shall be provided by the Contractor including snap-in hangers, hoist grips, ground kits, ground bars, etc.
   4. Contractor shall provide and install the prefabricated precast equipment shelter as part of the project. Contractor is responsible for hookup of utility connections/services to the shelter to insure a complete and fully functional shelter.
   5. Contractor shall provide and install the 25 kW backup generator system, including transfer switch and 500 gallon LP tank. All necessary electrical work, inside and outside the shelter, shall be completed by Contractor to energize the shelter with the new power service. All electrical work shall be completed by a licensed electrician and in accordance with applicable codes.
   6. Contractor shall provide and install a multi-carrier utility rack which includes: 600A electric service, (3) electric meter sockets, telco distribution cabinet and associated conduit and wiring runs. The new electric service will be applied and paid for directly by the Owner. The Contractor shall include all required conduits, conductors and other items from the transformer into the site as required by the electric provider.

C. Robert LaSalle Park Tower
   1. The project scope of work generally consists of the construction of a new 80 foot tapered monopole galvanized steel communication tower. The new tower shall be furnished and installed as part of this work including associated hardware, foundation system, antenna mounts, line supports, ice bridges and grounding system as detailed in the plans and specifications. Site work includes installation of a prefabricated outdoor equipment cabinet, chain link fenced compound and
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other general site improvements.

2. Contractor shall provide and install the tower, tower foundation, climbing ladder, safety climb, tower base ground bar and air terminal and other required items specified for the tower as part of the project.

3. Contractor shall provide and install all proposed antennas and associated feedlines. Microwave dish and waveguide will be provided and installed by Others. All hardware and accessories required for installing of specified antennas and feed lines shall be provided by the Contractor including snap-in hangers, hoist grips, ground kits, ground bars, etc.

4. Contractor shall provide and install the prefabricated outdoor equipment cabinet as part of the project. Contractor is responsible for hookup of utility connections/services to the cabinet to insure a complete and fully functional cabinet.

5. All necessary electrical work, inside and outside the cabinet, shall be completed by Contractor to energize the cabinet with the new power service. All electrical work shall be completed by a licensed electrician and in accordance with applicable codes.

6. Contractor shall provide and install a new 100A electric service, single electric meter socket and associated conduit and wiring runs. The new electric service will be applied and paid for directly by the Owner. The Contractor shall include all required conduits, conductors and other items from the transformer into the site as required by the electric provider.

1.3 TYPE OF CONTRACT
A. The project will be constructed under a single prime construction contract.

1.4 WORK BY OTHERS
A. Providing and installing of microwave dishes and related waveguides will be completed by Others. Contractor is responsible for providing and installing microwave dish mounts.

B. Andres Pit Tower: All site clearing, grubbing, rough grading, culvert installation, driveway aggregate installation and restoration outside the compound limits will be completed by Others prior to project initiation.

1.5 WORK BY OWNER
A. Owner will apply for electric service at each tower site including paying associated fees for each service installation directly to the utility provider.

1.6 CONTRACTOR’S USE OF SITE
A. Coordination with Occupants: Contractor shall coordinate construction activities to allow access to the existing buildings and towers during the entire construction period. Cooperate with Occupants during construction period to minimize conflicts and facilitate Occupants day to day operations.

B. Construction Operations: Limited to areas noted on Drawings.
C. Time Restrictions for Performing Work: Perform work between hours of 7:00 am and 7:00 pm (Monday – Friday) or other timeframe required by Owner or local ordinance.

1.7 TIME FOR COMPLETION

A. Refer to the Agreement for Contract Times.

1.8 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Applications for payment.
B. Change procedures.
C. Defect assessment.

1.2 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be in accordance with the terms of the contract. Retainage in the amount indicated in the Agreement will be retained on each application until final completion and payment.
B. Submit one copy of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702.
C. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
D. Submit updated construction schedule with each Application for Payment.
E. Payment Period: Submit at intervals stipulated in the Agreement.
F. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures.
G. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
   1. Partial release of liens from major subcontractors and vendors.
   2. Construction progress schedules, revised and current as specified in Section.
H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
I. Final Payment Application: Submit Final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited to, the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance Certificates for products and completed operations where required and proof that taxes, fees and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, “Contractor’s Affidavit of Payment of Debts and Claims.”
7. Evidence that claims have been settled.

1.3 CHANGE PROCEDURES

A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA Form G710.

C. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's maximum price quotation or Contractor's request for Change Order as approved by Architect/Engineer.


F. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

G. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

H. Change Order Forms: AIA G701 Change Order.

I. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
J. Correlation Of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
   2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
   3. Promptly enter changes in Project Record Documents.

1.4 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.

D. Authority of Architect/Engineer or Owner to assess defects and identify payment adjustments, is final.

E. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from transporting vehicle.
   4. Products placed beyond lines and levels of required Work.
   5. Products remaining on hand after completion of the Work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Description.
B. Alternates.

1.2 DESCRIPTION
A. Conditions of the Contract and pertinent portions of Sections in Division One of this Project Manual, apply to the Work of this Section as fully as though repeated herein.
B. Each proposal under an alternate shall include all incidental work and all adjustments necessary to accommodate the changes. All work shall meet the requirements of the Contract Documents.
C. Each alternate proposal shall be submitted as an individual cost for the particular alternate and shall be proposed under the premise that no other alternates have been accepted. Should the work of an alternate called for by the Bid Form not affect the cost of the work, “No Change” shall be stated.
D. Owner may, at his option, vary the scope of the work by authorizing alternates which will add to the work, deduct from the work or substitute materials, equipment or methods.
E. Immediately following Award of Contract, prepare and distribute to each party involved, notification of the status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to alternates, if any.

1.3 ALTERNATES
A. Alternate Bid 0A – State the amount to be added to Base Bid 0 to install a drywell within the site grounding system at the Andres Pit Tower site. Refer to Specification Section 33 79 00 Site Grounding and Lightning Protection for drywell requirements.
B. Alternate Bid 0B – State the amount to be deducted from Base Bid 0 to not provide and install the Kewaunee County antennas and lines as listed in the tower loading legend (B/D100) of the plans. These include: A5, A6, A11, A12 & A16.
C. Alternate Bid 1A – State the amount to be added to Base Bid 1 to install a drywell within the site grounding system at the Mill Road Quarry Tower site. Refer to Specification Section 33 79 00 Site Grounding and Lightning Protection for drywell requirements.
D. Alternate Bid 2A – State the amount to be added to Base Bid 2 to install a drywell within the site grounding system at the Robert LaSalle Park Tower site. Refer to Specification Section 33 79 00 Site Grounding and Lightning Protection for drywell requirements.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.
B. Field engineering.
C. Preconstruction meeting.
D. Progress meetings.
E. Cutting and patching.
F. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirements and characteristics of operating equipment are compatible with existing utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

C. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

D. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's and building General Contractor's activities.

1.3 FIELD ENGINEERING


B. Control datum for survey is that shown on Drawings.

C. Verify set-backs and easements; confirm drawing dimensions and elevations.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
E. Maintain complete and accurate log of control and survey work as Work progresses.

F. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

G. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

H. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.4 PRECONSTRUCTION MEETING

A. Owner will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Architect/Engineer, and Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   4. Submission of list of products, schedule of values, and progress schedule.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.
   8. Use of premises by Owner and Contractor.
   9. Owner's requirements.
  10. Construction facilities and controls provided by Owner.
  11. Temporary utilities provided by Owner.
  12. Survey and layout.
  15. Application for payment procedures.
  16. Procedures for testing.
  17. Procedures for maintaining record documents.
  18. Requirements for start-up of equipment.
  19. Inspection and acceptance of equipment put into service during construction period.

1.5 PROGRESS MEETINGS

A. Participate in project conference call meetings with Owner, Engineer and others throughout progress of the Work at maximum weekly intervals.
B. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Uncover Work to install or correct ill-timed Work.
   2. Remove and replace defective and non-conforming Work.
   3. Remove samples of installed Work for testing.

C. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

D. Cut masonry and concrete materials using masonry saw or core drill.

E. Restore Work with new products in accordance with requirements of Contract Documents.

3.2 SPECIAL PROCEDURES

A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.

B. Employ skilled and experienced installer to perform alteration work.
C. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

D. Remove debris and abandoned items from area and from concealed spaces.

E. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

F. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

G. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

H. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.

END OF SECTION
SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Submittal procedures.
   B. Construction progress schedules.
   C. Proposed products list.
   D. Product data.
   E. Shop drawings.
   F. Samples.
   G. Design data.
   H. Test reports.
   I. Certificates.

1.2 SUBMITTAL PROCEDURES
   A. Transmit each submittal with Architect/Engineer accepted form.
   B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
   C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.
   D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
   E. Schedule submittals to expedite Project, and deliver to Architect/Engineer at business address or in person. Coordinate submission of related items.
   F. For each submittal for review, allow 3 days excluding delivery time to and from Contractor.
   G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
H. Allow space on submittals for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit preliminary outline Schedule at the preconstruction meeting for coordination with Owner's requirements. After review, submit detailed schedules within 7 days modified to accommodate revisions recommended by Architect/Engineer.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Revisions To Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
   3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PROPOSED PRODUCTS LIST

A. Within 7 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
1.5 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus one copy Architect/Engineer will retain.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers’ standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution Requirements.

1.6 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit number of opaque reproductions Contractor requires, plus two copies Architect/Engineer will retain.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution Requirements.

1.7 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
B. Samples For Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
   2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns for Architect/Engineer selection.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.

F. Reviewed samples which may be used in the Work are indicated in individual specification sections.

G. Samples will not be used for testing purposes unless specifically stated in specification section.

H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01 70 00 - Execution Requirements.

1.8 DESIGN DATA

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.
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PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary water service.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.
   5. Traffic regulation.

C. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Water control.
   4. Dust control.
   5. Erosion and sediment control.
   6. Noise control.
   7. Pollution control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

A. Contractor shall pay cost of energy used until project substantial completion. Exercise measures to conserve energy. Utilize Owner’s existing power service when available.

1.3 TEMPORARY WATER SERVICE

A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations. Connect to existing water sources when available. Provide separate metering and reimburse Owner for cost of water used.

1.4 FIELD OFFICES AND SHEDS

A. None Required.
1.5 VEHICULAR ACCESS

A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.

C. Location as indicated on Drawings and/or approved by Owner.

D. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.

E. Provide and maintain access to fire hydrants and control valves free of obstructions.

F. Provide means of removing mud from vehicle wheels before entering streets.

G. Use designated existing on-site roads for construction traffic.

1.6 PARKING

A. Arrange for temporary surface parking areas to accommodate construction personnel.

B. Locate as approved by Owner.

C. When site space is not adequate, provide additional off-site parking.

D. Use of designated existing on-site streets and driveways used for construction traffic is permitted. Tracked vehicles not allowed on paved areas.

E. Use of designated areas of existing parking facilities used by construction personnel is permitted.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Do not allow vehicle parking on existing pavement.

H. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.7 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
1.8 TRAFFIC REGULATION

A. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

B. Flares And Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

C. Haul Routes:
   1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.

D. Removal:
   1. Remove equipment and devices when no longer required.
   2. Repair damage caused by installation.

1.9 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for plants designated to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.10 ENCLOSURES AND FENCING

A. No permanent enclosure or fence is required. Provide temporary enclosures and fences as necessary to protect the public and secure the site.

1.11 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.12 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.13 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.14 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.15 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to minimum depth of 4 feet. Grade site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
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SECTION 01 70 00  
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.
B. Final cleaning.
C. Protecting installed construction.
D. Project record documents.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
B. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
B. Clean site; sweep paved areas, rake clean landscaped surfaces.
C. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.
B. Prohibit traffic from landscaped areas.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   3. Field changes of dimension and detail.
   4. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the demolition, removal and/or salvage of existing facilities as required in these specifications and on the drawings. Included are the following topics:

B. Related Sections:
   1. Section 31 22 13 – Rough Grading
   2. Section 31 23 23 - Fill

1.2 SUBMITTALS

A. For utilities or other services requiring removal or abandonment in-place, submit materials documenting completion of such work.

1.3 SAFETY

A. Verify that all gas, electrical and water utilities have been abandoned or disconnected and associated hazards mitigated, prior to beginning any demolition.

B. Take all necessary precautions while dismantling piping containing gas, gasoline, oil or other explosive or toxic fluids or gases. Purge lines and contain materials in accordance with all applicable regulations. Store such piping outdoors until fumes are removed.

C. Maintain a clean and orderly site. Remove debris at end of each workday.

D. Burning of debris is not permitted.

E. If hazardous materials are not anticipated, but encountered, terminate operations and contact the DSF Construction Representative immediately. Follow all applicable local, state and federal regulations pertaining to hazardous materials.

1.4 PERMITS

A. Unless otherwise noted, Contractor shall be responsible for obtaining and paying for all permits necessary to complete demolition work. This includes but is not limited to local Work in Right of Way permits, transportation and/or material disposal permits.
1.5 DISCONNECTION OF SERVICES

A. Prior to starting removal and/or demolition operations be responsible and coordinate disconnection of all existing utilities, communication systems, alarm systems and other services scheduled for removal.

B. Disconnect all services in manner which insures continued operation in facilities not scheduled for demolition.

C. Disconnect all services in manner which allows for future connection to that service.

D. Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.

1.6 REMOVAL/SALVAGING OF ITEMS

A. Where salvaged items are indicated to be turned over to Owner, deliver to location where designated by Owner. For this project all salvaged items shall be turned over to Owner at the project site.

B. Where indicated to be incorporated into new work, store the salvaged item in secure location until trade responsible for re-installation mobilizes his equipment and storage facilities to the site, or otherwise accepts responsibility for the salvaged item.

2.1 EQUIPMENT

A. Use Contractor's normal equipment for demolition purposes and which meets all safety requirements imposed on such equipment.

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING WORK & FACILITIES

A. Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the work.

B. Furnish and install fencing or other barriers as shown on the plans or as otherwise necessary to protect existing features.

C. Verify the locations of, and protect, any buildings, structures, utilities, paved surfaces, signs, streetlights, utilities, landscaping and all other such facilities that are intended to remain or be salvaged.

D. Make such explorations and probes as necessary to ascertain any required protection measures that shall be used before proceeding with demolition.

E. Provide and maintain adequate catch platforms, warning lights, barricades, guards, weather protection, dust protection, fences, planking, bracing, shoring, piling, signs, and other items required for proper protection.
F. Provide protection for workmen, public, adjacent construction and occupants of existing building(s).

G. Report damage of any facilities or items scheduled for salvaging to the Construction Representative.

H. Repair or replace any damaged facilities that are not scheduled for demolition.

I. Explosives shall not be used for demolition.

J. Keep streets, walks and all other adjacent paved areas clean and swept clear of dirt, mud and debris deposited as a result of this operation.

K. Protect surrounding area from dust. Control rodents, and other vermin associated with demolition operations.

3.2 DEMOLITION

A. Remove all equipment, fixtures and other materials scheduled for salvage prior to beginning demolition operations.

B. Demolish and remove all buildings and structures scheduled for demolition as shown on the plans.

C. Abandon gas, electric, communication, water and sewer utilities in accordance with local utility company requirements, or applicable substantive requirements if considered private.

D. Carry out vehicle loading as necessary within the project boundaries or as defined or indicated on the drawings, but not in locations that block vehicular traffic on the streets or pedestrian traffic on adjacent public walks.

E. Dismantle each structure in an orderly manner to provide complete stability of the structure at all times. Provide bracing and shoring where necessary to avoid premature collapse of structure.

F. Conduct demolition operations and the removal of rubbish and debris in such a way that a minimum of nuisance dust is caused. Constantly sprinkle rubbish and debris with water if necessary to keep nuisance dust to a minimum.

G. Where necessary to prevent collapse of any construction, install temporary shores, underpinning, struts or bracing. Do not commence demolition work until all temporary construction is complete.

H. During the execution of the work, provide, operate, and maintain all pumping equipment, suction and discharge lines in a number of capacity as required to keep all excavations and pits free of water from any source whatsoever at all times.

END OF SECTION
Towers for Public Safety Communication System
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SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tower & equipment building foundations.
   2. Ice bridge, bollard and fence post footings.
   3. Concrete support slabs & stoops.

B. Related Sections:
   1. Section 13 36 00 – Communication Tower
   2. Section 32 31 13 – Chain Link Fences and Gates.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

B. ASTM International:
   1. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
   2. ASTM A775/A775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
   4. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  10. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
  12. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
1.3 SUBMITTALS

A. Concrete Mix Design: Submit proposed mix designs for each class of concrete a minimum of 7 days prior to the start of work in this section.

B. Product Data: Submit data on joint filler, concrete admixtures and curing compounds.

C. Delivery Tickets: Submit delivery tickets from each load of concrete delivered.

D. Test Results: Submit test results for required testing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall not have concrete delivered until forms, reinforcement, and embedded items are in place and ready for concrete placement. The Contractor shall coordinate with the Owner and building addition General Contractor for job site storage of materials.

B. The Contractor shall store reinforcements of different sizes and shapes in separate piles or racks. The piles or racks shall be raised above the ground to avoid excessive rusting. The Contractor shall protect materials from contaminants, such as grease, oil, and dirt.

C. The Contractor shall ensure that materials can be accurately identified after bundles are broken and tags removed.

1.5 TESTING

A. An independent testing firm, hired by the Contractor, shall perform all concrete tests in accordance with ACI 301, except that the sampling shall be done from the truck.

B. Perform one set of tests for each 30 CY of concrete placed. Testing to include:
   1. Slump
   2. Air entrainment
   3. Cylinders for compression testing. Cast a minimum of 6 cylinders for each test. Perform two breaks at 7 days, 28 days and other if results are required prior to 28 days.

C. Tests may be required of in-place concrete by the testing laboratory if concrete is suspected of being unacceptable. Test may be core cylinders complying with ASTM C42. Such testing will be at the Contractor's expense and any other additional testing when the concrete is unacceptable.

D. Unacceptable concrete work shall be corrected at the Contractor's expense and without a time extension for removing and replacing the defective work.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.
B. Obtain cementitious materials from same source throughout.
C. Follow recommendations of ACI 305R when concreting during hot weather.
D. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.1 FORM MATERIALS
A. Form Materials: Conform to ACI 301.
B. Joint Filler: ASTM D1751 type; 1/2 inch thick.

2.2 REINFORCING STEEL
A. Reinforcing Steel: ASTM A615, 60 ksi yield grade billet steel deformed bars; uncoated finish.
B. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in flat sheets; uncoated finish. Size and gauge as indicated on plans.

2.3 CONCRETE MATERIALS
A. Cement ASTM C150, normal - Type 2, Portland, gray color.
B. Fine and Coarse Aggregates: ASTM C33, Coarse aggregate size as shown in mix class. Gradation to comply with ASTM C-33, Table II, within the following limits:
C. Use 3/4” to No. 4 aggregate for footings, slabs, plain concrete, walls and pavement.
D. Fine aggregate to be natural sand. Aggregates to be free of iron oxide and not more than 2.5% soft particles.

2.4 ADMIXTURES
A. Air Entrainment Admixture: ASTM C260
B. Chemical Admixtures for Concrete: ASTM C494.

2.5 CURING MATERIALS
A. Water: Shall be potable and free from injurious amounts of oil, alkalis or organic matter.
B. Absorptive Mat: Burlap-polyethylene, 8 oz. / sq. yd., bonded to prevent separation during use.
C. Membrane Curing Compound: ASTM C309, Type 1.
D. Polyethylene Film: ASTM D4397, 4 mil thick, clear color.

2.6 CONCRETE MIX

A. Mix Concrete in accordance with ASTM C94.

B. All Concrete:
   1. Minimum compressive strength (28 days): 4000 psi., as tested by ASTM C39, and proportioned by ACI 318.
   2. Refer to tower foundation design for greater compressive strength and other, more stringent, design requirements.
   3. Note: Some jurisdictions may require special inspections above 2500psi.
   4. Slump: 5 inch maximum - 2 inch minimum.

C. Concrete exposed to the weather including foundations and exterior slabs shall be air-entrained conforming to ASTM C 260 at the rate of 4% to 8% for 3/4" aggregate concrete. Air content to be determined by "Pressure Method" ASTM C-231 or "Volumetric Method" ASTM C-173.

D. Minimum Cement Content: 517 lbs. per cubic yard.

E. Concrete being placed when temperature is less than 40 F. may contain 1% calcium chloride by weight of cement, ASTM C-494. Approval by Owner Representative prior to use is required.

PART 3 EXECUTION

3.1 FORMWORK ERECTION

A. Verify lines, levels, and measurements before proceeding with formwork.

B. Hand trim sides and bottom of earth forms; remove loose dirt.

C. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, embedded plates and angles, and other inserts.

D. Formwork shall comply with all pertinent provisions of ACI 347.

E. Forms shall remain in place for a minimum of 24 hours after concrete placement and finishing.

F. The Contractor shall construct formwork for exposed concrete surfaces with smooth faced, undamaged plywood or other panel type materials acceptable to Owner in order to provide continuous straight, smooth as-cast surfaces. The Contractor shall furnish in largest, practicable sizes in order to minimize the joints.

G. The Contractor shall provide form material with sufficient thickness to withstand the pressure of the newly placed concrete without exceptional bow or deflection.
H. Side forms for footings may be omitted and concrete poured directly against excavation only when requested by the Contractor and accepted by Owner. When omission of forms is accepted, the Contractor shall provide additional concrete 2.5 cm (1") on each side of the minimum design profile of sides and dimensions shown.

I. Cleaning and Tightening:
1. The Contractor shall thoroughly clean forms and adjacent surfaces that are to receive concrete.
2. The Contractor shall remove chips, wood, sawdust, dirt, and other debris just before concrete is placed.
3. The Contractor shall retighten forms immediately after concrete placement, as required, to eliminate mortar leaks.

3.2 REINFORCEMENT PLACEMENT

A. Supports for Reinforcement: For slabs on grade, the Contractor shall use supports with sand plates or horizontal runners where base material will not support chair legs. Pieces of concrete block or bricks will not be permitted.

B. Steel supports shall comply with CRSI recommendations.

C. The Contractor shall position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. The Contractor shall locate and support reinforcing by ties, spacers, chairs or hangers, as required.

D. The Contractor shall clean reinforcement to remove loose rust and mill scale, earth, and other materials.

3.3 CONCRETE PLACEMENT

A. Contractor shall notify Engineer 72 hours in advance of each concrete pour. Engineer to inspect foundation excavation prior to concrete placement and to be present during concrete placement.

B. All concrete work shall meet ACI 318 and ACI 309 requirements. All applicable placement recommendations of ACI shall be followed including recommendations for hot and cold weather placement.

C. All work to be performed by skilled workers. Form work and slab areas to be clean of all foreign material (i.e., rocks, sawdust, blocks, etc.).

D. Concrete shall be moved and placed in a manner to avoid segregation of mix.

E. Consolidate all concrete in accordance with ACI 309.

F. Consolidate each layer of concrete immediately after placing by using internal vibrators supplemented by hand spading, rodding, or tamping.
G. Spacing between insertions of the vibrator that is used to consolidate shall not exceed twice the radius of action as shown in Table 5.1.4 of ACI 309.

H. The Contractor shall not vibrate forms or reinforcement.

I. The Contractor shall limit the duration of vibration to time necessary to produce satisfactory consolidation without causing segregation of aggregates.

3.4 CONCRETE FINISH

A. The foundations shall receive a smooth steel trowel finish. Levelness shall be held to 1/8" in 10'.

B. Concrete stoops shall be smooth troweled and shall receive a medium broom finish.

C. Control joints for slabs on grade shall be tooled to 1/3 of slab depth (or saw cut to same depth) and shall be spaced in feet, twice the slab depth in inches (i.e., joints for a 4" slab shall be spaced 8' on center in each direction).

D. All concrete slab edges to have 1” chamfer.

END OF SECTION
Towers for Public Safety Communication System  
Door County, WI

SECTION 13 34 23  
PRECAST CONCRETE COMMUNICATION SHELTERS

PART 1 GENERAL

1.1 SUMMARY

A. The work under this section includes construction and installation of prefabricated precast concrete communication shelters within the tower site compounds as detailed in the plans.

B. Related Sections:
   1. Section 33 81 00 – Communication Towers
   2. Section 33 82 00 – Coax and Waveguides

1.2 DESCRIPTION OF SYSTEM

A. Precast Concrete Communications Shelters are required at two (2) sites. The shelters sizes required at each site are as follows:
   1. Andres Pit Tower – 12’ x 18’
   2. Mill Road Quarry Tower – 12’ x 18’

B. Refer to the individual site drawings for exact shelter configurations.

1.3 EQUIPMENT & MATERIALS FURNISHED BY OTHERS

A. Owner Furnished Equipment:
   1. None.

1.4 WORK BY OTHERS

A. Equipment racks and equipment within the racks will be installed by Others.

1.5 SHELTER MANUFACTURER

A. The equipment shelter manufacturer shall have been engaged in the production of precast concrete shelters for the telecommunications industry for a minimum of five years.

B. The manufacturing plant shall have an in house concrete batch plant. Ready mixed concrete is not permitted.

C. Approved manufacturers include:
   1. Cellxion – Bossier City, LA
   2. Fibrebond – Minden, LA
   3. Old Castle Precast – Hartford City, IN
   4. VFP – Roanoke, Virginia
   5. Other manufacturers may be allowed at the discretion of the Owner and A/E.
### SHELTER DESCRIPTIONS

A. Each communication shelter shall be a precast concrete prefabricated steel reinforced structure. No other type of construction material is permitted. The building exterior shall be the nominal dimensions as noted in the plans with a minimum of 1 ½” roof overhang on all sides. The roof shall be a cap type to provide a drip point for rain water to drip clear of the shelter wall. The finished inside clear height shall be at least 9'-5".

B. Roof shall be solid concrete and have a center ridge to provide water runoff with a thickness of 5” at the eave and 6” at the ridge.

C. Walls shall be 4” solid concrete with an exposed aggregate exterior finish. Exposed aggregate shall be sealed. No sandwich type construction permitted.

D. Exterior wall vertical corners to have cast in steel protection edges.

E. Concrete floor shall have a step joint design and support the design loads and specialized equipment.

F. The shelter shall be sealed, waterproofed, and tested for water tightness at the factory.

G. The shelter shall be designed to be handled and off-loaded with standard pickups at the base of the shelter. Roof pick points for handling the structure are not permitted.

### MINIMUM DESIGN REQUIREMENTS

A. The shelter shall be designed to meet the following minimum loading:
   1. Roof Live Load 100 PSF
   2. Floor Live Load 200 PSF
   3. Floor Dead Load 75 PSF
   4. Wall Wind Load 150 MPH
   5. Earthquake Zone 4
   6. Ballistic tested for UL 752 (HPR – 30.06 – Point Blank Range)
   7. Roof Ice impact loading 40 lbs at 225’

B. In addition to the requirements set forth in these specifications, this structure will also meet or exceed, to the extent applicable, but not limited to, the requirement of the latest documents as follows:
   1. ANSI/NFPA-70 and NFPA-78
   2. MIL-I-45208
   3. ASTM-E-84
   4. ANSI-58
   5. MIL-188-124A
   6. PS1-74999
   7. All applicable equipment is U.L. listed.

C. The building, once mounted, shall be able to withstand wind loadings of 120 MPH without moving, turning over or damage.
1.8 ELECTRICAL DESIGN AND INSTALLATION

A. All electrical systems shall be designed and installed in accordance with the National Electric Code (NEC), latest edition and applicable local codes for the jurisdiction in which the shelter is to be installed.

B. All electrical and grounding systems shall be installed by a licensed electrician.

1.9 DESIGN CERTIFICATION

A. The shelter shall be professionally engineered to meet zoning and building code requirements for the State and county in which it is to be delivered. The shelter’s design calculations or a letter of certification signed and sealed by a registered professional engineer for the State of Wisconsin stating the building system meets design load requirements shall be available upon request. The shelter shall be approved, inspected, and labeled by an independent third party agency, if required. Inspections must be completed and labels applied prior to delivery to the site.

B. The shelter shall be designed to meet the requirements of loading of the following:
   2. American Concrete Institute (A.C.I.-318R-05) "Building Code Requirements for Reinforced Concrete."

1.10 SUBMITTALS

A. Submit shelter manufacturer's pre-production (shop) drawings of supplied equipment shelters for approval. Shop drawings to include the following:
   1. Title sheet with plan index, code summary, design parameters, physical properties and finish schedule
   2. Interior and exterior elevations noting all equipment, devices and relevant dimensions.
   3. Interior floor and ceiling plans noting all equipment, devices and relevant dimensions.
   4. Electrical plan with one line diagram, panel board layouts, lighting layout, motor and lighting fixture schedules, wiring schematics, conduit and receptacle layout and all associated details.
   5. Cable tray layout including details for installation
   6. Grounding Plan
   7. Alarm Schematic
   8. Foundation Plan
   9. Shelter cross section, construction details and connection details
   10. Drawings signed and sealed by a Registered Professional Engineer licensed in the State of Wisconsin. Engineer to certify the design and construction meets the minimum requirements specified herein along with all requirements of the Wisconsin Commercial Building Code (IBC) 2009.
B. Submit manufacturer’s cut sheets of devices, equipment and other items installed as part of the equipment shelter package for approval. Items that require cut sheet submittal include the following:
1. Electrical panel boards
2. Electric service disconnect
3. Electrical wiring devices
4. Ground bars
5. Lights
6. Surge arrestors
7. Air conditioners
8. Hollow metal doors
9. Door locks
10. Cable tray
11. Wave guide entry ports

C. All submittals must receive full approval of the Engineer prior to equipment shelter manufacture.

D. One (1) hard copy and one (1) electronic (pdf) copy of all submittals shall be provided to engineer for approval.

1.11 WARRANTY

A. The shelter manufacturer shall warrant the shelter structure and from water intrusion for a period of 10 years and its electrical/mechanical components for one (1) year from the date of installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. The materials furnished shall include a precast concrete structure, fasteners, anchors, sealants, doors, cable tray, electrical, HVAC, standby generator and all other parts/equipment necessary for a complete building system as detailed in the plans and specifications. The shelter shall be delivered to and installed at the site location determined by the customer.

B. Concrete:
1. Steel-Reinforced (ASTMA615 Grade 60 & ASTMA-185 Welded Wire Fabric), 5,000 PSI minimum, 28 Day Compressive Strength, Air-Entrained (ASTM C260).

C. Electrical:
1. Electrical equipment, installations and labor shall comply with the most recent edition of the National Electrical Code.

D. Exterior:
1. The exterior wall finish shall be an exposed aggregate with an earth tone brown color. The exterior finish shall be sealed with an approved compound designed for this application.

2. The exterior base and vertical corners shall be protected by a continuous steel edge. Exposed concrete on the base surface and corners is not permitted. The base and corner protection steel, doors and ventilation hoods shall be primed and painted the same color with rust inhibitor paint.

3. Roof surface shall be trowel and sealed with a liquid membrane coating. Roof edges are to be smooth without chips or irregular surface.

E. Interior:
1. Concrete walls and ceiling shall be covered with White Nu-Poly FRP over 3/8” OSB. No wood or steel framing studs permitted.

2. Concrete floor shall be rotary trowel to smooth and flat surface. The floor shall be sealed with epoxy built up coating, covered with commercial vinyl floor tile and include vinyl base cove installed around the perimeter.

F. Fire Resistant:
1. The exterior and interior walls shall have at least a two (2) hour fireproof rating without affecting the structural properties of the building.

2. The separation wall between the equipment room and generator room shall be a fire wall which meets applicable federal, state and local codes.

G. Insulation:
1. Energy calculations conforming to the 2006 International Energy Conservation Code shall be submitted with the completed design documents. The shelter shall have the following minimum insulation values:
   a. Exterior walls: R-11
   b. Ceiling: R-22

H. Doors:
1. Insulated painted 18 GA galvanized steel door and 16 GA painted galvanized steel frame, cast-in. Hardware to include NRP stainless steel hinges, stepped threshold, door sweep, anti-pick guard, door bumper, drip cap, 48” weather canopy, weather stripping, electronic push button programmable combination lockset (E-Plex 2000 Series as manufactured by Kaba IICo Corp.), Door stop T latch and hydraulic door closer.

2. Size: See plans

I. Electrical Systems:
1. 120/240 VAC single phase, 60hz, 200 Amp service disconnect breaker

2. 200A (42) Circuit Main Panel Load Center with branch breakers as follows:
   a. (2) 60A (or other), 2P – HVAC Units
   b. (1) 60A, 2P – Main Panel Surge Arrestor
   c. 20A, 1P – Rack Receptacles ((1) Duplex twist lock at each rack location)
   d. (1) 20A, 1P – Interior lights
   e. (1) 20A, 1P – Exterior lights
   f. (1) 20A, 1P – Emergency lights
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- (1) 20A, 1P – Smoke detector  
- (1) 20A, 1P – Dehydrator  
- (1) 20A, 1P – Tower lights  
- (1) 20A, 1P – Interior Shelter Receptacles  
- (1) 20A, 1P – Exterior Shelter Receptacles  
- (1) 30A, 1P – Generator Panel (Block heater, Battery Charger, etc.)  
- (1) 20A, 1P – Utility Rack Light & Convenience Receptacle

3. Main Panel and ATS Surge Arrestors:  
   a. APEX Imax MOV with 500V UL Surge Volt Rating, or equiv.  
   b. Provide 60A 2P Disconnect for ATS Surge Arrestor

4. 120V and 240V receptacles per drawings. Equipment Circuits to include independent ground receptacles where noted in the plans. Independent ground receptacles shall each have a separate ground wire (third wire) run back to the distribution panel (no daisy chaining from outlet to outlet).  

5. All wiring will be installed in surface mounted conduit or wire ways and will be in full compliance with ANSI/NFPA-70; The National Electric Code, Latest Revision.

J. Lighting:  
1. Interior: 4ft dual bulb, 32-watt fluorescent light fixtures with wrap around protective lens (See plans). Interior light system to include occupancy sensors.  
2. Exterior: Exterior lighting fixtures with timer switches (See Plans).  
3. Emergency: Twin bulb with battery EXIT sign located over each doorway.

K. Smoke Detectors  
1. There shall be two (2) smoke detectors installed in the communications equipment room.  
2. These smoke detectors shall be alarmed and wire to a 66 type punch block located on the MDF panel.  
3. The smoke detectors shall be operated on the mains power with battery backup.

L. Alarms:  
1. Unless otherwise specified, all alarm contacts shall be normally opened, SPST, common ground and wired to the alarm R66 punchblocks located on the alarm panel. The contact closures on the relays shall be capable of sinking 100 ma at – 48 volts dc.  
2. Provide (1) punch block  
3. All alarms shall be wired from each device back to the alarm punch block within conduit.

M. HVAC:  
1. The HVAC system shall include Two (2) lead lag controlled wall mount air conditioning units of the following size at each listed site:  
   a. Andres Pit Tower: 3.0 Ton or 35,400 BTUH  
   b. Mill Road Quarry Tower: 3.0 Ton or 35,400 BTUH  
2. Efficiency shall provide 9.0 EER minimum cooling ratio  
3. Lead lag controller: Bard MC3000-A  
4. No Economizer  
5. R-410A Refrigerant
6. Low ambient air kit to allow compressor to run down to 0 degrees F.
7. 5KW heat strip

N. Cable Tray:
1. 12", 18" or other size overhead cable ladder per plans.
2. 1 ½” stringers
3. 9” rung spacing
4. Zinc dichromate finish

O. Wave Guide Entry Port:
1. 12 or other size port waveguide/coax entry port panels (see plans). 4” diameter port openings with cushions and caps (inside and out). Panels supplied both inside and outside of building with rigid insulation installed between each panel.

P. Grounding:
1. All grounding and lightning protection systems installed shall meet or exceed the requirements of the Motorola R56 Standard. In cases where these plans and specifications exceed the requirements of the 56 standard, these plans and specifications shall be followed. In cases where these plans and specifications are in conflict with the R56 standard, contact Engineer for desired resolution.
2. Interior ground halos: #2 AWG stranded insulated conductors installed on all four walls of equipment and generator rooms located approximately 6-inches below ceiling level. Ground halos shall be mounted on 6 inch standoffs located on approximate 12 inch centers. Maintain gaps in halos as noted in the plans.
3. All equipment cabinets, racks, transmission line entrance panels, cable trays, conduits, doors, door frames, HVAC grills, louvers and other metallic items shall be individually bonded to the halo using No.6 AWG copper conductors. Provide jumpers between conduit and cable tray splices.
4. Provide ground bars and connections as noted in the plans.
5. Refer to shelter grounding plans and specification section 33 79 00 for additional requirements.

Q. Miscellaneous:
1. Telco board
2. Service manual wall pocket
3. Fire extinguisher
4. First aid kit
5. Tie down plates & hardware

PART 3 EXECUTION

3.1 SHELTER INSTALLATION

A. Allow shelter foundation to adequately cure prior to setting shelter. Shelter foundation installer shall provide concrete break strength reports to document concrete has achieved design strength requirements prior to installation.
B. Install shelter per manufacturer’s recommendations including tie downs, door canopy and ice shields. Align structure to match conduit stubs.

C. Field install any other equipment and devices not furnished in the prefabricated structure which are required as part of the project.

END OF SECTION
SECTION 13 34 24

COMMUNICATION EQUIPMENT ENCLOSURES

PART 1 GENERAL

1.1 SUMMARY

A. The work under this section includes construction and installation of prefabricated communication equipment enclosures within the tower sites as detailed in the plans.

B. Related Sections:
   1. Section 33 81 00 – Communication Towers
   2. Section 33 82 00 – Coax and Waveguides

1.2 SYSTEM DESCRIPTION

A. Communication equipment enclosures are required at the following sites:
   1. Robert LaSalle Park Tower: Double Bay Outdoor Enclosure w/ Outdoor Battery Box Enclosure with the following specifications:
      a. (1) DDB Unlimited Item #: 2OD-50DDC
         1) 50”Hx59”Wx34”D Double Bay Outdoor Enclosure
         2) 4 Sets standard adjustable 19” racking rails, 2 sets per bay, 26 RU’s per rail, 104 RU’s total
         3) 2 front and 2 rear doors
         4) 3 point pad locking system
         5) 6 standard lifting hooks
         6) Heavy duty door windlocks
         7) Textured cream paint
         8) 0.125 Aluminum construction
         9) NEMA 3R/4X Class 250
         10) One removable filter panel per door
         11) Counter sunk sink screws in mounting feet
         12) Extra center divider brackets
         13) Doors: 0.160 Aluminum w/ 3/16 stainless steel hinges
         14) All R-Nuts threaded for 3/8” bolts
         15) All door screws to be 10/32 min.
         16) 4 pad mounting feet
      b. (1) DDB Unlimited Item #: 2B0D-DD
         1) 16”Hx59”Wx34”D Outdoor Battery Box Enclosure
         2) 2 slide out battery trays
         3) 2 front and rear doors
         4) Filtered louvers vented
         5) Cream paint
         6) Each tray 2”Hx22.75”Wx29”D
      c. (2) DDB Unlimited Item #: F25-115T
         1) 110 Volt Dual fan kit w/ adjustable thermostat, 210 CFM
      d. (1) DDB Unlimited Item #: HT-600
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1.3 EQUIPMENT & MATERIALS FURNISHED BY OTHERS

A. Owner Furnished Equipment:
   1. None.

1.4 WORK BY OTHERS

A. Radio equipment and batteries within each enclosure will be installed by Others.

1.5 OUTDOOR EQUIPMENT ENCLOSURE MANUFACTURER

A. The manufacturer shall have been engaged in the production of outdoor equipment enclosures for the telecommunications industry for a minimum of five years.

B. Approved manufacturers include:
   1. DDB Unlimited – Pauls Valley, OK
   2. Hoffman – Anoka, MN
   3. Pre-Approved Equal.

1.6 ELECTRICAL DESIGN AND INSTALLATION

A. All electrical systems shall be designed and installed in accordance with the National Electric Code (NEC), latest edition and applicable local codes for the jurisdiction in which the shelter is to be installed.

B. All electrical and grounding systems shall be installed by a licensed electrician.
1.7 SUBMITTALS

A. Submit enclosure manufacturer's shop drawings of supplied equipment enclosures for approval. Shop drawings to include the following:
   1. Title sheet with plan index, code summary, design parameters, physical properties and finish schedule
   2. Interior and exterior elevations and floor plans noting all equipment, devices and relevant dimensions.
   3. Electrical plan with one line diagram, panel board layouts, lighting layout, motor and lighting fixture schedules, wiring schematics, conduit and receptacle layout and all associated details.
   4. Rack layout including details for installation
   5. Grounding Plan
   6. Alarm Schematic
   7. Cross sections, construction details and relevant connection details

B. Submit manufacturer’s cut sheets of devices, equipment and other items installed as part of the enclosure package for approval. Items that require cut sheet submittal include the following:
   1. Equipment Enclosure
   2. Battery Enclosure
   3. Electrical panel boards
   4. Electric service disconnect
   5. Electrical wiring devices
   6. Ground bars
   7. Lights
   8. Surge arrestors
   9. Air conditioners

C. All submittals must receive full approval of the Engineer prior to equipment enclosure manufacture.

D. One (1) electronic (pdf) copy of all submittals shall be provided to engineer for approval.

1.8 WARRANTY

A. The manufacturer shall warrant the enclosure structure and from water intrusion for a period of 10 years and its electrical/mechanical components for one (1) year from the date of installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Equipment Enclosure:
   1. Exterior: 0.125” Alumiflex construction
   2. Finish: Painted cream
   3. Rating: NEMA 4
4. Doors: Gasketed w/ 3 Point locking system
5. Racking: 19 inch

B. Electrical:
1. Electrical equipment, installations and labor shall comply with the most recent edition of the National Electrical Code.

C. Entry Ports:
1. Weatherproof
2. Sized appropriately for each feedline
3. Roxtec, or equivalent. (www.roxtec.com)

D. Grounding:
1. All grounding and lightning protection systems installed shall meet or exceed the requirements of the Motorola R56 Standard. In cases where these plans and specifications exceed the requirements of the 56 standard, these plans and specifications shall be followed. In cases where these plans and specifications are in conflict with the R56 standard, contact Engineer for desired resolution.
2. All equipment cabinets, racks, transmission line entrance panels, conduits, doors, door frames, HVAC grills, louvers and other metallic items shall be individually bonded to the ground system using copper conductors.
3. Provide ground bars and connections as noted in the plans.
4. Refer to grounding plans and specification section 33 79 00 for additional requirements.

PART 3 EXECUTION

3.1 EQUIPMENT ENCLOSURE INSTALLATION

A. Confirm enclosure dimensions and orientation with site and foundation plans.

B. Install below grade conduits and grounding systems to align with enclosure dimensions and orientation.

C. Install equipment enclosure foundation.

D. Allow equipment enclosure foundation to adequately cure prior to setting enclosure. Foundation installer shall provide concrete break strength reports to document concrete has achieved design strength requirements prior to installation.

E. Install enclosure per manufacturer’s recommendations including tie downs. Align enclosure to match conduit stubs.

F. Field install any other equipment and devices not furnished in the prefabricated structure which are required as part of the project.

END OF SECTION
SECTION 23 11 10
LP Gas Fuel Systems

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. LP fuel tank
   2. Remote LP gas monitor system
   3. LP fuel piping system

B. Related Sections:
   1. Section 26 32 00 – Packaged Generator Assemblies
   2. Section 31 23 16.13 - Trenching

1.2 REFERENCES

A. Abbreviations of standards and organizations referenced in other sections are as follows:
   AGA American Gas Association
   ANSI American National Standards Institute
   ASME American Society of Mechanical Engineers
   ASTM American Society for Testing and Materials
   AWS American Welding Society
   CGA Compressed Gas Association
   EPA Environmental Protection Agency
   GAMA Gas Appliance Manufacturers Association
   MCA Mechanical Contractors Association
   MSS Manufacturer’s Standard Society of the Valve and Fitting Industry
   NBS National Bureau of Standards
   NEC National Electric Code
   NEMA National Electrical Manufacturers Association
   NFPA National Fire Protection Association
   UL Underwriters Laboratories Inc.

1.3 SUBMITTALS

A. Submit shop drawings and/or product information for the following items:
   1. LP tank
   2. LP fuel gas piping
3. Remote LP gas monitor system
4. LP fuel regulators

B. For all equipment and systems as indicated above, mark each submittal with that specification section number. Mark the general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number as indicated in the contract documents.

C. Submit Certificate of Installation for installed system.

1.4 QUALITY ASSURANCE

A. Supplier: Supplier of LP fuel systems and fuel supply shall have service facilities within 100 miles of project site.

B. Installer: LP Gas fuel system installer shall be certified and/or licensed for installation of such systems with the state in which it is being installed.

1.5 RECORD DRAWINGS

A. Record on as-built drawings locations of all installed below grade piping.

PART 2 PRODUCTS

2.1 LP FUEL TANK

A. Provide one (1) new 1,000 or 500 gallon LP fuel storage tank per site as indicated on the drawings.

B. LP tank shall become the property of Owner and shall not be on lease/fill agreement with fuel supplier.

C. Tank shall be an above ground steel type with lockable cover all which are primed and painted suitable for outdoor environments.

D. Tank shall include direct read gauge to monitor fuel level at the tank.

2.2 REMOTE LP GAS MONITOR SYSTEM

A. System shall be a hard wired local stationary tank monitor system with remote read out located within the equipment building. System shall include:
   1. Remote monitor with field programmable high/low set points
   2. RS232 interface to PC for programming/saving parameters
   3. Alarm relay form “C:, 10A dry contacts
   4. 120VAC power supply
   5. System shall also include remote sensor at the tank with volume readout

B. The system shall be a LevelCon Model#: STM94442A, or equivalent.
2.3 LP FUEL PIPING

A. All LP fuel piping components shall be specifically manufactured for use in LP fuel applications.

B. Below grade fuel piping shall be direct buried polyethylene tubing or copper tubing encased with a carrier conduit of the size indicated in the plans. Below grade tubing shall include tracer wire.

C. Provide anodeless meter risers, for polyethylene tubing, at each end where LP fuel piping stubs up to generator and LP fuel tank. Anodeless meter risers shall include epoxy coated steel casing and be rated for 125 psig.

D. Above grade hard piping at generator and LP tank shall be steel gas rated piping which is primed and painted for outdoor environments.

E. Above grade piping at LP fuel tank from LP tank to anodeless meter riser shall be copper tubing or flexible LP fuel gas tubing rated for outdoor environments.

2.4 LP FUEL PRESSURE REGULATORS

A. Cast iron body, aluminum spring and diaphragm, Nitrile diaphragm, threaded ends, 150psi W.O.G., -20°F to 150°F.

B. Regulators shall be specifically manufactured for use in LP fuel applications. Size regulators as appropriate for piping sizes and anticipated pressure drops as noted on the plans.

2.5 SHUT-OFF VALVES

A. Two (2) inch or smaller: Ball valve, bronze body, threaded ends, stainless steel or chrome plated ball, full or conventional port, Teflon seat, blowout-proff system, two-piece construction, suitable for 150psig working pressure, U.L. listed for use as LP gas shut-off.

PART 3 EXECUTION

3.1 LP FUEL TANK

A. Install concrete foundation slab per the plans and specifications.

B. Mount and secure tank on slab concrete slab.

C. Connect each tank leg (2) to grounding system in accordance with the plans and specifications.

D. Install LP gas monitor system per these specifications.
E. Purge and fill tank to 80% of capacity with LP fuel. Fuel used during project construction is responsibility of the Contractor. The tank shall be re-filled by Contractor just prior to Owner taking occupancy of the equipment building. After occupancy, fuel use will then become the responsibility of the Owner.

3.2 REMOTE LP GAS MONITOR SYSTEM

A. Trench and install conduit between LP tank and equipment building for hard wire leads as detailed in the plans. Install tracer wire. Support conduit above grade at LP tank.

B. Install remote LP gas monitor system per manufacturer’s instructions.

C. Mount remote monitor unit within the equipment building on the telco board at the location as indicated in the plans.

D. Seal conduit containing hard wire leads between LP tank and equipment building at both ends.

3.3 LP FUEL PIPING

A. Trench and install LP fuel piping between LP tank and generator as detailed in the plans and specifications.

B. Install AGA approved ball shut-off valve at the generator.

C. Install LP fuel pressure regulators per manufacturers requirements at the locations noted in the plans.

D. Provide fuel line support as noted in the plans.

E. Provide sediment trap/dirt leg in hard piping at generator.

F. Install flexible LP fuel gas tubing between hard piping and generator for vibration isolation.

G. Air test fuel piping to insure no leaks exist prior to burying piping. Air test shall be at 100 psig for 24 hours. Repair as necessary. Document test results and provide to A/E.

3.4 TESTING/CERTIFICATION

A. Test and certify LP gas system has been installed in accordance with applicable Federal, State and local Codes.

B. Provide Certificate of Installation for installed system.

END OF SECTION
SECTION 26 32 00
PACKAGED GENERATOR ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. The work under this section includes providing and installing packaged standby power systems to supply electrical power to the equipment shelters.

B. Related Sections:
   1. Section 26 36 00 – Transfer Switches
   2. Section 23 11 10 – LP Gas Fuel Systems
   3. Section 13 34 23 – Precast Concrete Communication Shelters

1.2 DESCRIPTION OF SYSTEM AND SITE

A. Provide standby power systems to supply electrical power at 120/240 Volt, 60 Hertz, Single Phase. Generators shall consist of a liquid cooled spark-ignited engine, a synchronous AC alternator, and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified hereinafter.

   1. Andres Pit Tower Site:
      a. Kohler Power Systems 50kW (50REZGB) – LP Vapor fueled, 200A Min. Standby Rating (4P8X)

   2. Mill Road Quarry Tower Site:

B. The site is an NEC ordinary location with no specific harsh environment requirements.

C. Each genset shall be applied at the listed ambient and elevation. Bidders to submit the generator’s rated power output at 104 °F and 1000 elevation (Ft).

D. Bidders are to submit the genset’s sound level in dBA at 23 ft based on the configuration specified. Each genset shall meet site noise requirements of 75 dBA at 23 feet.

E. The on-site propane gas pressure is 11 - 14 inches of water column.

1.3 REQUIREMENTS OF REGULATORY AGENCIES

A. An electric generating system, consisting of a prime mover, generator, governor, coupling and all controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.

B. The generator set must conform to applicable NFPA requirements.
C. The generator set must be available with the Underwriters Laboratories listing (UL2200) for a stationary engine generator assembly.

D. The generator set must be pre-certified to meet EPA federal emission requirements for stationary standby. On-site emission testing & certification will not be acceptable for standby applications.

1.4 MANUFACTURER QUALIFICATIONS

A. This system shall be supplied by an original equipment manufacturer (OEM) who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 25 years, thereby identifying one source of supply and responsibility.

B. Approved generator suppliers include:
   1. Kohler Power Systems
   2. Generac Industrial Power
   3. Cummins Power Generation
   4. Pre-approved equal.

C. The manufacturer shall have printed literature and brochures describing the standard series specified, not a one of a kind fabrication.

D. Manufacturer’s authorized service representative shall meet the following criteria:
   1. Certified, factory trained, industrial generator technicians
   2. Service support 24/7
   3. Service location within 200 miles
   4. Response time of 4 hours
   5. Service & repair parts in-stock at performance level of 95%
   6. Offer optional remote monitoring and diagnostic capabilities

1.5 SUBMITTALS

A. Submit the following product data:
   1. Engine Generator specification sheet
   2. Controls specification sheet(s)
   3. Installation / Layout dimensional drawing
   4. Wiring schematic
   5. Sound data
   6. Emission certification
   7. Warranty statement
   8. Installation instructions

PART 2 PRODUCTS

2.1 ENGINE

A. Engine Rating and Performance
1. The prime mover shall be a liquid cooled, spark-ignited, 4-cycle engine. It will have adequate horsepower to achieve rated kW output.
2. The engine shall support a 100% load step.
3. The generator system shall support generator start-up and load transfer within 10 seconds.
4. The generator shall accept a load step of 100% of rated kW with a maximum frequency dip of 12 Hz.

B. Engine Oil System
1. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s).
2. The engine shall operate on mineral based oil. Synthetic oils shall not be required, but may be used for protection in extreme conditions.

C. Engine Cooling System
1. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system. The coolant system shall include a coolant fill box which will provide visual means to determine if the system has adequate coolant level. The radiator shall be designed for operation in 122 degrees F, (50 degrees C) ambient temperature.
2. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer
3. Engine coolant and oil drain extensions, equipped with pipe plugs and shut-off valves, must be provided to the outside of the mounting base for cleaner and more convenient engine servicing.
4. A radiator fan guard must be installed for personnel safety that meets UL and OSHA safety requirements.

D. Engine Starting System
1. Starting shall be by a solenoid shift, DC starting system.
2. The engine’s cranking batteries shall be lead acid. The batteries shall be sized per the manufacturer’s recommendations. The batteries supplied shall meet NFPA 110 cranking requirements of 90 seconds of total crank time. Battery specifications (type, amp-hour rating, cold cranking amps) to be provided in the submittal.
3. The genset shall have an engine driven, battery charging alternator with integrated voltage regulation.
4. The genset shall have an automatic dual rate, float equalize, 10 amp battery charger. The charger must be protected against a reverse polarity connection. The chargers charging current shall be monitored within the generator controller to support remote monitoring and diagnostics. The battery charger is to be factory installed on the generator set.
5. Thermostatically controlled battery blanket heaters, sized by the manufacturer, are to be provided to maximize the batteries cold cranking capabilities.

E. Engine Fuel System
1. The engine shall be configured to operate on propane vapor.
2. The engine shall utilize a fuel system inclusive of fuel-air mixer, secondary gas regulator, low gas pressure switch, and fuel shut-off solenoid.

3. The engines internal fuel connections shall be terminated to the generator frame via an NPT fitting for easy installation. A flex fuel line shall be supplied with the unit.

F. Engine Controls
1. Engine speed shall be controlled with an integrated isochronous governor function with no change in alternator frequency from no load to full load. Steady state regulation is to be 0.25%.

2. Engine sensors used for monitoring and control are to be conditioned to a 4-20ma signal level to enhance noise immunity.

3. All engine sensor connections shall be sealed to prevent corrosion and improve reliability.

G. Engine Exhaust and Intake
1. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.

2. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system. A rain cap will terminate the exhaust pipe after the silencer. All components must be properly sized to assure operation without excessive back pressure when installed.

3. The manufacturer shall supply a critical grade exhaust silencer as standard. For applications with site specific sound requirements (reference section 1.2), the silencer shall be selected to achieve site sound levels.

4. For gensets in a weather or sound attenuated enclosure, all exhaust piping from the turbo-charger discharge to the silencer shall be thermally wrapped to minimize heat dissipation inside the enclosure.

5. The engine intake air is to be filtered with engine mounted, replaceable, dry element filters.

2.2 ALTERNATOR

A. The alternator shall be the voltage and phase configuration as specified in section 1.2.

B. The alternator shall be a 4-pole, revolving field, stationary armature, synchronous machine. The excitation system shall utilize a brushless exciter with a three phase full wave rectifier assembly protected against abnormal transient conditions by a surge protector. Photo-sensitive components will not be permitted in the rotating exciter.

C. Single phase alternators shall be four lead. All leads must be extended into a NEMA 1 connection box for easy termination. A fully rated, isolated neutral connection must be included by the generator set manufacturer.

D. The alternator shall use a single, sealed bearing design. The rotor shall be connected to the engine flywheel using flexible drive disks. The stator shall be direct connected to the engine to ensure permanent alignment.
E. The alternator shall meet temperature rise standards of UL2200 (120 degrees C). The insulation system material shall be class "H" capable of withstanding 150 degrees C temperature rise.

F. The alternator shall be protected against overloads and short circuit conditions by advanced control panel protective functions. The control panel is to provide a time current algorithm that protects the alternator against short circuits. To ensure precision protection and repeatable trip characteristics, these functions must be implemented electronically in the generator control panel.

2.3 CONTROLS

A. The generator control system shall be a fully integrated microprocessor based control system for standby emergency engine generators meeting all requirements of NFPA 110 level 1.

B. The generator control system shall be a fully integrated control system enabling remote diagnostics and easy building management integration of all generator functions. The generator controller shall provide integrated and digital control over all generator functions including: engine protection, alternator protection, speed governing, voltage regulation, air-fuel-ratio control (as required) and all related generator operations. The generator controller must also provide seamless digital integration with the engine’s electronic engine control module (ECM) if so equipped. Generator controller’s that utilize separate voltage regulators and speed governors or do not provide seamless integration with the engine management system are considered less desirable.

C. The control system shall provide an environmentally sealed design including encapsulated circuit boards and sealed automotive style plugs for all sensors and circuit board connections. The use of non-encapsulated boards, edge cards, and pc ribbon cable connections are considered unacceptable.

D. Circuit boards shall utilize surface mount technology to provide vibration durability. Circuit boards that utilize large capacitors or heat sinks must utilize encapsulation methods to securely support these components.

E. A predictive maintenance algorithm that alarms when maintenance is required. The controller shall have the capability to call out to the local servicing dealer when maintenance is required.

F. Diagnostic capabilities should include time-stamped event and alarm logs, ability to capture operational parameters during events, simultaneous monitoring of all input or output parameters, callout capabilities, support for multi-channel digital strip chart functionality and .2 msec data logging capabilities.

G. In addition to standard NFPA 110 alarms, the application loads should also be protected through instantaneous and steady state protective settings on system voltage, frequency, and power levels.
H. The control system shall provide pre-wired customer use I/O: 8 relay outputs (user definable functions), communications support via RS232, RS485. Additional I/O must be an available option.

I. Alarm wiring and cabling shall be extended from generator unit to punch block in shelter.

J. Customer I/O shall be software configurable providing full access to all alarm, event, data logging, and shutdown functionality. In addition, custom ladder logic functionality inside the generator controller shall be supported to provide application support flexibility. The ladder logic function shall have access to all the controller inputs and customer assignable outputs.

K. The control panel will display all user pertinent unit parameters including: engine and alternator operating conditions; oil pressure and optional oil temperature; coolant temperature and level alarm; fuel level (where applicable); engine speed; DC battery voltage; run time hours; generator voltages, amps, frequency, kilowatts, and power factor; alarm status and current alarm(s) condition per NFPA 110 level 1.

2.4 ENGINE / ALTERNATOR PACKAGING

A. The engine/alternator shall be mounted with internal vibration isolation onto a welded steel base. These units shall not need external vibration isolation for normal pad mounted applications.

B. Mainline Breakers
   1. **25 KW System**: One mainline, thermal magnetic circuit breaker(s) carrying the UL mark shall be factory installed. The breaker(s) shall be rated as follows: (1) 100amps. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections. The breaker(s) are to include auxiliary contacts for shunt trip functionality.
   2. **50 KW System**: One mainline, thermal magnetic circuit breaker(s) carrying the UL mark shall be factory installed. The breaker(s) shall be rated as follows: (1) 200amps. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections. The breaker(s) are to include auxiliary contacts for shunt trip functionality.

2.5 ENCLOSURE

A. The genset shall be packaged with an insulated sound attenuating weather protective rodent proof enclosure.

B. The enclosure shall be completely lined with sound deadening material. This material must be of a self extinguishing design.

C. The enclosure shall be made of steel with a minimum thickness of 14 gauge. The enclosure is to have hinged, removable doors to allow access to the engine, alternator and control panel. The hinges shall allow for door fit adjustment. Hinges and all exposed fasteners will be stainless steel or JS5000. The use of pop-rivets weakens the paint.
system and not allowed on external painted surfaces. Each door will have lockable hardware with identical keys.

D. The enclosure shall be coated with electrostatic applied powder paint, baked and finished to manufacturer's specifications. The color will be manufacturer’s standard.

E. The enclosure shall utilize an upward discharging radiator hood. Due to concerns relative to radiator damage, circulating exhaust, and prevailing winds, equipment without a radiator discharge hood will not be acceptable.

F. The genset silencer shall be mounted on the discharge hood of the enclosure. Due to architectural concerns, silencers mounted on the top of the generator enclosure are not acceptable. Gensets with silencers mounted inside the main generator compartment are acceptable only if the silencer is thermally wrapped to minimize heat stress on the surrounding components.

2.6 MISCELLANEOUS EQUIPMENT

A. Load Center: Provide and install 120/240V, 30A Load Center within the enclosure with branch circuits and duplex receptacles to power the following items:
   1. Battery Charger
   2. Block Heater
   3. Battery Warmer
   4. Duplex receptacles to include box with hinged cover suitable for wet/dry locations.

B. Remote Emergency Stop Switch: Provide and install (1) weather proof mushroom type emergency off switches to turn off generator (within building). Switch shall have a clear, hinged cover to protect from accidental tripping. Mount the switch in equipment building by door with a plaque stating “Generator Emergency Off Switch”.

C. Software and associated “dongle” or “access key” for remote system monitoring.

2.7 LOOSE ITEMS

A. Supplier to itemize loose parts that require site mounting and installation. Preference will be shown for gensets that factory mount items like mufflers, battery chargers, etc.

B. Spare Parts:
   1. Fuses: One spare set
   2. Filters: One spare set (air, fuel, oil)

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that required utilities are available in proper location and ready for use.
B. Coordinate generator slab dimensions, locations for conduit stub ups and location for LP fuel entry into generator enclosure with generator supplier.

3.2 FACTORY TESTING

A. Before shipment of the equipment, the engine-generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:
   1. Verify voltage & frequency stability.
   2. Verify transient voltage & frequency dip response.
   3. Load test the generator for 30 minutes.
   4. Load testing to be performed at rated power factor.

B. Tests shall be completed using both types of fuel sources when dual fuel units are specified.

3.3 INSTALLATION

A. Install complete electrical generating system including all external fuel connections in accordance with requirements of NEC, NFPA and the manufacturer's instructions.

B. Generator set shall be anchored to the concrete generator slab. All openings shall be sealed shut such that the entire system is weather and rodent proof.

C. Contractor shall provide all required fuel during testing.

3.4 SERVICE

A. Supplier of the genset and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

3.5 WARRANTY

A. The standby electric generating system components, complete genset and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of two (2) years. An option for a Five (5) year Comprehensive shall be available. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge for parts, labor and travel.

B. The warranty period shall commence when the standby power system is first placed into service. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.
3.6 STARTUP AND CHECKOUT

A. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:

1. Ensuring the engine starts (both hot and cold) within the specified time.
2. Verification of engine parameters within specification.
3. Verify no load frequency and voltage, adjusting if required.
4. Test all automatic shutdowns of the engine-generator.
5. Load Testing:
   a. Perform a load test of the electric plant using primary fuel source, ensuring full load frequency and voltage are within specification by using building load.
   b. Perform full load testing utilizing a portable test bank for four hours continuous, minimum. During the first two hours, step increase the load from 0% to 100% in at least six equal steps. At the end of two hours, continue running test at 100% load. Record the following in 20 minute intervals throughout the four hour test: kilowatts, amperes, voltage, coolant temperature, room temperature, generator frequency (Hz), oil pressure, fuel consumption.
   c. After the generator has cooled down from the four hour test, shut it down and then simulate a power failure including operation of the transfer switch, automatic cycle, and automatic shutdown and return to normal.

3.7 TRAINING

A. Training is to be supplied by the start-up technician for the end-user during commissioning. The training should cover basic generator operation and common generator issues that can be managed by the end-user.

B. Provide 8 hours of training time for each system to be determined by the Owner.

3.8 OWNKR’S MANUALS

A. Three (3) sets of owner’s manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

END OF SECTION
SECTION 26 36 00
TRANSFER SWITCHES

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. The work under this section includes transfer switches (less than 600V) for standby generator systems of the size and quantity as noted in the drawings.

B. Related Sections:
   1. Section 26 32 00 – Packaged Generator Assemblies
   2. Section 13 30 20 – Precast Concrete Communications Shelters

1.2 QUALITY ASSURANCE
A. Manufacturer: Company specializing in automatic transfer equipment with five years documented experience.

1.3 SUBMITTALS
A. Submit product data showing overall dimensions, electrical connections, electrical ratings, all specified accessories, interlock methods, and environmental requirements.

B. Submit manufacturer's installation, operation and maintenance instructions.

PART 2 PRODUCTS

2.1 AUTOMATIC TRANSFER SWITCH
A. The automatic transfer switch shall be furnished by the manufacturer of the engine-generator set so as to maintain system compatibility and local service responsibility for the complete emergency power system. It shall be listed by Underwriter's Laboratory, Standard 1008 with fuse or circuit breaker protection. Representative production samples of the transfer switch supplied shall have demonstrated through tests the ability to withstand at least 10,000 mechanical operation cycles. One operation cycle is the electrically operated transfer from normal to emergency and back to normal. Wiring must comply with NEC table 312.6. The manufacturer shall furnish schematic and wiring diagrams for the particular automatic transfer switch and a typical wiring diagram for the entire system.

2.2 RATINGS AND PERFORMANCE
A. The automatic transfer switches shall be Open Transition, 3 pole, 120/240 VAC 1 Phase, 200 amp. It shall be rated for continuous operation in ambient temperatures of -20
degrees Fahrenheit (-30 degrees Celsius) to +140 degrees Fahrenheit (+60 degrees Celsius). Main power switch contacts shall be rated for 600 V AC minimum. Each transfer switch supplied shall have a minimum withstand and closing rating when fuse protected of 200,000 amperes. Where the line side over current protection is provided by circuit breakers, the short circuit withstand and closing ratings shall be 14,000 amperes RMS. These RMS symmetrical fault current ratings shall be the rating listed in the UL listing or component recognition procedures for the transfer switch. All withstand tests shall be performed with the over current protective devices located external to the transfer switch.

2.3 CONSTRUCTION

A. The transfer switch shall be double throw construction, positively electrically and mechanically interlocked to prevent simultaneous closing and mechanically held in both normal and emergency positions. Independent break before make action shall be used to positively prevent dangerous source to source connections. When switching the neutral, this action prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs. The transfer switch shall be approved for manual operation. The electrical operating means shall be by electric solenoid. Every portion of the contactor is to be positively mechanically connected. No clutch or friction drive mechanism is allowed, and parts are to be kept to a minimum. This transfer switch shall not contain integral over current devices in the main power circuit, including molded case circuit breakers or fuses.

B. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy with arc chutes and separate arcing contacts to resist burning and pitting for long life operation.

2.4 CONTROLS

A. All control equipment shall be mounted on the inside of the cabinet door in a metal lockable enclosure with transparent safety shield to protect all solid state circuit boards. This will allow for ease of service access when main cabinet lockable door is open, but to prevent access by unauthorized personnel. Control boards shall have installed cover plates to avoid shock hazard while making control adjustments. The solid state voltage sensors and time delay modules shall be plug-in circuit boards with silver or gold contacts for ease of service.

B. A solid state under voltage sensor shall monitor all phases of the normal source and provide adjustable ranges for field adjustments for specific application needs. Pick-up and drop-out settings shall be adjustable from a minimum of 70% to a maximum of 95% of nominal voltage. A utility sensing interface shall be used, stepping down system voltage of 240/120 VAC 3 phase to 24VAC, helping to protect the printed circuit board from voltage spikes and increasing personnel safety when troubleshooting.

C. Signal the engine-generator set to start in the event of a power interruption. A set of contacts shall close to start the engine and open for engine shutdown. A solid state time
delay start, adjustable, .1 to 10 seconds, shall delay this signal to avoid nuisance start-ups on momentary voltage dips or power outages.

D. Transfer the load to the engine-generator set after it reached proper voltage, adjustable from 70-90% of system voltage, and frequency, adjustable from 80-90% of system frequency. A solid state time delay, adjustable from 5 seconds to 3 minutes, shall delay this transfer to allow the engine-generator to warm-up before application of load. There shall be a switch to bypass this warm-up timer when immediate transfer is required.

E. Retransfer the load to the line after normal power restoration. A return to utility timer, adjustable from 1-30 minutes, shall delay this transfer to avoid short term normal power restoration.

F. The operating power for transfer and retransfer shall be obtained from the source to which the load is being transferred. Controls shall provide an automatic retransfer of the load from emergency to normal if the emergency source fails with the normal source available.

G. Signal the engine-generator to stop after the load retransfers to normal. A solid state engine cool down timer, adjustable from 1-30 minutes, shall permit the engine to run unloaded to cooldown before shutdown. Should the utility power fail during this time, the switch will immediately transfer back to the generator.

H. Provide an engine minimum run timer, adjustable from 5-30 minutes, to ensure an adequate engine run period.

I. The transfer switch shall have a time delay neutral feature to provide a time delay, adjustable from .1-10 seconds, during the transfer in either direction, during which time the load is isolated from both power sources. This allows residual voltage components of motors or other inductive loads (such as transformers) to decay before completing the switching cycle. A switch will be provided to bypass all transition features when immediate transfer is required.

J. The transfer switch shall have an in phase monitor which allows the switch to transfer between live sources if their voltage waveforms become synchronous within 20 electrical degrees within 10 seconds of transfer initiation signal. A switch must be provided to bypass this feature if not required.

K. If the in phase monitor will not allow such a transfer, the control must default to time delay neutral operation. Switches with in phase monitors which do not default to time delay neutral operation are not acceptable.

L. Front mounted controls shall include a selector switch to provide for a NORMAL TEST mode with full use of time delays, FAST TEST mode which bypasses all time delays to allow for testing the entire system in less than one minute, or AUTOMATIC mode to set the system for normal operation.
M. Provide bright lamps to indicate the transfer switch position in either UTILITY (white) or EMERGENCY (red). A third lamp is needed to indicate STANDBY OPERATING (amber). These lights must be energized from utility or the engine-generator set.

N. Provide manual operating handle to allow for manual transfer. This handle must be mounted inside the lockable enclosure so accessible only by authorized personnel.

O. Provide a maintenance disconnect switch to prevent load transfer and automatic engine start while performing maintenance. This switch will also be used for manual transfer switch operation.

P. Provide LED status lights to give a visual readout of the operating sequence. This shall include utility on, engine warm-up, standby ready, transfer to standby, in phase monitor, time delay neutral, return to utility, engine cool down and engine minimum run. A "signal before transfer" lamp shall be supplied to operate from optional circuitry.

2.5 MISCELLANEOUS EQUIPMENT

A. The transfer switch mechanism and controls shall be mounted in a NEMA 1 indoor enclosure.

B. The following options are to be provided by the transfer switch manufacturer.
1. A second set of DPDT (form C), 10 ampere, 250 volt auxiliary contacts, operated by the transfer switch mechanism shall be installed.
2. All required generator alarms shall be wired to the alarm R66 block located in the shelter.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install transfer switch in accordance with requirements of NEC and the manufacturer's instructions.

3.2 FIELD ADJUSTMENTS

A. The contractor shall field adjust all timing and voltage settings of the transfer switch as necessary for proper operation of the switch, related loads and sources.

3.3 WARRANTY

A. Warranty for transfer switches shall be the same requirements as set forth for the Packaged Generator Assemblies.

END OF SECTION
SECTION 31 05 13
SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Subsoil materials.
   2. Topsoil materials.

B. Related Sections:
   1. Section 31 05 16 - Aggregates for Earthwork.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils
      Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics
      of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
   2. ASTM D1557 - Standard Test Method for Laboratory Compaction
      Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
   3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes
      (Unified Soil Classification System).

1.3 SUBMITTALS

A. Materials Source: Submit name, source location and supplier of imported materials.

1.4 QUALITY ASSURANCE

A. Furnish each subsoil and topsoil material from single source throughout the Work.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

A. Subsoil Type (S1) General Fill:
   1. Excavated and re-used material or local borrow.
   2. Graded.
   3. Free of lumps larger than 2 inches, rocks larger than 2 inches, and debris.
4. Conforming to ASTM D2487 Group Symbol GW, GP, GP-GM, SW, SP and SP-SM.
5. Use of clay soils with written permission of Architect.

B. Subsoil Type (S2) Select Fill:
1. Excavated and re-used material or local borrow.
2. Graded.
3. Free of lumps larger than 2 inches, rocks larger than 2 inches, and debris.
4. Conforming to ASTM D2487 Group Symbol GW, GP, SW and SP.
5. Material with less than 15% passing the No. 200 sieve.

2.2 TOPSOIL MATERIALS

A. Topsoil Type (S3) Onsite Topsoil:
1. Excavated and reused material.
2. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
3. Conforming to ASTM D2487 Group Symbol OH.

B. Topsoil Type (S4) Imported Topsoil:
1. Imported borrow.
2. Friable loam.
3. Graded / Screened.
4. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
5. Containing minimum of 8 percent and maximum of 25 percent inorganic matter.
6. Conforming to ASTM D2487 Group Symbol OH.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.

B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations designated by Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.
C. Separate differing materials with dividers or stockpile apart to prevent mixing.
D. Stockpile topsoil 15 feet high maximum.
E. Prevent intermixing of soil types or contamination.
F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   2. Fine aggregate materials.

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork
   2. Section 31 23 17 – Rough Grading.
   3. Section 31 23 17 - Trenching.
   4. Section 31 23 23 - Fill.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-
      Aggregate Subbase, Base and Surface Courses.
   2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils
      Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
      Aggregates.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics
      of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Method for Laboratory Compaction
      Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes
      (Unified Soil Classification System).
   5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and
      Plasticity Index of Soils.

1.3 SUBMITTALS

A. Materials Source: Submit name and location of imported materials suppliers.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Provide aggregate materials from sources approved by State of Wisconsin Department of
   Transportation.
### PART 2 PRODUCTS

#### 2.1 COARSE AGGREGATE MATERIALS

##### A.  Coarse Aggregate Type (A1) 3/4-Inch Dense Graded Base Aggregate: Conforming to State of Wisconsin DOT Standard Specifications Section 305; within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>95 to 100</td>
</tr>
<tr>
<td>3/8 inches</td>
<td>50 to 90</td>
</tr>
<tr>
<td>No. 4</td>
<td>35 to 70</td>
</tr>
<tr>
<td>No. 10</td>
<td>15 to 55</td>
</tr>
<tr>
<td>No. 40</td>
<td>10 to 35</td>
</tr>
<tr>
<td>No. 200</td>
<td>5 to 15</td>
</tr>
</tbody>
</table>

##### B.  Coarse Aggregate Type (A2) 1 1/4-Inch Dense Graded Base Aggregate: Conforming to State of Wisconsin DOT Standard Specifications Section 305, within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/4 inches</td>
<td>95 to 100</td>
</tr>
<tr>
<td>1 inch</td>
<td>-</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>70 to 93</td>
</tr>
<tr>
<td>3/8 inches</td>
<td>45 to 80</td>
</tr>
<tr>
<td>No. 4</td>
<td>30 to 63</td>
</tr>
<tr>
<td>No. 10</td>
<td>20 to 48</td>
</tr>
<tr>
<td>No. 40</td>
<td>8 to 28</td>
</tr>
<tr>
<td>No. 200</td>
<td>2 to 12</td>
</tr>
</tbody>
</table>

##### C.  Coarse Aggregate Type (A3) 3-Inch Dense Graded Base Aggregate: Conforming to State of Wisconsin DOT Standard Specifications Section 305; within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inches</td>
<td>90 to 100</td>
</tr>
<tr>
<td>1 1/2 inches</td>
<td>60 to 85</td>
</tr>
<tr>
<td>1 inch</td>
<td>-</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>40 to 65</td>
</tr>
<tr>
<td>3/8 inches</td>
<td>-</td>
</tr>
</tbody>
</table>
Towers for Public Safety Communication System  
Door County, WI

| No. 4 | 15 to 40 |
| No. 10 | 10 to 30 |
| No. 40 | 5 to 20 |
| No. 200 | 2 to 12 |

D. Coarse Aggregate Type (A4) 3/4-Inch Clear Crushed Stone: Crushed clear stone or gravel; within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90 - 100</td>
</tr>
<tr>
<td>5/8 inches</td>
<td>-</td>
</tr>
<tr>
<td>3/8 inches</td>
<td>20 to 55</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 to 10</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

Coarse Aggregate Type (A5) 3/8 - Inch Clear Crushed Stone Chips: Crushed clear stone or gravel; within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>-</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/8 inches</td>
<td>90 to 100</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 15</td>
</tr>
<tr>
<td>No. 30</td>
<td>0 to 3</td>
</tr>
</tbody>
</table>

E. Aggregate Type (A6) Breaker Run (Breaker): Conforming to State of Wisconsin DOT Standard Specifications Section 311.

F. Aggregate Type (A7) Pea Gravel: Natural stone; washed, free of clay, shale and organic matter.

1. Graded in accordance with ASTM C136, within the following limits:
   a. Minimum Size: 1/4-inch
   b. Maximum Size: 3/8-inch

2.2 FINE AGGREGATE MATERIALS

A. Fine Aggregate Type (A8) Granular Backfill Grade No. 1: Conforming to State of Wisconsin DOT Standard Specifications Section 209.

B. Fine Aggregate Type (A9) Granular Backfill Grade No. 2: Conforming to State of Wisconsin DOT Standard Specifications Section 209.
C. Fine Aggregate Type (A10) Bedding Sand (Sand): Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter; graded in accordance with ASTM C136 within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Inch</td>
<td>100</td>
</tr>
<tr>
<td>No. 16</td>
<td>45 to 80</td>
</tr>
<tr>
<td>No. 200</td>
<td>2 to 10</td>
</tr>
</tbody>
</table>

2.3 SOURCE QUALITY CONTROL


C. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate aggregate materials from on-site locations indicated or designated by Architect/Engineer as specified in Section 31 23 00.

B. Stockpile excavated material meeting requirements for coarse aggregate materials and fine aggregate materials.

C. Remove excess excavated materials coarse aggregate materials and fine aggregate materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for coarse aggregate materials and fine aggregate materials from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations indicated designated by Architect/Engineer.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
E. Stockpile unsuitable hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION
Towers for Public Safety Communication System  
Door County, WI  

SECTION 31 10 00  
SITE CLEARING  

1.1 SUMMARY  

A. Section Includes:  
   1. The work under this section shall consist of providing all work, materials, labor,  
      equipment, and supervision necessary to clear and grub the site of existing  
      vegetation as required in these specifications and on the drawings.  

B. Related Sections:  
   1. Section 31 05 13- Soils for Earthwork  
   2. Section 31 23 23 - Fill  

1.2 CLEARING LIMITS  

A. Confine clearing and grubbing operations to the limits as indicated on the drawings. In  
   the absence of such a designation on the drawings, confine work to the minimum area  
   reasonably necessary to undertake the work as determined by the Owner's Project  
   Representative. Clearing and grubbing operations shall not extend past the property line  
   or easement line without prior approval of the Construction Representative.  

PART 2 PRODUCTS  
NOT USED  

PART 3 EXECUTION  

3.1 GENERAL  

A. Limits of clearing and grubbing shall be as shown on plans. When selective pruning and  
   removal is specified, limit work to only those plants or limbs shown drawings or  
   scheduled.  

B. Remove trees, stumps, roots, brush, other vegetation, debris, and other items that interfere  
   with new construction.  

C. To minimize erosion, limit heavy equipment travel only to that necessary to complete  
   clearing and grubbing.  

D. Repair damaged erosion control features immediately.
3.2 CUTTING

A. Fell and prune trees in manner so as not to damage adjacent structures, site features or other plants not scheduled for removal. Use tag lines and other devices as necessary to control falling tree and limbs.

B. When pruning, limit removal only to those limbs shown on plans or that which is necessary to complete other sitework.

C. When pruning, make cuts near trunk, but beyond branch collar. If no branch collar is present, make a vertical cut near where the limb meets the trunk. Do not cut branch collar.

D. Use sharp tools and make clean cuts.

E. Application of wound paint is not necessary.

3.3 CHIPPING

A. Unless otherwise prohibited by project plans and specifications or local regulations, Contractor shall chip cleared material and dispose of it onsite. Materials that are too large to be chipped or ground in place shall be disposed of off site.

B. Chipped material shall be thin spread or blow over non disturbed areas of the site. Large segregated piles of chippings shall not be left onsite, unless requested by the owner.

C. Protect all existing and proposed utility structures and waterways from collecting chippings.

3.4 ONSITE BURIAL OF MATERIALS

A. Onsite burials of materials in borrow pits or other locations is not permitted.

3.5 OFFSITE BURIAL OF MATERIALS

A. Clearing and grubbing debris shall be disposed of at facilities designed to accept the material that is being disposed. Follow all local, state and federal regulations.

3.6 GRUBBING

A. Remove Grubbing operations may be completed by removal of stump section or by grinding.

B. Remove stumps, logs, roots, other organic matter located within proposed building excavations completely.

C. Remove stumps, logs, roots, other organic matter located within proposed pavements and structures to the depth indicated:
   1. Walks: 24 inches below subgrade
2. Roads and drives and parking areas: 36 inches below subgrade
3. Concrete slabs: 24 inches below subgrade
4. Lawn areas: 12 inches
5. Footings and foundations for signs, lights, etc.: 18 inches below footing base

D. Depressions resulting from grubbing operations shall be backfilled in accordance with Section 31 23 23 – Fill.

END OF SECTION
SECTION 31 22 13
ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating topsoil.
   2. Excavating subsoil.
   3. Cutting, grading, filling, and compacting site
   4. Subgrade approval & Proof-Roll
   5. Excavation Below Subgrade (EBS)
   6. Geotextile Subgrade Stabilization

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork
   2. Section 31 05 16 - Aggregates for Earthwork
   3. Section 31 23 16 – Excavation
   4. Section 31 23 17 - Trenching
   5. Section 31 23 23 - Fill

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:

B. ASTM International:
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).

1.3 SUBMITTALS


B. Materials Source: Submit name, source location and supplier of imported materials.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.
1.5 QUALITY ASSURANCE


B. Proof-roll subgrade in the presence of the Engineer.

C. Warrant work under this section against settlement for a period of (1) year after substantial completion.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: (S3) Onsite and (S4) Imported as specified in Section 31 05 13.

B. Subsoil Fill: (S1) General and (S2) Select as specified in Section 31 05 13.

C. Structural Fill: (S2) Select and (A7) Granular Grade No. 1 as specified in Sections 31 05 13 and 31 05 16.

D. Breaker Run: (A5) Breaker Run as specified in Section 31 05 16.

E. Geotextile Fabric for Subgrade Stabilization: Geotextile fabric installed over subgrade and under aggregate base course shall be a high performance non-biodegradable polypropylene geotextile specifically designed for soil stabilization and soil reinforcement applications. Acceptable products include Iowa DOT Section 4196 with the following test values:

<table>
<thead>
<tr>
<th>Test</th>
<th>Method</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Tensile Strength</td>
<td>GRI Method GG1-87</td>
<td>250 lb/in</td>
</tr>
<tr>
<td>Max. Aperture</td>
<td>Internal Dimension Measuring Calipers</td>
<td>2 in.</td>
</tr>
<tr>
<td>Min. Aperture</td>
<td>Internal Dimension Measuring Calipers</td>
<td>0.5 in</td>
</tr>
<tr>
<td>Min. Ultimate Junction</td>
<td>GRI GG2-87</td>
<td>800 lbs./ft.</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Call Local Utility Line Information service at not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Notify utility company to remove and relocate utilities.

D. Protect utilities indicated to remain from damage.

E. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

A. Excavate topsoil from entire site without mixing with foreign materials for use in finish grading.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 15 feet and protect from erosion.

D. Remove excess topsoil not intended for reuse, from site.

3.4 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, re-landscaped or re-graded.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform Work by hand and cut roots with sharp axe.

D. Remove excess subsoil not intended for reuse, from site.

E. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.

F. Stability: Replace damaged or displaced subsoil as specified for fill.
3.5 FILLING
A. Fill areas to contours and elevations with unfrozen materials.
B. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
C. Maintain optimum moisture content of fill materials to attain required compaction density.
D. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
E. Make grade changes gradual. Blend slope into level areas.
F. Repair or replace items indicated to remain damaged by excavation or filling.
G. Remove surplus materials from site.

3.6 SUBGRADE APPROVAL AND PROOF-ROLL
A. Prior to placing aggregate base course materials in traffic areas contact Geotechnical Engineer to schedule inspection of subgrade and proof rolling. Provide minimum of 24 hrs confirmed notice. All proof rolling shall be completed in the presence of the Geotechnical Engineer.
B. To complete proof rolling, entire subgrade shall be provided with a relatively smooth surface, suitable for observing soil reaction during proof rolling.
C. Contractor shall schedule and provide a fully loaded tri-axle dump truck for proof rolling. Loaded truck shall have a minimum gross operating weight of 30 tons. Test shall be conducted with “tag” or “pusher” axles retracted from the ground. Other test rolling measures may be suitable provided they are approved by the Geotechnical Engineer.
D. Test rolling shall be accomplished in a series of traverses parallel to the centerline of the pavement section. The truck shall traverse the length of the pavement section once for each 12’ of width. Additional passes along the traverse shall be completed as directed by the Engineer, to further define unsatisfactory subgrade.
E. Soft areas, yielding areas, cracked areas or areas where rolling or wave action is observed shall be considered indicative of an unsatisfactory subgrade. Such areas shall be undercut or stabilized with geotextile fabric as outlined in subsequent subsections of this specification.
F. Once the subgrade has been proof-rolled and approved, protect the soils from becoming saturated, frozen, or adversely altered.
3.7 UNDERCUTTING/EXCAVATION BELOW SUBGRADE (EBS)

A. Excavate areas to be undercut to the depth specified using equipment with smooth cutting edge. Excavated undercut material that does not meet the specifications for fill needed elsewhere on site shall be removed from the site and legally disposed.

B. Undercut areas shall be backfilled with 3-inch Breaker Run (A6) in maximum of 12” thick lifts (compacted). Breaker Run shall be compacted to 95% Modified Proctor dry density.

C. Measure and document areas to be undercut in consultation with Engineer.

D. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

E. Do not place fill on soft, muddy, or frozen surfaces.

F. Work under this item shall include all excavating, backfilling, disposal and new materials necessary to complete the work.

3.8 GEOTEXTILE SUBGRADE STABILIZATION

A. Installation of geotextile fabric for subgrade reinforcement shall be completed only when directed by the Engineer. Measure and document areas to be covered with geotextile fabric in consultation with Engineer.

B. Install geotextile fabric per manufacturer’s recommendations.

3.9 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 1/20 foot from required elevation.

3.10 SCHEDULES

A. Fill Under Landscaped or Grass Areas:
   1. Subsoil Fill:
      a. To finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.

B. Fill Under Exterior Concrete, Asphalt Pavement or Gravel Areas:
   1. Structural Fill:
      a. To within 3 feet of finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.
      b. From 3 feet below subgrade to finished subgrade elevation: Place material in 8-inch max lifts, compact uniformly to 95 percent of maximum dry density

C. Topsoil Fill:
1. Topsoil Fill:
   a. To finished grade elevation. 4-inches to 6-inches thick.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating for equipment building foundations.
   2. Excavating for access roads, compounds and parking areas.
   3. Excavating for slabs-on-grade.
   4. Excavating for site structures.

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork
   2. Section 31 05 16 - Aggregates for Earthwork
   3. Section 31 22 13 – Rough Grading
   4. Section 31 23 17 - Trenching
   5. Section 31 23 23 - Fill.

1.2 REFERENCES

A. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

B. Local utility standards when working within 24 inches of utility lines.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 PREPARATION

A. Call Digger’s Hotline not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Verify locations of locally installed private utilities and conduits. Coordinate with building addition General Contractor and sub-contractors.

C. Identify required lines, levels, contours, and datum.
D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.2 EXCAVATION

A. Underpin adjacent structures which may be damaged by excavation work.
B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and site structures.
C. Excavate to working elevation for piling work.
D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with specifications.
E. Slope banks with machine to angle of repose or less until shored.
F. Do not interfere with 45 degree bearing splay of foundations.
G. Grade top perimeter of excavation to prevent surface water from draining into excavation.
H. Trim excavation. Remove loose matter.
I. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.
J. Notify Architect/Engineer of unexpected subsurface conditions.
K. Correct areas over excavated as directed by Architect/Engineer.
L. Remove excess and unsuitable material from site.
M. Repair or replace items indicated to remain damaged by excavation.

3.3 FIELD QUALITY CONTROL

A. Request visual inspection of foundation bearing surfaces by Architect/Engineer before installing subsequent work.
B. Perform Proof-Roll (roll-test) of finished subgrade traffic areas in accordance with Section 31 22 13. Undercut unsatisfactory materials and replace with breaker run at no additional cost to Owner.

3.4 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating and backfilling site utility trenches for utilities services and grounding.

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork
   2. Section 31 05 16 - Aggregates for Earthwork
   3. Section 31 23 16 – Rough Grading
   4. Section 31 23 16 - Excavation
   5. Section 31 23 23 - Fill

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:

B. ASTM International:
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
   3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
   5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Materials Source: Submit name, source location and supplier of imported fill materials.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

1.6 QUALITY ASSURANCE

A. Warrant trenching and backfilling work under this section against settlement for a period of (1) year after substantial completion.

PART 2 PRODUCTS

2.1 MATERIALS

A. Subsoil Fill: Type (S1) General Fill and (S2) Select as specified in Section 31 05 13.

B. Structural Fill: (S2) Select and (A8) Granular Grade No. 1 as specified in Sections 31 05 13 and 31 05 16.

PART 3 EXECUTION

3.1 PREPARATION

A. Call Diggers Hotline or other Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.

D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

3.2 TRENCHING

A. Excavate subsoil required for utilities to utility service.

B. Remove lumped subsoil, boulders, and rock over 6 inches in diameter.

C. Perform excavation within 24 inches of existing utility service in accordance with utility’s requirements.
D. Do not advance open trench more than 100 feet ahead of installed pipe.

E. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

F. Excavate bottom of trenches a minimum of 6 inches and a maximum 12 inches wider than outside diameter of pipe.

G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.

H. Do not interfere with 45 degree bearing splay of foundations.

I. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.

J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered.

K. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type Structural Fill and compact to density equal to or greater than requirements for subsequent backfill material.


M. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Architect/Engineer.

N. Remove excess subsoil not intended for reuse, from site.

3.3 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.
3.4 UTILITY INSTALLATION

A. Install utility within trench including required bedding and cover materials in accordance with the specifications for each utility.

3.5 BACKFILLING

A. Do not leave more than 50 feet of trench open at end of working day.
B. Protect open trench to prevent danger to the public.
C. Backfill areas to contours and elevations with unfrozen materials.
D. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
E. Place backfill material and compact in continuous layers in accordance with the schedule at the end of this section.
F. Employ placement method that does not disturb or damage other work.
G. Maintain optimum moisture content of backfill materials to attain required compaction density.
H. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
I. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
J. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
K. Make gradual grade changes. Blend slope into level areas.
L. Remove surplus backfill materials from site.
M. Leave fill material stockpile areas free of excess fill materials.

3.6 TOLERANCES

A. Top Surface of Backfilling Within Building Areas: Plus or minus 1/2 inch from required elevations.
B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.
C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
3.7 FIELD QUALITY CONTROL

A. Perform Proof-Roll (roll-test) of finished backfilled areas within proposed traffic areas in accordance with Section 31 22 13. Undercut unsatisfactory materials and replace with breaker run at no additional cost to Owner.

3.8 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic.

3.9 SCHEDULE

A. Trenches Under Landscaped or Grass Areas:
   1. Subsoil Fill:
      a. To finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.

B. Trenches Under Exterior Concrete, Asphalt Pavement or Gravel Areas:
   1. Structural Fill:
      a. To within 3 feet of finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.
      b. From 3 feet below subgrade to finished subgrade elevation: Place material in 8-inch max lifts, compact uniformly to 95 percent of maximum dry density

END OF SECTION
SECTION 31 23 23
FILL

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
1. Backfilling building perimeter to subgrade elevations.
2. Backfilling site structures to subgrade elevations.
3. Fill under slabs-on-grade.
4. Fill under paving.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork
2. Section 31 05 16 - Aggregates for Earthwork
3. Section 31 22 13 – Rough Grading
4. Section 31 23 16 - Excavation
5. Section 31 23 17 - Trenching

1.2 REFERENCES
A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils
   Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics
   of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
2. ASTM D1557 - Standard Test Method for Laboratory Compaction
   Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
3. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in
   Place by Nuclear Methods (Shallow Depth).
4. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in
   Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS
A. Materials Source: Submit name, source location and supplier of imported fill materials.

1.4 QUALITY ASSURANCE
A. Warrant backfilling work under this section against settlement for a period of (1) year
   after substantial completion.

November 8, 2012
Fill
31 23 23-1
PART 2 PRODUCTS

2.1 MATERIALS

A. Subsoil Fill: Type S1 General Fill as specified in Section 31 05 13.
B. Subsoil Fill: (S1) General and (S2) Select as specified in Section 31 05 13.
C. Structural Fill: (S2) Select and (A8) Granular Grade No. 1 as specified in Sections 31 05 13 and 31 05 16.
D. Breaker Run: (A6) Breaker Run as specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify sub-drainage, damp-proofing, or waterproofing installation has been inspected.
B. Verify structural ability of unsupported walls to support loads imposed by fill.
C. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.
B. Compact subgrade to density requirements for subsequent backfill materials.
C. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill and compact to density equal to or greater than requirements for subsequent fill material.
D. Scarify subgrade surface to depth of 6 inch.
E. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 FILLING

A. Fill areas to contours and elevations with unfrozen materials.
B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
C. Place material in continuous layers and compact in accordance with the schedule at the end of this section.
D. Employ placement method that does not disturb or damage other work.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

H. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.

I. Make gradual grade changes. Blend slope into level areas.

J. Remove surplus backfill materials from site.

K. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

A. Top Surface of Backfilling Within Building Areas: Plus or minus 1/2 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Perform Proof-Roll (roll-test) of finished filled traffic areas in accordance with Section 31 22 1 – Rough Grading.

B. Undercut unsatisfactory materials and replace with breaker run at no additional cost to Owner.

3.6 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic.

3.7 SCHEDULE

A. Backfilling Building Perimeters and Site Structures:
   1. Structural Fill:
      a. To within 3 feet of finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.
b. From 3 feet below subgrade to finished subgrade elevation: Place material in 8-inch max lifts, compact uniformly to 95 percent of maximum dry density

B. Fill Under Exterior Concrete, Asphalt Pavement or Gravel Areas:
   1. Structural Fill:
      a. To within 3 feet of finished subgrade elevation: Place material in 12-inch max lifts, compact uniformly to 90 percent of maximum dry density.
      b. From 3 feet below subgrade to finished subgrade elevation: Place material in 8-inch max lifts, compact uniformly to 95 percent of maximum dry density

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fence framework, fabric, and accessories.
   2. Excavation for post bases.
   3. Concrete foundation for posts and center drop for gates.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A121 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.

B. Chain Link Fence Manufacturers Institute:
   1. CLFMI - Product Manual.

1.3 SYSTEM DESCRIPTION

A. Fence Height: as indicated on Drawings.

B. Line Post Spacing: At intervals matching plans not exceeding 10 feet.

1.4 SUBMITTALS

A. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

B. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.
1.5 QUALITY ASSURANCE
   A. Supply material in accordance with CLFMI - Product Manual.
   B. Perform installation in accordance with ASTM F567.

1.6 QUALIFICATIONS
   A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
   B. Installer: Company specializing in performing work of this section with minimum of 5 years documented experience approved by manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING
   A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
   B. Identify each package with manufacturer’s name.
   C. Store fence fabric and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS
   A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1043 Type A on pipe exterior and interior.

2.2 COMPONENTS
   A. Line Posts: 2 1/2 inch OD Sch 40.
   B. Corner and Terminal Posts: 4 inch OD Sch 40.
   C. Gate Posts: 4 inch OD Sch 40.
   D. Top and Brace Rail: 1 5/8 inch OD Sch 40, plain end, sleeve coupled.
   E. Gate Frame: 2 inch OD Sch 40 for welded fittings and truss rod fabrication.
   F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage thick, top salvage knuckle end closed, bottom selvage twisted.
G. Tension Wire: 7 gage thick steel, single strand.

H. Tension Band: 3/16 inch thick steel.

I. Tension Strap: 3/16 inch thick steel.

J. Tie Wire: Aluminum alloy steel wire.

2.3 ACCESSORIES

A. Caps: Malleable iron galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.

C. Gate Hardware: Fork latch with gravity drop; two 180 degree gate hinges for each leaf.

2.4 GATES

A. General:
   1. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
   2. Factory assemble gates.
   3. Design gates for operation by one person.

B. Swing Gates:
   1. Fabricate gates to permit 180 degree swing.
   2. Gates Construction: ASTM F900 with welded corners. Use of corner fittings is not permitted.

2.5 FINISHES


B. Accessories: Same finish as framing.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. All posts are to be driven posts. Drive post plumb and true to the required depths and elevations.

C. Line Posts: Drive a minimum of 5 feet below finish grade.
D. Corner, Gate and Terminal Posts: Drive a minimum of 6 feet below finish grade.

E. Brace each gate and corner post to adjacent line post with horizontal center brace rail. Install brace rail one bay from end and gate posts.

F. Install top rail through line post tops and splice with 6 inch long rail sleeves.

G. Install center and bottom brace rail on corner gate leaves.

H. Place fabric to match existing adjacent fence.

I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

J. Position bottom of fabric 1 inches above finished grade.

K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

M. Install bottom tension wire stretched taut between terminal posts.

N. Support gates from gate posts. Do not attach hinged side of gate from building wall.

O. Connect to existing fence at new terminal posts.

P. Install posts with 6 inches maximum clear opening from end posts to buildings, fences and other structures.

Q. Center and align posts. Verify vertical and top alignment of posts and make necessary corrections.

3.2 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From Indicated Position: 1 inch.

END OF SECTION
SECTION 33 79 00

SITE GROUNDING AND LIGHTNING PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Communication tower grounding and Lightning protection.
   2. Site grounding.
   3. Coax and waveguide grounding.
   4. Equipment shelter grounding.

B. Related Sections:
   1. Section 13 30 20 – Precast Concrete Communication Shelters
   2. Section 31 23 16.13 - Trenching
   3. Section 33 81 00 – Communication Towers
   4. Section 33 82 00 – Coax and Waveguides

1.2 REFERENCES

A. Lightning Protection
   1. NFPA 780, Standard for the Installation of Lightning Protection Systems.
   2. UL 96A, Installation Requirements for Lightning Protection Systems.

B. Grounding
   1. NFPA 70, National Electric Code
   2. IEEE Std.1100, IEEE Recommended Practice for Powering and Grounding
      Electronic Equipment.

1.3 DESIGN INTENT AND MINIMUM REQUIREMENTS

A. All grounding and lightning protection systems installed shall meet or exceed the
   requirements of the Motorola R56 Standard. In cases where these plans and
   specifications exceed the requirements of the 56 standard, these plans and specifications
   shall be followed. In cases where these plans and specifications are in conflict with the
   R56 standard, contact Engineer for desired resolution.

1.4 QUALITY ASSURANCE

A. All site grounding systems shall be installed in accordance with the National Electric
   Code (NEC), latest edition and applicable local codes for the jurisdiction in which the
   shelter is to be installed.

B. All grounding systems shall be installed by a licensed electrician.
1.5 PERFORMANCE REQUIREMENTS
   A. Overall site and tower grounding system shall have a 5 ohm maximum resistance.
   B. Testing of ground system shall be witnessed by the Engineer’s delegated field representative.
   C. Test reports of ground system performance shall be included in final closeout submittals.

1.6 EQUIPMENT AND MATERIALS FURNISHED BY OTHERS
   A. None.

1.7 WORK BY OTHERS
   A. None.

1.8 SUBMITTALS
   A. Submit manufacturer's cut sheets for all grounding and lightning protection system materials to be used on the project to the Engineer for approval prior to installation.
   B. Items requiring submittal include:
      1. Grounding conductors
      2. Air Terminals
      3. Ground rods
      4. Chemical ground rods
      5. Ground bars
      6. Coax and waveguide ground kits
      7. Surge Protection Devices / Polyphasers

1.9 RECORD DRAWINGS
   A. Accurately record installed locations of all below grade grounding electrodes and other grounding devices.
   B. Document locations in record drawings provided in final closeout submittals.
   C. Contractor to take digital photos of all installed below grade connections. Provide photos with record drawings.

PART 2 PRODUCTS

2.1 GROUNDING CONDUCTORS
   A. All ground system conductors shall be stranded or solid, tinned, copper conductors of the size and type noted on the plans. Aluminum conductors are not permitted.
2.2 AIR TERMINALS

A. Air terminals shall be constructed of copper clad steel.

B. Air terminal(s) (lightning rod) shall extend a minimum of two feet above the highest appurtenance on the tower.

C. Air terminals may be mounted on mast pipes to reach required height.

D. Air terminals shall be directly connected to mast pipes or bonded to tower steel with a #2 stranded insulated copper conductor using UL approved mechanical connectors.

E. Mast pipes (when used) shall be directly connected to tower steel or bonded to tower steel with a #2 stranded insulated copper conductor using UL approved mechanical connectors.

2.3 GROUND RODS

A. 5/8-inch or ¾-inch dia. x 10 foot copper clad steel rods. Refer to plans for requirements.

B. Rods shall be driven to depth noted in the drawings.

C. Connect each ground rod to the below grade ground system using #2 AWG solid tinned copper ground conductors. Utilize exothermic connections between ground rod and conductor.

D. Provide the number of rods as indicated on the drawings, generally no greater than (10) ten feet on center along path of ground ring.

2.4 CHEMICAL ENHANCED GROUND RODS

A. Chemical enhanced ground rod as manufactured by Harger, or equivalent, composed of a copper tube that contains specialized hygroscopic electrolytic salts that help lower soil resistivity.

B. Chemical enhanced ground rods shall be UL Listed and designed to last in excess of 35 years.

C. Chemical enhanced ground rods shall be of the length and orientation noted in the plans and be provided with test well cover and #2 solid tinned conductor for connection to site grounding system.

D. Install chemical enhanced ground rod per manufacturer’s recommendations with 4-inch minimum cover of ultra-low resistance carbon based (Ultra-fill) material on all sides.

2.5 GROUND BARS

A. ANTENNA GROUND BARS
1. Copper bus bars shall sized appropriately to accommodate the number of connecting lines. Minimum copper bar size shall be ¼” x 4” x 6” providing (9) ten (2) two hole grounding lugs, (Site Pro Part No. MG40609 or equivalent).

2. Provide (2) two #2 AWG stranded insulated ground leads which connect the ground bar to tower steel in two places using UL listed mechanical connectors as detailed in the plans.

B. LOWER TOWER GROUND BAR

1. Copper bus bar shall sized appropriately to accommodate the number of connecting lines. Minimum copper bar size shall be ¼” x 4” x 24” providing (44) forty four (2) two hole grounding lugs, (Site Pro Part No. MG42488K or equivalent).

2. Provide non-conductive insulators between bus bar and tower structure.

3. Provide (2) two #2 AWG bare solid tinned ground leads, exothermically connected to ground bar, which connects ground bar to tower ground system in two places as detailed in the plans.

C. INTERIOR/EXTERIOR SHELTER GROUND BARS

1. Copper bus bar shall sized appropriately to accommodate the number of connecting lines. Minimum copper bar size shall be ¼” x 4” x 24” providing (44) forty four (2) two hole grounding lugs, (Site Pro Part No. MG42488K or equivalent).

2. Provide non-conductive insulators between bus bar and tower/building structure.

3. Provide (2) two #2 AWG bare solid tinned ground leads, exothermically connected to ground bar, which connects ground bar to site ground system in two places as detailed in the plans.

2.6 COAX AND WAVEGUIDE GROUND KITS

A. Copper strap type ground with integral #6 ground lead with 3/8-inch two hole lug, butyl wrap and electrical tape specially fabricated for use for coax and waveguide grounding (Site Pro Series SGT, UGT or equivalent)

2.7 SURGE PROTECTION DEVICES

1. Provide Surge Protection Devices (SPDs) for all Contractor installed coax and waveguide lines.

2. Devices shall provide proper termination ends as required by the Owner.

3. Devices shall be of proper frequency for intended use.

4. Devices shall be as manufactured by PolyPhaser, or equivalent

2.8 GROUNDING CONNECTORS

A. MECHANICAL

1. Mechanical connector bodies shall be manufactured from high strength, high conductivity cast copper alloy material. Bolts, nuts, washers and lockwashers shall be made of Silicon Bronze and supplied as a part of the connector body and shall be of the two bolt type.

2. The connectors shall meet or exceed UL 467 and be clearly marked with the catalog number, conductor size and manufacturer.
B. COMPRESSION
1. Compression connectors shall be manufactured from pure wrought copper. The conductivity of this material shall be no less than 99% by IACS standards.
2. The connectors shall meet or exceed the performance requirements of IEEE 837, latest revision.
3. The installation of the connectors shall be made with a compression, tool and die system, as recommended by the manufacturer of the connectors.
4. The connectors shall be clearly marked with the manufacturer, catalog number, conductor size and the required compression tool settings.
5. Each connector shall be factory filled with an oxide-inhibiting compound.

C. EXOTHERMIC
1. Exothermic welding system connection specifically used for in making electrical connections of copper to copper, copper to steel or copper to cast iron or copper to brass/bronze for grounding and cathodic applications as manufactured by Cadweld, or equivalent.
2. Exothermic welding system shall meet the applicable requirements of IEEE Std. 80 and IEEE Std. 837. Independent test data showing conformance to shall be readily available.
3. Electronic ignitor must meet applicable requirements for electromagnetic compatibility. An independent test report including results of radiated emission, electrostatic discharge and radiated immunity shall be readily available.

D. GROUNDING PLATES
1. 18”x18” square x 0.032-inch thick solid copper grounding plates.

E. DRYWELLS
1. All well drilling and construction work to be completed by a Wisconsin Licensed well driller.
2. Drill 4-inch min. diameter borehole to 120 feet below grade or 10 feet below 99% reliable water table, whichever is less.
3. 2-inch min. diameter continuous steel casing (welded seams)
4. Submit copies of well construction reports to Engineer in accordance with State regulations.

PART 3 EXECUTION

3.1 PREPARATION

A. Call Local Utility Line Information service at not less than three working days before performing Work.
1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Coordinate fence ground lead locations with fencing contractor.
3.2 GENERAL

A. Install Products in accordance with the plans, details and manufacturer's instructions.

B. Mechanical connections shall be accessible for inspection and checking. No insulation shall be installed over mechanical ground connections.

C. Ground connection surfaces shall be properly cleaned and prepared to provide metal to metal contact. All connections shall be made so that it is impossible to move.

3.3 TOWER & EQUIPMENT BUILDING FOUNDATION REINFORCING STEEL GROUNDING

A. Connect tower and equipment building foundation’s reinforcing steel to tower ground ring with (1) one #2 solid bare tinned copper conductor as detailed in the plans.

3.4 BELOW GRADE GROUND SYSTEM

A. Excavate ground trenches at the locations and required depths as noted in the plans.

B. Install ground rods, ground plates, conductors and other below grade devices as detailed in the plans.

C. Connect all devices using exothermic type connections to below grade ground system.

D. Contractor shall conduct ground system performance testing to determine the resistivity to ground prior to backfilling. Ground system testing shall utilize “Fall of Potential” testing methodology. Notify Engineer of results. Adjustments to the design ground system may be made at this time pending performance testing results.

E. Notify Engineer for inspection of ground system and connections prior to backfilling. Provide 72 hour minimum advanced notice.

F. Record locations of all below grade connections.

G. Record digital photos of all completed below grade connections.

H. Backfill and compact trenches per the plans and specifications.

I. Install inspection/test wells per the plans and specifications.

J. Grounding plates shall be utilized in lieu of ground rods at locations where ground rods can not be installed (i.e. over tower foundation or bedrock). Install ground plates at standard ground trench depth.
3.5 GROUND BARS
   A. Install ground bars at the locations shown and as detailed in the plans.

3.6 GROUND KITS
   A. Install ground kits on all coax and waveguide at the locations shown in the plans.
   B. Ground kits shall be installed on each coax/waveguide a minimum of (3) three times (antenna level, base of the tower and building coax port entry). For coax/waveguide runs above a tower height of 200 feet, an additional ground kit shall be installed at the 200 foot level.

3.7 SURGE PROTECTION DEVICES
   A. Install surge protection devices on the ends of coax and waveguide lines on the inside of building just inside of the coax port entry.
   B. Connect surge protection device ground leads to interior ground bar.

3.8 ABOVE GRADE GROUND SYSTEM
   A. Connect fence posts, gates, ice bridge posts, tower and ground bar leads to the below grade ground system as detailed in the plans.

3.9 DRYWELLS
   A. Drill 4-inch min. diameter borehole to 120 feet below grade or 10 feet below 99% reliable water table, whichever is less.
   B. Install 2-inch min. diameter continuous steel casing (welded seams) to borehole depth.
   C. Grout casing in place and fill casing with bentonite grout.
   D. Cadweld (2) #2 solid tinned copper conductors to casing and tie to tower or shelter ground ring.
   E. Install inspection well over drywell such that the top of casing and cadweld connections are exposed within the well.

3.10 QUALITY CONTROL
   A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
   B. Use suitable test instrument to measure resistance to ground of overall system. Perform testing in accordance with test instrument manufacturer’s recommendations using the fall-of-potential method. Resistance shall meet or exceed a 5 ohm maximum resistance plateau. Provide written results of resistance measurements to the Engineer.
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END OF SECTION
SECTION 33 81 00
COMMUNICATION TOWERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Providing and erecting communication towers.
2. Antenna mounts.
3. Transmission line ice bridges.

B. Related Sections:
1. Section 03 30 00 – Cast In Place Concrete
2. Section 33 79 00 – Site Grounding and Lightning Protection
3. Section 33 82 00 – Coax and Waveguides
4. Section 33 83 00 – Antennas

1.2 REFERENCES

A. Abbreviations of standards or organizations referenced in this specification are as follows:
1. ACI American Concrete Institute
2. AISC Manual of the American Institute of Steel Construction
3. ANSI American National Standards Institute
4. ASME American Society of Mechanical Engineers
5. ASTM American Society for Testing and Materials
6. AWS American Welding Society
7. CS Commercial Standards, Products Standards Sections, Office of Eng. Standards Service, NBS
8. EPA Environmental Protection Agency
9. EIA Electronic Industries Association
10. FAA Federal Aviation Administration
11. FCC Federal Communications Commission
13. UL Underwriters Laboratories Inc.
14. IEEE Institute of Electrical and Electronics Engineers
15. NBS National Bureau of Standards
16. NEC National Electric Code
17. NEMA National Electrical Manufacturers Association
18. SSPC Steel Structures Painting Council
1.3 DESIGN

A. The tower shall be designed, fabricated and erected in accordance with TIA-222-Revision G Standards, including latest revisions. The tower shall comply with EIA Specifications for twist and sway as they relate to the tower and antenna support brackets. The following design parameters shall be used for the analysis:
   1. TIA-222- Revision G:
      a. Structure Classification: “Class 3”
      b. Exposure Category:
         1) Andres Pit Tower & Mill Road Quarry Tower: “C”
         2) Robert LaSalle Park Tower: “D”
      c. Topographic Category:
         1) Andres Pit Tower & Mill Road Quarry Tower: “1”
         2) Robert LaSalle Park Tower: “2”
      d. 90 mph basic wind speed
      e. 40 mph wind speed with 0.50-inch radial ice
      f. 60 mph wind speed for deflection calculations

B. The loading criteria to be used for tower and foundation design is as follows:
   1. Tower Structure and Accessories:
      a. Antennas: Quantity, size, location and orientation as specified in the drawings
      b. Feed lines and Transmission Line Ladders: Placement on the tower as specified in the drawings
      c. Climbing Ladder: Placement on the tower as specified in the drawings
      d. Other appurtenances: As specified in the drawings
      e. All mounts shall be designed to remain vertical under design wind conditions. Design of antenna mounts is the responsibility of the supplier. The mount design shall meet general dimensions noted in the plans. If determined that a suitable design is not achievable per the general dimensions, the engineer shall be notified prior to manufacture and installation.
      f. Tower structure shall be designed such that no member is stressed to more than 80% of its design capacity under the modeled loading criteria for the limiting design case (basic wind, radial ice, deflection) and to account for future loading.
   2. Tower Foundation:
      a. The base reactions calculated for the modeled loading criteria for the limiting design case shall be increased by a minimum of 15% to account for future loading.

C. The design, fabrication and erection shall conform to the requirements of the Federal Communications Commission, Federal Aviation Administration, the National Electrical Code, 2006 International Building Code and Wisconsin Building Code. Any known conflicts between these specifications or drawings, and codes, as well as any suspected error in these specifications or plans shall be brought to the attention of the Engineer.

D. Design analysis, erection drawings and foundation drawings shall be certified by a Registered Professional Engineer licensed in the State of Wisconsin.
E. The tower foundations shall be designed based on the soil conditions provided in the subsurface soil exploration reports for the site. Refer to Section 00 31 00 – Information Available to Bidders. If subsurface conditions are found to be materially different from those described, then the provisions of Article 2, General Conditions shall apply.

F. The Contractor is responsible to insure the proposed tower design is compatible with the site layout and general parameters specified in the bid documents. Any proposed changes to layout shall be pre-approved by the Engineer prior to implementing. All costs associated with such changes shall be the responsibility of the Contractor.

1.4 FALL RADIUS DESIGN

A. Not Applicable.

1.5 QUALITY ASSURANCE

A. Where equipment, accessories, or materials are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated in the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and for obtaining the intended performance from the system into which these items are placed.

B. All ground and aerial work shall be performed by persons equipped and qualified to do so. The Contractor shall furnish upon award of tower contract, evidence of adequate bonding and insurance to hold the State harmless in completion of the contract issued for this work.

C. The Contractor shall be experienced in the installation and alignment of microwave parabolic antennas. Furnish a list of at least three references where microwave parabolic antennas were successfully installed and aligned.

D. The Contractor shall visit the tower site to verify the site specific data and drawings. Any expense and delay due to lack of information shall be the Contractor’s responsibility.

1.6 QUALIFICATIONS

A. Tower Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

B. Tower Erector: Company specializing in performing work of this section with minimum of five (5) years documented experience.

1.7 PROTECTION OF EXISTING WORK AND FACILITIES

A. Verify the locations of, and protect, any signs, paved surfaces, buildings, structures, landscaping, streetlights, utilities and all other such facilities that may be encountered or interfered with during the progress of the work. Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the work or items which are within the construction limits but are intended to remain.
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1.8 CONSTRUCTION LIMITS

A. Construction Limits are indicated on the drawings. In the absence of such a designation on the drawings, confine work to the minimum area reasonably necessary to undertake the work as determined by the Engineer. All area disturbed by excavation and grading, plus such additional areas as are disturbed by construction related activities including construction access and storage and installation of materials shall be considered the "Construction Area."

1.9 EQUIPMENT AND MATERIALS FURNISHED BY OTHERS

A. None.

1.10 WORK BY OTHERS

A. None.

1.11 SUBMITTALS

A. Section 00 13 30 - Submittal Procedures: Requirements for submittals.

B. Tower and Foundation Design:
   1. Submit engineering design and structural analysis package for tower and tower foundations.
   2. Design and analysis shall be completed using structural analysis software generally accepted by the tower industry.
   3. The design and analysis shall be in accordance with the Design requirements of this specification.
   4. Submitted package shall include sufficient information and detail to allow a third party engineer to accurately model the tower and foundation system for future changes in loading per TIA-222-Revision G requirements as a "Rigorous Analysis”. This includes providing all member sizes, material types, connection details, weld information, bolt size and material strengths, geometry configuration, loading input parameters, factors of safety, design assumptions, calculations and results of each loading condition.
   5. This package shall include a scaled drawing which shows the layout of the tower geometry, location of each appurtenance load applied to it and feed line placement on the tower.

C. Fabrication and Erection Drawings:
   1. Submit fabrication and erection drawing package of all fabricated items associated with the tower package.
   2. All submittals must receive full approval of the Engineer prior to tower manufacture and erection.
   3. Submitted package shall include engineering shop drawings for the fabrication, assembly and erection of all items. The drawings at a minimum shall include:
      a. Cover sheet showing project name, tower height, manufacturer’s name and model number
      b. Bill of materials for the tower and each attached component.
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1.12 WARRANTY

A. The tower and components supplied under this specification shall be warranted, by the manufacturer, to be free of defects for a minimum period of five (5) years from the date of substantial completion. In addition, all workmanship provided under this specification, shall be warranted, by the contractor, to be free of defects for a minimum period of five (5) years from the date of substantial completion. Defects in materials or workmanship during the warranty period and any materials and/or equipment damage because of defects, shall be repaired or replaced at no cost to the Owner.

B. This warranty shall not be void by the Owner’s use of other competent Contractors to install antennas or transmission lines or perform other maintenance on the tower when the work is consistent with the initial design and intent.

C. Warranty service shall be provided and repairs completed within 24 hours following notification of Contractor by Owner that a failure covered by the warranty provisions has occurred. Contractor shall furnish Owner with a telephone number at which Contractor, or his representative, may be reached 24 hours a day, seven days a week, notification of in-warranty failures.

1.13 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Assemble material in an operating and maintenance manual composed of three-ring or post binders, using and index at the front of each volume and tabs for each system or type of equipment installed. In addition to the data indicated in the General Requirements, include the following information:
1.Copies of all approved shop drawings
2. Manufacturer’s wiring diagrams for electrically powered equipment
3. Records of tests performed to certify compliance with system requirements
4. Parts lists for manufactured equipment
5. Warranties and/or guarantees
6. Additional information as indicated in the technical specification sections

1.14 RECORD DRAWINGS

A. Maintain record drawings of all as-built system installations and points of connection made as part of this project. Include copies of record drawings with the Operating and Maintenance instructions.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

A. All structural materials, fabricated parts and associated assemblies shall be galvanized in accordance with ASTM A-123 (Hot-Dip).

B. All mounting hardware shall be either galvanized or stainless steel.

C. Tower structure and appurtenances shall be designed and fabricated so that erection may be accomplished using bolt connections with no field welding required.

2.2 SELF-SUPPORT TOWERS

A. Tower shall be a free standing three leg tapered self-support tower constructed of galvanized steel.

B. Tower sections shall utilize bolted connections, no field wielding is permitted.

C. Each base section tower leg shall be provided with a grounding tab for connection of ground leads.

2.3 MONOPOLE TOWERS

A. Tower shall be a free standing galvanized steel tapered monopole communications tower.

B. Tower sections shall utilize slip type connections with constant taper.

C. Tower shall be provided with hand holes and coax ports at the locations and size noted in the plans.

D. A minimum of three grounding tabs shall be provided on the tower base section for connection of ground leads.
2.4 GUYED TOWERS
   A. Not Applicable.

2.5 TOWER FOUNDATIONS
   A. Self-support tower foundations shall be a monolithic spread footing (mat) type, individual pad and piers at each tower leg or drilled pier (caisson) foundations at each tower leg consisting of reinforced concrete.
   B. Monopole tower foundations shall be a monolithic spread footing (mat) type or drilled pier (caisson), consisting of reinforced concrete.
   C. Guyed tower foundations shall be a spread footing (mat) type at the tower base and “dead man” type at each of the guy anchor locations all consisting of reinforced concrete.

2.6 CLIMBING LADDERS & SAFETY CLIMBS
   A. Self-support towers shall be equipped with (1) one continuous permanent exterior climbing ladder which includes 7-inch OSHA toe clearance on one tower face from the base to top of the tower.
   B. Self-support towers shall also be equipped with construction step bolts on each tower leg from the base of the tower to a point where the tower face width is less than 15 feet wide.
   C. Monopole towers shall be equipped with permanent exterior climbing bolts on one tower face.
   D. No climbing ladder or step bolts are required for guyed towers.
   E. Each tower shall be equipped with a permanent safety climb cable device coordinated with climbing ladder which meets OSHA and ANSI requirements for a climbing safety device.
   F. Provide one compatible climbing harness along with safety climb device for each tower site.

2.7 VERTICAL TRANSMISSION LINE LADDERS
   A. Provide vertical transmission line ladders of the size, quantity and style as noted in the drawings.

2.8 ANTENNA MOUNTS
   A. All antenna mounts shall connect to tower with mechanical compression type brackets as detailed in the plans. The use of chain mounts is not acceptable.
   B. Mounts shall include brackets to orient the assembly vertically when mounted on tapered sections of the tower.
C. Each mount shall be designed and adequately braced back to tower structure to minimize deflections of the antenna such that pole type antenna assemblies do not strike one another or the tower structure under the design wind conditions. In addition, antennas shall remain vertical under design wind conditions. Design of antenna mounts is the responsibility of the supplier. The mount design shall meet general dimensions noted in the plans. If determined that a suitable design is not achievable per the general dimensions, the engineer shall be notified prior to manufacture and installation.

D. Stand-Off Mounts
   1. Stand-off mounts utilize a single pipe/tube extension which interfaces with collar bracket assemblies on monopole towers.
   2. Provide horizontal stand-off separation distances as noted in the plans.
   3. Stand-Off mounts shall be designed for connection of one antenna on each mount.
   4. Stand-off mounts shall be provided with 2 3/8” OD mast pipe for mounting of antennas, when necessary.

E. Sidearm Mounts
   1. Sidearm mounts shall utilize truss style extension and be adequately connected or otherwise braced with tieback arms to prevent antenna movement.
   2. Provide horizontal stand-off and vertical separation distances as noted in the plans.
   3. Mounts shall be designed for connection of one antenna on each mount.
   4. Sidearm mounts shall be provided with 2 3/8” OD mast pipes for mounting of antennas, when necessary.

F. V-Arm Truss Frame Mounts
   1. Stand-off mounts shall utilize triangle truss style extension and be adequately connected or otherwise braced with tieback arms to prevent antenna movement.
   2. Provide horizontal stand-off and vertical separation distances as noted in the plans.
   3. Mounts shall be designed for connection of two antennas, one at each end.
   4. Stand-off mounts shall be provided with 2 3/8” OD mast pipe for mounting of antennas.

G. Dish Mounts
   1. Dish mounts shall be leg type mounts and be adequately connected or otherwise braced to prevent dish antenna movement.
   2. Provide vertical separation distances suitable for each dish to be installed.
   3. Dish mounts shall be provided with 4 1/2” OD mast pipe for mounting of dish antennas.

H. Leg Mounts
   1. Leg mounts shall be adequately connected or otherwise braced to prevent antenna movement.
   2. Provide vertical separation distances suitable for each antenna to be installed.
   3. Leg mounts shall be provided with 2 3/8” OD mast pipe for mounting of antennas.
I. Platform Mounts
   1. Monopole platform mount kits shall be low profile design, triangle shaped and of the face width size noted in the plans.
   2. Platforms shall be specifically designed for use on tapered monopole towers and include all required collar mounting bracket assemblies.
   3. Each platform shall include a handrail kit for climber safety.
   4. Provide the quantity, size and length of antenna mounting pipes as noted in the plans.

2.9 TRANSMISSION LINE ICE BRIDGE
   A. Provide self-supporting transmission line ice bridge(s) supported by galvanized steel pipes between tower and building coax port entries as detailed in the plans.
   B. All of the vertical pipe supports shall be three (3) inches in diameter schedule 40 galvanized steel pipe. Extend vertical supports one (1) foot above top of transmission line ice fall protection as detailed in the plans. Provide pipe cap on top of vertical supports.
   C. Ice bridge shall be 24 inch wide grip strut type bridge with vertical extended double T-line hanging brackets as manufactured by Valmont, or equivalent. Transmission line support system shall provide holes for 14 total line capacity with expansion to 28 line capacity using double stack snap-in’s. Install support brackets three (3) feet on-center, or as recommended by the manufacturer.

2.10 TOWER GROUNDING
   A. Grounding Tabs:
      1. Self-Support Tower: Provide a minimum of (3) three (2 inch x 2 inch x ¼ inch thick) steel ground tabs (one on each leg) welded to the tower base legs for use in attachment of ground conductors.
      2. Guyed Tower: Provide a minimum of (3) three (2 inch x 2 inch x ¼ inch thick) steel ground tabs (one on each leg) welded to the tower base section for use in attachment of ground conductors.
      3. Monopole Tower: Provide a minimum of (3) three (2 inch x 2 inch x ¼ inch thick) steel ground tabs welded to the tower base section for use in attachment of ground conductors.
      4. Tabs to be evenly spaced around tower base and shop welded prior to galvanizing.
   B. Ground tower in accordance with the plans and specification section 33 79 00 Site Grounding and Lightning Protection.

2.11 OBSTRUCTION LIGHTING
   A. Not Applicable.
2.12 PAINT

A. Not Applicable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 PREPARATION

A. Call Local Utility Line Information service at not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Confirm that the Owner has a valid FAA construction permit, if applicable, before commencing construction.

3.3 TOWER FOUNDATION

A. Install tower foundation in accordance with tower manufacturer foundation design requirements and these specifications. Concrete, rebar and other material testing and quality assurance items shall conform to the respective sections of these specifications.

B. Ground foundation reinforcing steel per the drawings.

C. Tower foundation excavations, rebar placement and grounding shall be inspected by the Engineer prior to concrete installation.

D. Anchor bolts shall be installed per design requirements including minimum thread protrusion and allowance for grouting.

3.4 TOWER ERECTION

A. Provide concrete compressive strength test results to the Engineer which indicate conformance with the design requirements prior to tower erection.

B. Erect tower in accordance with tower manufacturer design requirements and these specifications.

C. The tower shall be erected using bolted connections. No field welding is allowed.

D. All bolts shall have a minimum of two (2) threads protruding beyond the nut and torque tested to meet installation requirements.
E. Install temporary lighting system when structure exceeds each level at which permanent lighting is required. Temporary high or medium intensity flashing white lights shall be operated 24 hours a day until all permanent lights are in operation.

F. Install vertical transmission line ladders, antenna mounts, safety climb, lightening arrestor, lighting system and all other appurtenances in accordance with tower manufacturer design requirements and these specifications.

G. Notify Owner within 24 hours of tower construction reaching full height so Owner can notify FAA regarding completed construction.

3.5 CLIMBING LADDERS & SAFETY CLIMBS

A. Install climbing ladders and safety climb devices in accordance with the manufacturers’ requirements at the location on the tower noted in the drawings.

B. Confirm climbing harness is compatible with the provided system.

3.6 ANTENNA MOUNTS

A. Install antenna mounts in accordance with manufacturer requirements, plans and these specifications.

3.7 ANTENNAS

A. Install antennas in accordance with the plans and Section 33 83 00 - Antennas.

3.8 VERTICAL TRANSMISSION LINE LADDERS

A. Place vertical transmission line ladders on the tower at the locations noted in the drawings.

B. Attach line ladder to the tower at 20 foot maximum spacing or as required by the manufacturer using J-bolt connectors. All coax and waveguide shall connect to transmission ladders with ¾-inch snap in hangers.

3.9 TRANSMISSION LINE ICE BRIDGE INSTALLATION

A. Install self-supporting transmission line ice bridge(s) between tower and building coax port entries in accordance with the manufacturer requirements, drawings and these specifications.

3.10 COAX AND WAVEGUIDE

A. Install and test coax and waveguide between antennas and equipment building in accordance with the plans and Section 33 82 00 – Coax and Waveguides.
3.11 TOWER, ANTENNA AND WAVEGUIDE GROUNDING

A. Ground tower, antennas and waveguide and install lightning protection systems in accordance with the plans and Section 33 79 00 – Site Grounding and Lightning Protection.

3.12 OBSTRUCTION LIGHTING

A. Install tower lighting in accordance with the manufacturer’s recommendations, FAA requirements and these specifications.

3.13 PAINTING

A. Not Applicable.

3.14 CORRECTION OF PUNCH LIST ITEMS

A. Following tower erection and antenna and line installation, A/E will perform a tower climb and punch list inspection of installed items. An inspection report will be issued with items to be addressed by Contractor. Contractor shall promptly correct all deficient items and provide photos of each item prior to and after correction. Photos documentation shall be sufficient and clear enough to allow the Owner and A/E to see that all items have been adequately addressed.

3.15 CLEAN UP

A. The Contractor shall be responsible for cleanup of the site of all refuse associated with this Contract. Contractor to remove all crates, reels and other refuse associated with the antennas and line shipping.

END OF SECTION
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SECTION 33 82 00
COAX AND WAVEGUIDES

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Providing and installing coax and waveguides.
B. Related Sections:
   1. Section 13 30 20 – Precast Concrete Communication Shelters
   2. Section 33 79 00 – Site Grounding and Lightning Protection
   3. Section 33 81 00 – Communication Towers
   4. Section 33 83 23 – Antennas

1.2 EQUIPMENT AND MATERIALS FURNISHED BY OTHERS
A. All surge protection devices (SPD’s) will be provided by Others. Contractor to install.

1.3 WORK BY OTHERS
A. Microwave dish waveguide installation for Door County dishes at all sites will be provided and installed by Others. Contractor to provide and install mounts.

1.4 SUBMITTALS
A. Submit product data for each type of coax and waveguide supplied.
B. Submit transmission line frequency return loss test reports for each installed coax/waveguide.
C. Submit written key for installed identification markings of each coax/waveguide.

1.5 QUALITY ASSURANCE
A. All installed coax and waveguides shall be “sweep” tested using frequency return loss, or other Owner approved method, after complete installation to insure the integrity of each line. Contractor shall submit, to Engineer, reports of the test results for each line.

PART 2 PRODUCTS

2.1 COAX AND WAVEGUIDE
A. Provide coax and waveguide as listed in the plans.
B. Provide associated hoist grips, snap-in supports, jumpers and connectors for complete installation from antenna to termination point inside of building.
   1. Hoist grips: galvanized
   2. Snap In Hangers: Stainless Steel
   3. Fasteners: Use corrosion resistant fasteners which are manufactured for outdoor use specifically for the intended application.

PART 3 EXECUTION

3.1 COAX AND WAVEGUIDE

A. Install coax lines and waveguides from antennas and dishes mounted on tower to interior side of equipment buildings per the plans and specifications. Connection of coax and waveguide to antennas and dishes shall be by the Contractor.

B. All coax and waveguide runs shall be continuous from each antenna to equipment building. No splicing of lines is allowed.

C. Secure and adequately support coax and waveguides as necessary to prevent movement.

D. Clearly mark all lines at each end with the termination elevation, azimuth, description, or as otherwise directed by Owner.

E. All lines shall route up the tower structure on vertical transmission line ladders utilizing snap-in style mounting clips. Place lines on ladders in configuration shown on the plans. Provide and install hoist grips and hoist grip hangers for each transmission line.

F. Install ground kits on each transmission line at the locations noted in the plans and per the details and grounding specifications. All ground kits shall be properly weatherproofed.

G. Route coax and waveguide along ice bridge hanger brackets. Secure to ice bridge hangers with snap-in style mounting clips per manufacturers recommendations.

H. Provide drip loop in line at base of the tower.

I. Route lines through building coax entry port. Provide and install weather proof boots for each port opening (inside and out).

J. Install surge protection device on each line within the building and terminate as directed by Owner. Install ground leads from surge protection device to interior ground bar.

K. Perform Quality Assurance “sweep tests” of all installed coax and waveguides. Provide documented results.

END OF SECTION
Towers for Public Safety Communication System
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SECTION 33 83 00
ANTENNAS

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Providing and installing antennas and microwave dishes.
B. Related Sections:
   1. Section 33 81 00 – Communication Towers
   2. Section 33 82 00 – Coax and Waveguides
   3. Section 33 79 00 – Site Grounding and Lightning Protection

1.2 EQUIPMENT AND MATERIALS FURNISHED BY OTHERS
A. None

1.3 WORK BY OTHERS
A. Microwave dish installation for Door County dishes at all sites will be provided and installed by Others. Contractor to provide and install mounts.

1.4 SUBMITTALS
A. Submit product data for each antenna supplied to Engineer for approval prior to ordering.

PART 2 PRODUCTS

2.1 ANTENNAS
A. Provide required antennas and microwave dishes as listed in the plans.
B. Provide all associated mounting and bracing hardware and fasteners for secure installation and proper alignment.

PART 3 EXECUTION

3.1 ANTENNAS
A. Install all antennas and microwave dishes on tower mounts installed at elevations and orientation noted on the plans with required mounting hardware.
B. Secure and properly brace each antenna and microwave dish. Orient to azimuth and down tilt noted on the plans.

C. Align microwave dishes at both send and receive locations.
   1. Contractor shall furnish personnel for each end of the path under alignment. Alignment shall be done once new equipment is “online” at both locations and peaked up to the highest level. Coordinate alignment procedures with Owner’s personnel.

D. Connect coax and waveguide runs to each antenna and microwave dish with required jumpers and connectors. Weatherproof each connection.

E. Record location of each installed antenna and microwave dish.

F. Notify Engineer when complete for inspection of installation. Provide 72 hour minimum advance notice.

END OF SECTION