

BID OF \_\_\_\_\_

**2013**

**PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS**

**FOR**

**UNIT WELL 26 GENERATOR ADDITION**

**CONTRACT NO. 7107**

**IN**

**MADISON, DANE COUNTY, WISCONSIN**

AWARDED BY THE COMMON COUNCIL  
MADISON, WISCONSIN ON \_\_\_\_\_

CITY ENGINEERING DIVISION  
1600 EMIL STREET  
MADISON, WISCONSIN 53713

[www.cityofmadison.com/business/pw](http://www.cityofmadison.com/business/pw)

<https://bidexpress.com/login>

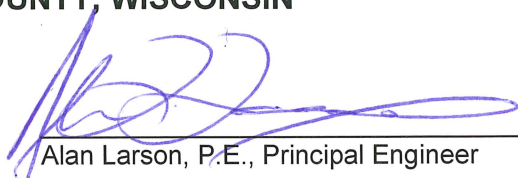
**UNIT WELL 26 GENERATOR ADDITION  
CONTRACT NO. 7107**

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This Proposal, and Agreement have  
been prepared by:

**CITY ENGINEERING DIVISION  
CITY OF MADISON  
MADISON, DANE COUNTY, WISCONSIN**

 10-7-13  
\_\_\_\_\_  
Alan Larson, P.E., Principal Engineer

## SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

### REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION CITY OF MADISON, WISCONSIN

#### A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	UNIT WELL 26 GENERATOR ADDITION
CONTRACT NO.:	7107
SBE GOAL	11%
BID BOND	5%
PRE BID MEETING (1:00 P.M.)	11/01/2013
PREQUALIFICATION APPLICATION DUE (1:00 P.M.)	11/01/2013
BID SUBMISSION (1:00 P.M.)	11/08/2013
BID OPEN (1:30 P.M.)	11/08/2013
PUBLISHED IN WSJ	10/11/2013, 10/25/2013 & 11/01/2013

PRE BID MEETING: Representatives of the Affirmative Action Department will be present to discuss the Small Business Enterprise requirements at 1600 Emil Street, Madison Wisconsin.

PREQUALIFICATION APPLICATION: Forms are available on our website, [www.cityofmadison.com/business/pw/forms.cfm](http://www.cityofmadison.com/business/pw/forms.cfm). If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

BIDS TO BE SUBMITTED by hand to 1600 EMIL ST., MADISON, WI 53713 or online at [www.bidexpress.com](http://www.bidexpress.com).

THE BID OPENING is at 1600 EMIL ST., MADISON, WI 53713.

Plans and Specifications are also available at 1600 Emil St., Madison, WI, 53713; (608) 267-1197.

#### STANDARD SPECIFICATIONS

The City of Madison's Standard Specifications for Public Works Construction - 2013 Edition, as supplemented and amended from time to time, forms a part of these contract documents as if attached hereto.

These standard specifications are available on the City of Madison Public Works website, [www.cityofmadison.com/Business/PW/specs.cfm](http://www.cityofmadison.com/Business/PW/specs.cfm).

The Contractor shall review these Specifications prior to preparation of proposals for the work to be done under this contract, with specific attention to Article 102, "BIDDING REQUIREMENTS AND CONDITIONS" and Article 103, "AWARD AND EXECUTION OF THE CONTRACT." For the convenience of the bidder, below are highlights of three subsections of the specifications.

#### SECTION 102.1: PRE-QUALIFICATION OF BIDDERS

In accordance with Wisconsin State Statutes 66.0901 (2) and (3), all bidders must submit to the Board of Public Works proof of responsibility on forms furnished by the City. The City requires that all bidders be qualified on a biennial basis.

Bidders must present satisfactory evidence that they have been regularly engaged in the type of work specified herein and they are fully prepared with necessary capital, materials, machinery and supervisory

personnel to conduct the work to be contracted for to the satisfaction of the City. All bidders must be pre-qualified by the Board of Public Works for the type of construction on which they are bidding prior to the opening of the bid.

In accordance with Section 39.02(9)(a)l. of the General Ordinances, all bidders shall submit in writing to the Affirmative Action Division Manager of the City of Madison, a Certificate of Compliance or an Affirmative Action Plan at the same time or prior to the submission of the proof of responsibility forms.

The bidder shall be disqualified if the bidder fails to or refuses to, prior to opening of the bid, submit a Certificate of compliance, Affirmative Action Plan or Affirmative Action Data Update, as applicable, as defined by Section 39.02 of the General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

#### SECTION 102.4 PROPOSAL

No bid will be accepted that does not contain an adequate or reasonable price for each and every item named in the Schedule of Unit Prices.

A lump sum bid for the work in accordance with the plans and specifications is required. The lump sum bid must be the same as the total amounts bid for the various items and it shall be inserted in the space provided.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. The plans, specifications and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership shall be signed by a member/partner or by a duly authorized agent thereof. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized registered agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. The required signatures shall in all cases appear in the space provided thereof on the proposal.

Each proposal shall be placed, together with the proposal guaranty, in a sealed envelope, so marked as to indicate name of project, the contract number or option to which it applies, and the name and address of the Contractor or submitted electronically through Bid Express ([www.bidexpress.com](http://www.bidexpress.com)). Proposals will be accepted at the location, the time and the date designated in the advertisement. Proposals received after the time and date designated will be returned to the bidder unopened.

The Bidder shall execute the Disclosure of Ownership form. REFER TO SECTION F.

#### SECTION 102.5: BID DEPOSIT (PROPOSAL GUARANTY)

All bids, sealed or electronic, must be accompanied with a Bid Bond equal to at least 5% of the bid or a Certificate of Annual/Biennial Bid Bond or certified check, payable to the City Treasurer. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

#### PREVAILING WAGE RATES

Prevailing Wage Rates may be required and are attached in Section J of the contract. See Special Provisions to determine applicability.

**Bidders for this Contract(s) must be Pre-Qualified for at least one of the following type(s) of construction denoted by an ☒**

**Building Demolition**

- 101 ☐ Asbestos Removal  
120 ☐ House Mover

- 110 ☐ Building Demolition

**Street, Utility and Site Construction**

- 201 ☐ Asphalt Paving  
205 ☐ Blasting  
210 ☐ Boring/Pipe Jacking  
215 ☐ Concrete Paving  
220 ☐ Con. Sidewalk/Curb & Gutter/Misc. Flat Work  
221 ☐ Concrete Bases and Other Concrete Work  
225 ☐ Dredging  
230 ☐ Fencing  
235 ☐ Fiber Optic Cable/Conduit Installation  
240 ☐ Grading and Earthwork  
241 ☐ Horizontal Saw Cutting of Sidewalk  
242 ☐ Infrared Seamless Patching  
245 ☐ Landscaping, Maintenance  
250 ☐ Landscaping, Site and Street  
251 ☐ Parking Ramp Maintenance  
255 ☐ Pavement Sealcoating and Crack Sealing  
260 ☐ Petroleum Above/Below Ground Storage Tank Removal/Install  
265 ☐ Retaining Walls, Precast Modular Units  
270 ☐ Retaining Walls, Reinforced Concrete  
275 ☐ Sanitary, Storm Sewer and Water Main Construction

- 280 ☐ Sewer Lateral Drain Cleaning/Internal TV Insp.  
285 ☐ Sewer Lining  
290 ☐ Sewer Pipe Bursting  
295 ☐ Soil Borings  
300 ☐ Soil Nailing  
305 ☐ Storm & Sanitary Sewer Laterals & Water Svc.  
310 ☐ Street Construction  
315 ☐ Street Lighting  
318 ☐ Tennis Court Resurfacing  
320 ☐ Traffic Signals  
325 ☐ Traffic Signing & Marking  
332 ☐ Tree pruning/removal  
333 ☐ Tree, pesticide treatment of  
335 ☐ Trucking  
340 ☐ Utility Transmission Lines including Natural Gas, Electrical & Communications  
399 ☐ Other \_\_\_\_\_

**Bridge Construction**

- 501 ☐ Bridge Construction and/or Repair

**Building Construction**

- 401 ☐ Floor Covering (including carpet, ceramic tile installation, rubber, VCT)  
402 ☐ Building Automation Systems  
403 ☐ Concrete  
404 ☐ Doors and Windows  
405 ☒ Electrical - Power, Lighting & Communications  
410 ☐ Elevator - Lifts  
412 ☐ Fire Suppression  
413 ☐ Furnishings - Furniture and Window Treatments  
415 ☐ General Building Construction, Equal or Less than \$250,000  
420 ☐ General Building Construction, \$250,000 to \$1,500,000  
425 ☐ General Building Construction, Over \$1,500,000  
428 ☐ Glass and/or Glazing  
429 ☐ Hazardous Material Removal  
430 ☐ Heating, Ventilating and Air Conditioning (HVAC)  
433 ☐ Insulation - Thermal

- 435 ☐ Masonry/Tuck pointing  
437 ☐ Metals  
440 ☐ Painting and Wallcovering  
445 ☐ Plumbing  
450 ☐ Pump Repair  
455 ☐ Pump Systems  
460 ☐ Roofing and Moisture Protection  
461 ☐ Solar Photovoltaic/Hot Water Systems  
465 ☐ Soil/Groundwater Remediation  
466 ☐ Warning Sirens  
470 ☐ Water Supply Elevated Tanks  
475 ☐ Water Supply Wells  
480 ☐ Wood, Plastics & Composites - Structural & Architectural  
499 ☐ Other \_\_\_\_\_

**State of Wisconsin Certifications**

- 1 ☐ Class 5 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for quarries, open pits and road cuts.  
2 ☐ Class 6 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for trenches, site excavations, basements, underwater demolition, underground excavations, or structures 15 feet or less in height.  
3 ☐ Class 7 Blaster - Blasting Operations and Activities for structures greater than 15' in height, bridges, towers, and any of the objects or purposes listed as "Class 5 Blaster or Class 6 Blaster".  
4 ☐ Petroleum Above/Below Ground Storage Tank Removal and Installation (Attach copies of State Certifications.)  
5 ☐ Hazardous Material Removal (Contractor to be certified for asbestos and lead abatement per the Wisconsin Department of Health Services, Asbestos and Lead Section (A&LS).) See the following link for application:  
[www.dhs.wisconsin.gov/Asbestos/Cert](http://www.dhs.wisconsin.gov/Asbestos/Cert). State of Wisconsin Performance of Asbestos Abatement Certificate must be attached.  
6 ☐ Certification number as a Certified Arborist or Certified Tree Worker as administered by the International Society of Arboriculture  
7 ☐ Pesticide application (Certification for Commercial Applicator For Hire with the certification in the category of turf and landscape (3.0) and possess a current license issued by the DATCP)  
8 ☐ Other \_\_\_\_\_  
9 ☐ Other \_\_\_\_\_

## SECTION B: PROPOSAL

Please refer to the  
Bid Express Website  
at <https://bidexpress.com>  
look up contract number  
and go to  
Section B: Proposal Page

You can access all City of Madison bid solicitations for FREE at [www.bidexpress.com](http://www.bidexpress.com)

Click on the “Register for Free” button and follow the instructions to register your company and yourself. You will be asked for a payment subscription preference, since you may wish to bid online someday. Simply choose the method to pay on a ‘per bid’ basis. This requires no payment until / unless you actually bid online. You can also choose the monthly subscription plan at this time. You will, however, be asked to provide payment information. Remember, you can change your preference at anytime. You will then be able to complete your free registration and have full access to the site. Your free access does not require completion of the ‘Digital ID’ process, so you will have instant access for viewing and downloading. To be prepared in case you ever do wish to bid online, you may wish to establish your digital ID also, since you cannot bid without a Digital ID.

If you have any problems with the free registration process, you can call the bidexpress help team, toll free at 1-888-352-2439 (option 1, option1).

## **SECTION C: SMALL BUSINESS ENTERPRISE**

### **Instructions to Bidders City of Madison SBE Program Information**

#### **2 Small Business Enterprise (SBE) Program Information**

##### **2.1 Policy and Goal**

The City of Madison reaffirms its policy of nondiscrimination in the conduct of City business by maintaining a procurement process which remains open to all who have the potential and ability to sell goods and services to the City. It is the policy of the City of Madison to allow Small Business Enterprises (SBE) maximum feasible opportunity to participate in City of Madison contracting. The bidder acknowledges that its bid has been submitted in accordance with the SBE program and is for the public's protection and welfare.

Please refer to the "ADVERTISEMENT FOR BIDS" for the goal for the utilization of SBEs on this project. SBEs may participate as subcontractors, vendors and/or suppliers, which provide a commercially useful function. The dollar value for SBE suppliers or 'materials only' vendors shall be discounted to 60% for purposes of meeting SBE goals.

A bidder which achieves or exceeds the SBE goal will be in compliance with the SBE requirements of this project. In the event that the bidder is unable to achieve the SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Failure to either achieve the goal or demonstrate a good faith effort to do so will be grounds for the bidder being deemed a non-responsible contractor ineligible for award of this contract.

A bidder may count towards its attainment of the SBE goal only those expenditures to SBEs that perform a commercially useful function. For purposes of evaluating a bidder's responsiveness to the attainment of the SBE goal, the contract participation by an SBE is based on the percentage of the total base bid proposed by the Contractor. The total base bid price is inclusive of all addenda.

Work performed by an SBE firm in a particular transaction can be counted toward the goal only if it involves a commercially useful function. That is, in light of industry practices and other relevant considerations, does the SBE firm have a necessary and useful role in the transaction, of a kind for which there is a market outside the context of the SBE Program, or is the firm's role a superfluous step added in an attempt to obtain credit towards goals? If, in the judgment of the Affirmative Action Division, the SBE firm will not perform a commercially useful function in the transaction, no credit towards goals will be awarded.

The question of whether a firm is performing a commercially useful function is completely separate from the question of whether the firm is an eligible SBE. A firm is eligible if it meets the definitional criteria and ownership and control requirements, as set forth in the City of Madison's SBE Program.

If the City of Madison determines that the SBE firm is performing a commercially useful function, then the City of Madison must then decide what that function is. If the commercially useful function is that of an SBE vendor / supplier that regularly transacts business with the respective product, then the City of Madison will count 60% of the value of the product supplied toward SBE goals.

To be counted, the SBE vendor / supplier must be engaged in selling the product in question to the public. This is important in distinguishing an SBE vendor / supplier, which has a regular trade with a variety of customers, from a firm which performs supplier-like functions on an ad hoc basis or for only one or two contractors with whom it has a special relationship.

A supplier of bulk goods may qualify as an eligible SBE vendor / supplier if it either maintains an inventory or owns or operates distribution equipment. With respect to the distribution equipment; e.g., a fleet of trucks, the term "operates" is intended to cover a situation in which the supplier leases the equipment on a regular basis for its entire business. It is not intended to cover a situation in which the firm simply provides drivers for trucks owned or leased by another party; e.g., a prime contractor, or leases such a party's trucks on an ad hoc basis for a specific job.

If the commercially useful function being performed is not that of a qualified SBE vendor / supplier, but rather that of delivery of products, obtaining bonding or insurance, procurement of personnel, acting as a broker or manufacturer's representative in the procurement of supplies, facilities, or materials, etc., only the fees or commissions will apply towards the goal.

For example, a business that simply transfers title of a product from manufacturer to ultimate purchaser; e. g., a sales representative who re-invoices a steel product from the steel company to the Contractor, or a firm that puts a product into a container for delivery would not be considered a qualified SBE vendor / supplier. The Contractor would not receive credit based on a percentage of the cost of the product for working with such firms.

Concerning the use of services that help the Contractor obtain needed supplies, personnel, materials or equipment to perform a contract: only the fee received by the service provider will be counted toward the goal. For example, use of a SBE sales representative or distributor for a steel company, if performing a commercially useful function at all, would entitle the Contractor receiving the steel to count only the fee paid to the representative or distributor toward the goal. This provision would also govern fees for professional and other services obtained expressly and solely to perform work relating to a specific contract.

Concerning transportation or delivery services: if an SBE trucking company picks up a product from a manufacturer or a qualified vendor / supplier and delivers the product to the Contractor, the commercially useful function it is performing is not that of a supplier, but simply that of a transporter of goods. Unless the trucking company is itself the manufacturer or a qualified vendor / supplier in the product, credit cannot be given based on a percentage of the cost of the product. Rather, credit would be allowed for the cost of the transportation service.

The City is aware that the rule's language does not explicitly mention every kind of business that may contribute work on this project. In administering these programs, the City would, on a case-by-case basis, determine the appropriate counting formula to apply in a particular situation.

## **2.2 Contract Compliance**

Questions concerning the SBE Program shall be directed to the Contract Compliance Officer of the City of Madison Department of Civil Rights, Affirmative Action Division, 210 Martin Luther King, Jr. Blvd., Room 523, Madison, WI 53703; telephone (608) 266-4910.



## 2.3 Certification of SBE by City of Madison

The Affirmative Action Division maintains a directory of SBEs which are currently certified as such by the City of Madison. Contact the Contract Compliance Officer as indicated in Section 2.2 to receive a copy of the SBE Directory or you may access the SBE Directory online at [www.cityofmadison.com/dcr/aaTBDDir.cfm](http://www.cityofmadison.com/dcr/aaTBDDir.cfm).

All contractors, subcontractors, vendors and suppliers seeking SBE status must complete and submit the **Targeted Business Certification Application** to the City of Madison Affirmative Action Division by the time and date established for receipt of bids. A copy of the Targeted Business Certification Application is available by contacting the Contract Compliance Officer at the address and telephone indicated in Section 2.2 or you may access the Targeted Business Certification Application online at [www.cityofmadison.com/dcr/aaTBDDir.cfm](http://www.cityofmadison.com/dcr/aaTBDDir.cfm). Submittal of the Targeted Business Certification Application by the time specified does not guarantee that the applicant will be certified as a SBE eligible to be utilized towards meeting the SBE goal for this project.

## 2.4 Small Business Enterprise Compliance Report

### 2.4.1 Good Faith Efforts

Bidders shall take all necessary affirmative steps to assure that SBEs are utilized when possible and that the established SBE goal for this project is achieved. A contractor who self performs a portion of the work, and is pre-qualified to perform that category of work, may subcontract that portion of the work, but shall not be required to do so. When a bidder is unable to achieve the established SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Such a good faith effort should include the following:

- 2.4.1.1 Attendance at the pre-bid meeting.
- 2.4.1.2 Using the City of Madison's directory of certified SBEs to identify SBEs from which to solicit bids.
- 2.4.1.3 Assuring that SBEs are solicited whenever they are potential sources.
- 2.4.1.4 Referring prospective SBEs to the City of Madison Affirmative Action Division for certification.
- 2.4.1.5 Dividing total project requirements into smaller tasks and/or quantities, where economically feasible, to permit maximum feasible SBE participation.
- 2.4.1.6 Establishing delivery schedules, where requirements permit, which will encourage participation by SBEs.
- 2.4.1.7 Providing SBEs with specific information regarding the work to be performed.
- 2.4.1.8 Contacting SBEs in advance of the deadline to allow such businesses sufficient time to prepare a bid.
- 2.4.1.9 Utilizing the bid of a qualified and competent SBE when the bid of such a business is deemed reasonable (i.e. 5% above the lowest bidder), although not necessarily low.
- 2.4.1.10 Contacting SBEs which submit a bid, to inquire about the details of the bid and confirm that the scope of the work was interpreted as intended.

### 2.4.2 Reporting SBE Utilization and Good Faith Efforts

The Small Business Enterprise Compliance Report is to be submitted by the bidder with the bid. This report is due by the specified bid closing time and date. Bids submitted without a completed SBE Compliance Report as outlined below

shall be deemed non-responsible and the bidder ineligible for award of this contract.

2.4.2.1 If the Bidder meets or exceeds the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.1.1 **Cover Page**, Page C-6; and

2.4.2.1.2 **Summary Sheet**, C-7.

2.4.2.2 If the bidder does not meet the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.2.1 **Cover Page**, Page C-6;

2.4.2.2.2 **Summary Sheet**, C-7; and

2.4.2.2.3 **SBE Contact Report**, C-8 and C-9. (A separate Contact Report must be completed for each applicable SBE which is not utilized.)

## 2.5 Appeal Procedure

A bidder which does not achieve the established goal and is deemed non-responsible for failure to demonstrate a good faith effort to achieve such goal and subsequently denied eligibility for award of contract may, within 72 hours of receiving such notification, appeal that decision to a special appeals committee composed of three (3) members of the Affirmative Action Commission, three (3) members of the Board of Public Works and a seventh member appointed by the Mayor. All appeals must be made in writing to the City Engineer and received within 72 hours of City of Madison's notice. Postmark not applicable.

## 2.6 SBE Requirements After Award of the Contract

The successful bidder shall identify SBE subcontractors, suppliers and vendors on the subcontractor list in accordance with the specifications. The Contractor shall submit a detailed explanation of any variances between the listing of SBE subcontractors, vendors and/or suppliers on the subcontractor list and the Contractor's SBE Compliance Report for SBE participation.

No change in SBE subcontractors, vendors and/or suppliers from those SBEs indicated in the SBE Compliance Report will be allowed without prior approval from the Engineer and the Affirmative Action Division. The contractor shall submit in writing to the City of Madison Affirmative Action Division a request to change any SBE citing specific reasons which necessitate such a change. The Affirmative Action Division will use a general test of reasonableness in approving or rejecting the contractor's request for change. If the request is approved, the Contractor will make every effort to utilize another SBE if available.

The City will monitor the project to ensure that the actual percentage commitment to SBE firms is carried out.

## **2.7 SBE Definition and Eligibility Guidelines**

A Small Business Enterprise is a business concern awarded certification by the City of Madison. For the purposes of this program a Small Business Enterprise is defined as:

- A. An independent business operated under a single management. The business may not be a subsidiary of any other business and the stock or ownership may not be held by any individual or any business operating in the same or a similar field. In determining whether an entity qualifies as a SBE, the City shall consider all factors relevant to being an independent business including, but not limited to, the date the business was established, adequacy of its resources for the work in which it proposes to involve itself, the degree to which financial, equipment leasing and other relationships exist with other ineligible firms in the same or similar lines of work. SBE owner(s) shall enjoy the customary incidents of ownership and shall share in the risks and profits commensurate with their enjoyment interests, as demonstrated by an examination of the substance rather than form or arrangements that may be reflected in its ownership documents.
- B. A business that has averaged no more than \$4.0 million in annual gross receipts over the prior three year period and the principal owner(s) do not have a personal net worth in excess of \$1.32 million.

Firm and/or individuals that submit fraudulent documents/testimony may be barred from doing business with the City and/or forfeit existing contracts.

SBE certification is valid for one (1) year unless revoked.

**UNIT WELL 26 GENERATOR ADDITION  
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**Small Business Enterprise Compliance Report**

**This information may be submitted electronically through  
Bid Express or submitted with bid in sealed envelope.**

**Cover Sheet**

Prime Bidder Information

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Contact Person/Title: \_\_\_\_\_

Prime Bidder Certification

I, \_\_\_\_\_, \_\_\_\_\_ of  
Name Title

\_\_\_\_\_ certify that the information  
Company

contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

\_\_\_\_\_  
Witness' Signature

\_\_\_\_\_  
Bidder's Signature

\_\_\_\_\_  
Date

**UNIT WELL 26 GENERATOR ADDITION  
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**Small Business Enterprise Compliance Report**

**Summary Sheet**

SBE Subcontractors Who Are NOT Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
<b>Subtotal SBE who are NOT suppliers:</b>		_____ %

SBE Subcontractors Who Are Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
		%
		%
		%
		%
		%
		%
		%
<b>Subtotal Contractors who are suppliers:</b>		_____ % x 0.6 = _____ % (discounted to 60%)
<b>Total Percentage of SBE Utilization:</b> _____ %.		

**UNIT WELL 26 GENERATOR ADDITION  
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**Small Business Enterprise Compliance Report**

**SBE Contact Report**

Submit separate copy of this form for each SBE which you are not able to utilize towards meeting the SBE goal for this project. Attach separate sheets if necessary.

SBE Information

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Contact Person/Title: \_\_\_\_\_

1. Outline below all efforts to solicit a bid from the above SBE. Include date, means of contact, who from your company made this contact and the result.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Describe the information provided to the aforementioned SBE regarding the scope of work for which he/she was to provide a bid.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Is this the same scope of work on which the subcontractor you intend to utilize based his/her bid?

☐ Yes    ☐ No

3. Did this SBE submit a bid?      ☐ Yes    ☐ No

4. Is the General Contractor pre-qualified to self-perform this category of work?

☐ Yes    ☐ No

5. If you responded "Yes" to Question 3, please check the items below which apply and provide the requested detail. If you responded "No" to Question 3, please skip ahead to item 6 below.

☐ The SBE listed above is unavailable for work on this project for the following reasons. Provide specific detail for this conclusion.

---

---

☐ The SBE listed above is unqualified for work on this project. Provide specific details for this conclusion.

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☐ The SBE listed above provided a price that was unreasonable (i.e. more than 5% above the lowest bidder). Provide specific detail for this conclusion including the SBE's price and the price of the subcontractor you intend to utilize.

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☐ A contract with the SBE listed above may constitute a breach of the bidder's collective bargaining agreements. Provide specific detail for this conclusion including, but not limited to, correspondence from the SBE indicating it will not sign a project labor agreement and/or correspondence from the applicable trade union indicating a project labor agreement will not be allowed at the time of project bidding.

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☐ Other; please specify reason(s) other than listed above which made it impossible for you to utilize this SBE on this project.

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6. Describe any other good faith efforts:

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**SECTION D: SPECIAL PROVISIONS**  
**UNIT WELL 26 GENERATOR ADDITION**  
**CONTRACT NO. 7107**

It is the intent of these Special Provisions to set forth the final contractual intent as to the matter involved and shall prevail over the Standard Specifications and plans whenever in conflict therewith. In order that comparisons between the Special Provisions can be readily made, the numbering system for the Special Provisions is equivalent to that of the Specifications.

Whenever in these Specifications the term "Standard Specifications" appears, it shall be taken to refer to the City of Madison Standard Specifications for Public Works Construction and Supplements thereto.

**SECTION 102.10:      PREVAILING WAGE**

- ☒ Prevailing wages shall be required when this box is checked.  
☐ Prevailing wages shall not be required when this box is checked.

If prevailing wages (white sheets) are required, the wages and benefits paid on the contract shall not be less than those specified in the Prevailing Wage Determination included with these contract documents for the following types of work:

- ☒ Building and Heavy Construction  
☐ Sewer, Water, and Tunnel Construction  
☐ Local Street and Miscellaneous Paving Operations  
☐ Residential and Agricultural Construction

**SECTION 102.12:      BEST VALUE CONTRACTING**

This Contract shall be considered a Best Value Contract if the Contractor's bid is equal to or greater than \$53,000 for a single trade contract; or equal to or greater than \$257,500 for a multi-trade contract pursuant to MGO 33.07(7).

**SECTION 105.1:      AUTHORITY OF THE ENGINEER**

The Engineer shall resolve all questions which arise as to the quality and acceptability of materials furnished, work performed, manner of performance, rate of progress of the work, interpretation of the plans and Specifications, acceptable fulfillment of the contract, compensation, and disputes and mutual rights between Contractors under the Specifications. The Engineer shall determine the amount and quantity of work performed and materials furnished.

All decisions of the Engineer shall, when so requested, be rendered in writing. They shall be final and conclusive in all matters unless within ten (10) days after such decision the Contractor applies in writing to the Board of Public Works for a review of such decision.

Any change proposed by a Contractor in SBE subcontractors, vendors or suppliers from those SBEs indicated on the SBE Compliance Report must be approved by the Engineer and the City's Manager of the Affirmative Action Division (hereafter, AAD). When requested, such decision shall be rendered in writing. Such decisions shall be final and conclusive in all matters unless within ten (10) days after such decision the Contractor or the affected SBE applies in writing to the Board of Public Works for a review of such decision.

In the event the Engineer and the AAD disagree over the proper decision to be made regarding an SBE, the Mayor shall appoint a third person to resolve the disagreement, within 30 days of appointment. The decision thus rendered may be reviewed by the Board of Public Works upon request of the Contractor or the affected SBE as set forth in Sections 105.1 and 105.2 of the City's standard specifications.



**SECTION 107.4(I):      INSURANCE FOR THE CONSTRUCTION OF BUILDINGS**

The City will effect and maintain, Builder's Risk Insurance on a replacement cost basis in an amount equal to the estimated project cost. Coverage includes the building as well as materials stored on the site to be incorporated in the building, including form work in place, form lumber on site, temporary structures, equipment and supplies incidental to the construction of the building. The City's Builders Risk coverage is written on a per building basis and contains a \$25,000 per occurrence deductible. If a loss under the City's Builders Risk policy is caused by the negligence of the Contractor or its Subcontractor(s), the Contractor will be responsible for paying the City's \$25,000 deductible. The City Engineer has the authority to withhold such deductible from payments due to Contractor. In addition, City Engineer, in his/her sole authority, will determine whether the Contractor was negligent in causing the loss and therefore is responsible for the City's deductible.

The insured loss, if any, is to be adjusted with and payable to the City.

**MADISON WATER UTILITY  
UNIT WELL 26 GENERATOR ADDITION  
TECHNICAL SPECIFICATIONS**

Baxter & Woodman, Inc.  
Crystal Lake, IL  
815.459.1260

Chicago, IL  
773.444.0292

DeKalb, IL  
815.787.3111

Grayslake, IL  
847.223.5088

Mokena, IL  
708.478.2090

Burlington, WI  
262.763.7834

Madison, WI  
608.277.1230

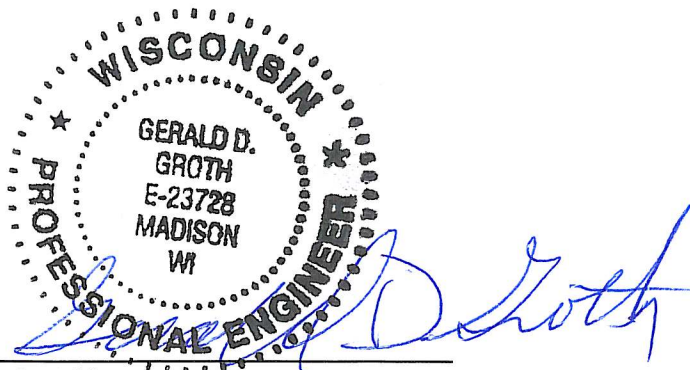
PROJECT TITLE PAGE  
00 01 01 (120851.41)

00 01 07

SEALS PAGE

October 4, 2013

1. Specifications of materials and labor required for the construction work shown on the Drawings are prepared by Baxter & Woodman, Inc., Consulting Engineers.
2. The Drawings which accompanies these Specifications are titled "Madison Water Utility Madison, Wisconsin, Unit Well 26 Generator Addition".
3. Copyright 2013 by Baxter & Woodman, Inc. All Rights Reserved. No part of these Specifications or the accompanying Drawings may be reproduced by any means, or otherwise reused without the prior written permission of Baxter & Woodman, Inc.



Project Manager  
License Expires 7/31/2014

SEALS PAGE

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**MADISON WATER UTILITY  
UNIT WELL 26 GENERATOR ADDITION  
TECHNICAL SPECIFICATIONS**

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## SUPPLEMENTARY CONDITIONS

## PART 1 - GENERAL

## 1.1 SUPPLEMENTARY CONDITIONS

- A. These Supplementary Conditions modify, change, delete from or add to the "Standard General Conditions of the Construction Contract" EJCDC No. C-700, 2007 edition, herein brought into the contract by reference. The EJCDC documents supplement the City of Madison General Conditions. Where any Article of the General Conditions is modified, or any Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

## 1.2 ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

- A. SC-1
  - 1. The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract have the identical meaning assigned to them in said General Conditions.
- B. SC-(1.01A.17)
  - 1. The term "Drawings" and the term "Plans" shall be considered synonymous whenever and wherever used in the Contract Documents.

## 1.3 ARTICLE 2 - PRELIMINARY MATTERS

- A. SC-2.01.B
  - 1. Delete paragraph 2.01.B in its entirety and substitute the following:

2.01.B When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner, with copies to each additional insured indicated in paragraphs 5.03 through 5.06, certificates of insurance which Contractor is required to purchase and maintain in accordance with paragraphs 5.03 and 5.04.
- B. SC-2.02
  - 1. Delete paragraph 2.02 in its entirety and substitute the following:

2.02 "Engineer will provide an electronic copy of the Drawings and Project Manual to the Contractor at the Preconstruction Conference."
- C. SC-2.03
  - 1. Under paragraph 2.03, delete the last sentence in its entirety.
- D. SC-2.05.A
  - 1. Delete paragraph 2.05.A in its entirety.

SUPPLEMENTARY CONDITIONS

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- E. SC-2.05.A.1 through 2.05.A.3
  - 1. Delete paragraphs 2.05.A.1 through 2.05.A.3 inclusive in their entirety.
- F. SC-2.06
  - 1. Under paragraph 2.06, add "Owner" to the listing of preconstruction conference attendees.
  - 2. Under paragraph 2.06, change "paragraph 2.05.A " to "paragraph 2.07".
- G. SC-2.07
  - 1. Delete paragraph 2.07 in its entirety and substitute the following:
 

2.07 Prior to submission of the first Application for Payment, but no later than 30 calendar days after Contract Times commence, Contractor shall submit to Engineer for review and approval:

    - A. A progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
    - B. A schedule of Shop Drawings and Sample submittal which will list each required submittal and the times for submitting, reviewing, and processing such submittal;
    - C. A schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work; and
    - D. A schedule of progress payments Contractor anticipates will be earned during the course of the Work.

No progress payment shall be made to Contractor until the schedules are submitted to and acceptable to Engineer as provided below. The progress schedule will be acceptable to Engineer as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on Engineer responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor. Contractor's schedule of Shop Drawing and Sample submissions will be acceptable to Engineer as providing a workable arrangement for reviewing and processing the required submittals. Contractor's schedule of values will be acceptable to Engineer as to form and substance.



1.4 ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;  
REFERENCE POINTS

A. SC-4.01.A

1. Under paragraph 4.01.A, third sentence, insert the words "and temporary construction easements shown on the Drawings" after the word "facilities".

B. SC-4.02.B

1. Under paragraph 4.02.B, delete the second sentence "Such technical data is identified in the Supplementary Conditions".

C. SC-4.05.A

1. Under paragraph 4.05.A., delete first sentence and substitute the following:
  - A. Owner shall provide land surveys necessary to establish right-of-way, easements and property lines. Engineer will provide base lines, bench marks and reference points which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall provide all stakes, markers, labor and assistance required by Engineer.
2. Under paragraph 4.05.A, last sentence, insert the words "and pay" between the words "responsible" and "for".

1.5 ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

A. SC-6.02.B

1. Under paragraph 6.02.B, add: The regular working hours are between 7:00 AM and 5:00 PM, Monday through Friday. In the event Contractor works more than eight hours on any weekday, or works anytime on Saturdays, Sundays, or holidays, during which time the Engineer, Resident Project Representative, or assistants are required to be present, Owner shall pay the cost for such overtime engineering services and shall deduct such cost from payments due Contractor. Overtime engineering services shall be charged at Engineer's standard hourly rates applied on a time and one-half basis for all time over eight hours on any single working day and for all hours on Saturday, and on a double time basis for all Sunday and holiday hours. If the amount due Contractor is not sufficient to cover the cost of overtime engineering services, Contractor shall reimburse Owner in the amount necessary to cover such costs. Legal holidays include:

New Years Day	Memorial Day
Independence Day	Labor Day
Thanksgiving Day	Christmas Day

If the legal holiday falls on Saturday, all hours worked on the preceding Friday and/or the Saturday will be considered as holiday hours. If the legal holiday falls on Sunday, all hours worked on the following Monday will be considered as holiday hours.

B. SC-6.06.A

1. Under paragraph 6.06.A, add: Any person employed by Contractor or Subcontractors who does not perform his work in a proper and skillful manner, or who is intemperate, disorderly, or otherwise objectionable, shall, at the written request of Owner, be forthwith removed from the project site and shall not be employed again in any portion of the Work without written consent of Owner.
- C. SC-6.06.B
1. Under paragraph 6.06.B, add: Contractor shall identify all Subcontractors, major Suppliers and other persons or organizations providing principal items of work, material, and equipment. Contractor shall within ten working days of the date on the Notice of Award identify and submit in writing to the Engineer for Owner acceptance the names, addresses, and telephone numbers of all Subcontractors, Major Suppliers, and other persons or organizations providing principal items of work, material, and equipment.
- D. SC-6.19.A
1. Delete paragraph 6.19.A and 6.19.B in their entirety and substitute the following:
 

6.19.A Contractor shall execute and deliver to Owner, before the final payment will be issued, a written warranty which guarantees that all work is in accordance with the Contract Documents and will not be defective. This warranty shall guarantee all work for a period of three years from the date of acceptance of the Work and final payment by Owner, except for equipment, motors, electrical controls, and other mechanical devices which shall be guaranteed for a period of two years from the date of acceptance and use of each item of equipment by Owner unless a different guarantee period of time is specified under other parts of the Contract Documents.

If within these guarantee periods or such longer period of time as may be prescribed by the Contract Documents, any work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such defective work, or, if it has been rejected by Owner, remove it from the site and replace it with nondefective work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective work corrected or the rejected work removed and replaced, and all direct and indirect costs of such repair and/or replacement of work, including compensation for additional professional services, shall be paid or reimbursed to Owner by Contractor.

Contractor shall furnish a warranty bond in an amount equal to five percent (5%) of the Contract Price, but not less than \$10,000, by a surety satisfactory to Owner to guarantee Contractor's warranty to repair or replace defective work. The warranty bond shall be in addition to Contractor's contract Performance-Payment Bond, and shall be delivered to Owner prior to final payment to Contractor for the Work. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
- E. SC-6.20.C
1. Under paragraph 6.20.C, add: Except insofar as indemnification is sought by Engineer or Engineer's Consultants for litigation type expenses including, but not

limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

## 1.6 ARTICLE 8 - OWNER'S RESPONSIBILITIES

### A. SC-8.06

1. Delete paragraph 8.06 in its entirety.

## 1.7 ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

### A. SC-9.03

1. Under the paragraph 9.03.A., delete the second sentence.
2. Under paragraph 9.03A add the following:

A LISTING OF THE DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE (RPR).

#### **A. General**

RPR is Engineer's agent at the site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's dealings in matters pertaining to the on-site work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors will only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

#### **B. Duties and Responsibilities of RPR**

1. *Schedules:* Review the progress schedule, schedule of the Shop Drawing submittals and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
3. *Liaison:*
  - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.
  - b. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
4. *Shop Drawings and Samples:*

- a. Record date of receipt of Shop Drawings and samples.
  - b. Receive samples which are furnished at the site by Contractor, and notify Engineer of availability of samples for examination.
  - c. Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been approved by Engineer.
- 5. *Review of Work, Rejection of Defective Work, Inspections and Tests:*
  - a. Conduct on-site observations of the Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to Engineer whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made: and advise Engineer of Work that RPR believes should be corrected or rejected or uncovered for observation, or requires special testing, inspection and approval.
  - c. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startups.
  - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.
- 6. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
- 7. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.
- 8. *Records:*
  - a. Maintain at the job site orderly files for correspondence, reports of job conference, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
  - b. Complete a Daily Report recording Contractor hours on the job site, weather conditions, data relative to questions or Work Directive Changes, Change Orders or changed conditions, list

- of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send original to Engineer.
- c. Record names, address and telephone numbers of all Contractors, subcontractors and major suppliers of materials and equipment.

9. *Reports:*

- a. Furnish Engineer periodic reports as required of progress of the Work and the Contractor's compliance with the progress scheduled and schedule of Shop Drawings and sample submittals.
- b. Consult with Engineer in advance of schedule major tests, inspections or start of important phases of the Work.
- c. Draft Field Orders, obtain backup material from Contractor and recommend to Engineer Change Orders and Work Directive Changes. Furnish Engineer copies of all Field Orders.
- d. Report immediately to Engineer and Owner upon occurrence of any accident.

10. *Payment Requests:* Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values. Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that certificates, operation and maintenance manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.

12. *Completion:*

- a. Before Engineer issues a Certificate of Substantial Completion, prepare and furnish to the Engineer a list of observed items requiring completion or correction.
- b. Conduct final inspection in the company of Engineer, Owner, and Contractor and prepare and furnish to the Engineer a final list of items to be completed or corrected.
- c. Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance.

**C. Limitations of Authority**

Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer.
2. Shall not exceed limitations of Engineer's authority as set forth in the Agreement or the Contract Documents.
3. Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.
4. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures or construction unless such advice or directions are specifically required by the Contract Documents.
5. Shall not advise on, issue directions relative or assume control over safety precautions and programs in connection with the Work.
6. Shall not accept Shop Drawing or sample submittals from anyone other than Contractor.
7. Shall not authorize Owner to occupy the Project in whole or in part.
8. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

#### 1.8 ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

##### A. SC-12.04 through 12.06

1. Add the following paragraphs:

##### 12.04 Start and Completion Times

The date of beginning and the time for completion of the Work are essential conditions of the Agreement and the Work required shall be commenced on a date specified in the Notice to Proceed.

##### 12.05 Time for Completion

Contractor shall proceed with the Work at such rate of progress to insure full completion within the Contract Times. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract Times for the completion of the Work described herein is a reasonable time, taking into consideration the adverse weather conditions for the season, or seasons, involved and other factors prevailing in the locality of the Work.

The Contract Substantial Completion Date shall be July 1, 2014. The Contract Final Completion date shall be August 1, 2014.

##### 12.06 Liquidated Damages

Contractor understands that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times or by the dates specified in the Bid Form, plus any extensions thereof allowed in accordance

#### SUPPLEMENTARY CONDITIONS

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with Article 12 of the General Conditions. Contractor also recognizes the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Contractor shall pay Owner as liquidated damages for delay (but not as a penalty) the amount as noted in City of Madison Contract, for each day that expires after the time or date specified in the Bid Form for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner the amount as noted in City of Madison Contract, for each day that expires after the time or date specified in the Bid Form for completion and readiness for final payment.

#### 1.9 ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

##### A. SC-13.10

1. Add new paragraph 13.10 as follows:

##### 13.10 Notification and Time Limit for Repairs:

- A. Contractor shall be responsible for the proper and safe protection of his work at all times during construction and also during the three-year guarantee period after the acceptance of the completed work by Owner. Contractor shall provide, erect, and maintain barricades, red flags, and torches and lights at all places where work is in progress, and wherever else required by Owner.
- B. Contractor shall maintain an emergency phone number where he/she can be notified at any time, Sundays and holidays included, of an emergency condition due to the work which requires immediate repair or protection. Upon such notification by Owner, Contractor shall be given a two-hour time limit to provide whatever barricades, flags, torches and lights are required to mark and protect the hazard. If Contractor fails to provide this protection within the two-hour period from time of notification, Owner will provide the necessary protection and deduct the sum of \$200.00 for each occurrence from the monies due and payable to Contractor for completed work.
- C. Also, upon notification by Owner, Contractor shall be given a 24-hour time limit to begin to make any repairs to the Work as deemed necessary by Owner. If Contractor fails to proceed with necessary repairs within the 24-hour notification period, Owner will make the necessary repairs to the Work and deduct the cost of labor and materials, including engineering costs, for each repair incident from the monies due and payable to Contractor for completed work.

#### 1.10 ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

##### A. SC-14.01

1. Add the following paragraph after paragraph 14.01.A:
  - B. Contractor shall submit revisions to the initial schedule of progress payments whenever actual outlays for the Work vary beyond -5 percent and +10 percent from the schedule, as determined by Engineer.
- B. SC-14.02
  1. Under paragraph 14.02.A.1, delete the remainder of the first sentence after "(but not more than one a month)" and insert the following:
 

Contractor shall submit to Engineer for review an original plus four duplicate copies of each Application for Payment and each copy shall be accompanied by a "Sworn Statement For Contractor And Subcontractor To Owner" on a pre-printed or computer generated form.
  2. Delete paragraph 14.02.A.3, and substitute the following:
 

Periodic partial payments shall be for the value of the completed work less a retained amount of 5 percent of the value of completed work as approved by Engineer until construction is 50 percent complete, after which no additional amount will be retained if Contractor is making progress to Owner's satisfaction and there is no specific cause for withholding 5 percent of the total value of completed work. At 50 percent completion or any time thereafter when the progress of the work is not satisfactory, additional amounts may be retained up to 10 percent of the value of the work completed. When the project is substantially complete and available for Owner's operational or beneficial occupancy, the retained amount shall be reduced to only that amount estimated by Engineer as necessary to assure completion of the Work. The final payment, including the retained amount, shall be payable within 30 days after the completion of the Work, approval by Engineer and acceptance by Owner. The acceptance of the final payment by Contractor shall be considered to be a waiver of all claims against Owner under the Agreement.
- C. SC-14.02.C
  1. Under paragraph 14.02.C, change "Ten" to "Within 30".



## D. SC-14.03

1. Under paragraph 14.03.A, add the following:

- B. Contractor shall procure from each Subcontractor and Supplier of material or labor a waiver of any claim which they may have under the mechanics lien laws of the state in which the Work is located, to insure Owner immunity from mechanics liens on account of anything which is done by Contractor or his Subcontractors in carrying out the Agreement and any work orders for additions thereto, all as a condition of any payment by Owner. Any payments made by Owner without requiring compliance with this paragraph shall not be construed as a waiver by Owner of the right to require compliance with this paragraph as a condition of later payments. Contractor shall furnish with his final Application for Payment a complete release of all liens arising out of this contract, or receipts in full in lieu thereof and an affidavit that the releases and receipts include all labor and material for which a lien could be filed.

## E. SC-14.07

1. Under paragraph 14.07.C, change "Thirty" to "Sixty".

## 1.11 ARTICLE 18 - EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION NOTICE

## A. SC-18.01 Equal Employment

1. Contractor shall comply with the equal employment opportunity affirmative action required by the City of Madison.

## 1.12 ARTICLE 19 – PREVAILING WAGE RATES

## A. SC-19.01 Prevailing Wage Rates

1. Contractor shall comply with the attached prevailing wage rates as determined by the State of Wisconsin Department of Workforce Development (DWD). If DWD finds a contractor violating the prevailing wage law DWD will assess liquidated damages of 100% of the wages owed to employees.
2. Contractor shall comply with all applicable federal, state, and local rules and regulations regarding the posting, certification, and filing of wage rates paid to employees. Contractor shall file certified payroll records with DWD on a monthly basis in a format that meets DWD reporting requirements. Certified payroll reports must be filed with DWD by the end of the first week following the month in which the work was conducted.
3. Upon completion of the Work and prior to final payment, Contractor shall file with Owner, the attached affidavit of compliance with prevailing wage rate determination.

END OF SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

00 73 00.13-11 (120581.41)

## SECTION 01 14 11

### CONTRACTOR USE OF PREMISES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

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

##### 1.2 QUALITY ASSURANCE

- A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

##### 1.3 NOISE CONTROL

- A. Conduct operations to cause the least annoyance to residents in the vicinity of the Work and comply with City of Madison Ordinances.
- B. Work hours shall be between 7 AM and 7 PM, Monday thru Friday, except legal holidays and unless otherwise agreed to in writing from Owner.
- C. Equip all mechanical devices and engines with adequate silencers and mufflers.

##### 1.4 USE AND RESTORATION OF THE SITE

- A. Utilize Construction Laydown Area shown on Drawings for storage of materials and access to work site.
- B. Install Erosion Control Measures before starting work.
- C. Before submitting Final Application for Payment, restore all areas within the work site boundaries disturbed by the Work to a fully regraded condition, provided with at least four (4) inches of hand raked topsoil and seeded as specified under Section 32 92 00.13.
- D. Clean all permanent roadways used for construction activities by using motorized street sweeper that utilizes vacuum and water to pick up debris, when directed by Engineer.

### CONTRACTOR USE OF PREMISES

01 14 11-1 (120851.40)

## 1.5 CONTRACTOR'S INGRESS AND EGRESS

- A. Truck and Equipment access:
  - 1. To avoid traffic conflict with vehicles of the Owner's employees Utilize the south access drive. Do not park near Unit Well 26 building or utilize the north parking lot and north access drive. Avoid overloading of streets and driveways elsewhere on the Owner's property. Do not obstruct cellular equipment compound or access to cellular equipment.
  - 2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the work site.
- B. Contractor's vehicles:
  - 1. Park cars legally on any street or other areas privately arranged by the Contractor.
- C. Restoration: Clean and restore to at least the preconstruction condition all roadways, streets, sidewalks, driveways, and parking areas used during construction.

## 1.6 ACCESS TO OWNER'S FACILITIES

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

## 1.7 PROTECTION OF EXISTING PROPERTY AND EQUIPMENT

- A. Property:
  - 1. Take all necessary precautions to protect existing structures, piping, trees and all other facilities from damage during construction, and comply with Section 31 23 79, paragraph 3.2 of these Specifications.
  - 2. Repair or replace all property damaged during construction.
- B. Equipment:
  - 1. Take all necessary precautions to protect all equipment from sand, dust, water and other debris which is produced during construction.
  - 2. Wherever possible, cut concrete or masonry from outside the structure to prevent production of dust in areas containing equipment.
  - 3. During dust-producing activities inside of structures, isolate work area from equipment using temporary impervious partitions or individual equipment encasement.
  - 4. Under excessive dust conditions, ventilate isolated working areas.

## CONTRACTOR USE OF PREMISES

01 14 11-2 (120851.40)

5. Remove all temporary equipment protection facilities upon completion of construction activity requiring such protective measures.

#### 1.8 DISPOSAL OF SPOIL

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

#### 1.9 CONTRACTOR'S STORAGE AREA

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

#### 1.10 SECURITY

- A. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the actual site of the Work.

END OF SECTION

## SECTION 01 14 15

### PLANT OPERATION DURING CONSTRUCTION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Prepare and maintain a sequence of construction which will ensure the continuance of water delivery from the 100 Hp booster pump into the high pressure zone, except for minor outages lasting no longer than 4 hours in duration.
- B. Neither the well nor the booster pumps shall be removed from service from July 1st through September 10th of any year.

##### 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed and as a part of the construction schedule required by Section 01 32 16, submit a detailed sequence of construction showing how the new work will be completed without interruption of the existing process.

##### 1.3 TEMPORARY EQUIPMENT

- A. Provide and arrange for temporary electrical power, starter and controls to provide power for the 100 Hp booster pump, controls for the booster pump, building lighting, and temporary power for construction activities at no additional cost to the Owner, except that electrical demand and power consumption will be paid for by the Utility.

##### 1.4 OPERATION OF WELL FACILITIES

- A. The Owner will operate and maintain permanent facilities used for the pump station and delivery of water into the distribution system. No watermain or equipment shall be removed from service nor shall the power to any part of the plant be discontinued without the approval of the Engineer.
- B. Contractor shall not restrict access to Unit Well 26 Building, cellular compound, or other facilities as required for delivery of water to distribution system.

END OF SECTION

PLANT OPERATION DURING CONSTRUCTION

01 14 15-1 (120851.41)

## SECTION 01 26 13

### REQUESTS FOR INTERPRETATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY: REQUESTS FOR INTERPRETATION (RFI)

- A. The Contractor may submit Requests For Interpretation (RFI) to the Engineer to expedite the Contractor's performance on the Project. RFIs will be submitted following the requirements, all as described in this Section.
- B. Related work:
  - 1. Individual requirements for submittals will be described in pertinent Sections of these Specifications.
- C. Work not included:
  - 1. Incomplete submittals will not be reviewed by the Engineer.
  - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

##### 1.2 SUBMITTALS

- A. Make submittals of RFI's in accordance with the provisions of this Section.
- B. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information requested is not reasonably obtainable from such sources.
- C. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required to allow the Engineer sufficient time, in the Engineer's professional judgement, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

#### PART 2 - PRODUCTS

This Subsection intentionally left blank.

## PART 3 - EXECUTION

### 3.1 IDENTIFICATION OF SUBMITTALS

- A. Each RFI shall be submitted to the Engineer, in writing, on such form and with such accompanying information as the Engineer may require for such purpose. Each RFI shall identify the specific sources which were reviewed by the Contractor in its efforts to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.
- B. Consecutively number all submittals.
  - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
  - 2. On re-submittals, cite the original submittal number for reference.
- C. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
  - 1. Use Request for Interpretation (RFI) Form, RFI 01 26 13.13-1.
- D. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- E. Submittal log:
  - 1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Engineer's resolution thereof.
  - 2. Make the submittal log available to the Engineer for the Engineer's review upon request.
  - 3. Review this log at each Project Meeting and make the resolution of RFIs a part of the minutes of such meetings.

END OF SECTION

## REQUEST FOR INTERPRETATION (RFI) FORM

RFI NO. \_\_\_\_\_

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

Date: \_\_\_\_\_ Project: \_\_\_\_\_

To: \_\_\_\_\_

Description of Requested Interpretation: \_\_\_\_\_

\_\_\_\_\_

Specification References: \_\_\_\_\_

Drawing References: \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

Potential impact on project cost: \_\_\_\_\_

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

Signed: \_\_\_\_\_, Project Superintendent  
Signature signifies acceptance of responsibility for accuracy and completeness of information.

### ENGINEER'S RESPONSE

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_



## SECTION 01 31 14

## PROJECT COORDINATION AND CONSTRUCTION PHASING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This section describes the Contractor's general project coordination and construction phasing requirements under this Contract.
- B. Coordinate construction activities with the Owner and Engineer.
- C. Follow specific procedures and project phasing requirements specified in this Section.
- D. Submit the plan of construction phasing to the Owner and Engineer for review two working days prior to the pre-construction conference.

## 1.2 SUBMITTALS

- A. Submit a detailed plan for phasing of construction in all areas and phasing of construction and restoration that will illustrate compliance with project phase completion requirements.
  - 1. Define construction activities on a week-by-week basis.
  - 2. Define subcontractor work activities.
  - 3. Allow for reasonable periods of delays caused by inclement weather.

## 1.3 CONTRACTOR'S REQUIREMENTS

- A. General: Water delivery from the 100 HP booster pump into the high pressure zone shall not be disrupted, except for minor outages lasting no longer than 4 hours in duration. Neither the well nor the booster pumps shall be removed from service from July 1<sup>st</sup> thru September 10<sup>th</sup> of any year.
- B. Paving and Fence Construction: Coordinate paving and fence construction to coincide with engine generator delivery.
- C. Electrical Phasing: Contractor to coordinate electrical work to within limits and restrictions noted and as described in detail on the drawings and within pertinent specification sections. This includes coordination of the temporary power and electrical controls for 100 HP booster pump as noted in Section 01 50 00, Item 2.1 B.
- D. Seeding and Sodding: Complete all exterior excavation and piping work to allow for seeding and sodding of all disturbed areas to allow for grass catch within growing season. Restore all disturbed areas within 2 weeks of start of earth disturbance.

## PROJECT COORDINATION AND CONSTRUCTION PHASING

01 31 14-1 (120851.41)

- E. Project Completion: Complete project as set forth in Item 1.9 A. 1. of the Supplementary Conditions, Section 00 73 00.13.

## PART 2 - PRODUCTS

No products are required in this Section.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Construct the proposed facilities in a timely manner and comply with these project coordination and construction phasing requirements.

END OF SECTION

SECTION 01 31 19  
PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.
- B. Related work:
  - 1. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.2 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Minutes:
  - 1. The Engineer will compile minutes of each project meeting, and will furnish three copies to the Contractor and required copies to the Owner.
  - 2. Recipients of copies may make and distribute such other copies as they wish.

1.3 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Project meetings will be scheduled at the Pre-construction Meeting.

- B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

### 3.2 MEETING LOCATION

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

### 3.3 PRECONSTRUCTION MEETING

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

### 3.4 PROJECT MEETINGS

- A. Attendance:
  - 1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
  - 2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

END OF SECTION

## SECTION 01 32 16

## CONSTRUCTION PROGRESS SCHEDULES

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Construction schedule: Prior to submission of the first Application for Payment, but no later than 30 calendar days after Contract Times commence, submit to the Engineer one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.
- C. Periodic reports: Prior to submittal of Application for Payment for completed work coinciding with 50 percent and 80 percent of the Contract Price, submit to the Engineer four prints of the construction schedule updated as described in Part 3 of this Section.

## 1.3 QUALITY ASSURANCE

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

## CONSTRUCTION PROGRESS SCHEDULES

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## PART 2 - PRODUCTS

### 2.1 CONSTRUCTION ANALYSIS

- A. Graphically show by Critical-Path (CPM), Program Evaluation and Review Technique (PERT), Precedence Methods, bar-chart, or other means acceptable to the Engineer, the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.
- B. Include, but do not necessarily limit indicated activities to:
  - 1. Project mobilization.
  - 2. Work elements.
  - 3. Special material and equipment installation and testing.
  - 4. Final cleanup.
  - 5. Final inspecting and testing.
  - 6. All activities by the Engineer that affect progress, required dates for completion, or both, for all and each part of the work.
  - 7. Contractor's anticipated working dates.

## PART 3 - EXECUTION

### 3.1 CONSTRUCTION SCHEDULE

- A. As soon as practicable after receipt of Notice to Proceed, complete the construction schedule in preliminary form, meet with the Engineer, review contents of the proposed construction schedule, and make all revisions agreed upon.
- B. Submit in accordance with Paragraph 1.2 B. above.

### 3.2 PERIODIC REPORTS

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

### 3.3 REVISIONS

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

END OF SECTION

CONSTRUCTION PROGRESS SCHEDULES

01 32 16-2 (120851.41)

## SECTION 01 33 01

## SUBMITTALS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section.
- B. Related work:
  - 1. Individual requirements for submittals will be described in pertinent Sections of these Specifications.
    - a. The process for securing approval of proposed substitutions is described in Section 01 62 01, "Product Options and Substitutions."
- C. Work not included:
  - 1. Unrequired submittals will not be reviewed by the Engineer.
  - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

## 1.2 SUBMITTALS

- A. Make submittals of Shop Drawings, Samples, Substitution Requests, progress schedules and other items in accordance with the provisions of this Section.

## 1.3 QUALITY ASSURANCE

- A. Coordination of submittals:
  - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
  - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
  - 3. By affixing the Contractor's signature and his certification stamp to each submittal, certify that this coordination has been performed.
- B. Resubmittals and reimbursement of Engineer's costs.
  - 1. The Engineer will record all time used by the Engineer in the review of any third and subsequent submittals.
  - 2. The Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent in such third and subsequent reviews and deduct such costs from payments due the Contractor.

## SUBMITTALS

01 33 01-1 (120851.41)

## PART 2 - PRODUCTS

### 2.1 SHOP DRAWINGS

- A. Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
  - 1. Shop Drawings are not required for manholes, valve vaults, catch basins, pipe, and appurtenances needed for infrastructure systems (storm sewers, sanitary sewers, and water distribution) so long as the items are the materials and manufacturers specified in the project manual.
- B. Submit the number of copies which are required to be returned, plus five copies which will be retained by the Engineer.
  - 1. Collate each copy of the required number of shop drawing sets to be submitted and include one of each item for that current submittal.
- C. Collate each copy of the required number of shop drawing sets to be submitted and include one of each item for that current submittal.

### 2.2 MANUFACTURERS' LITERATURE

- A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portion of the contents is being submitted for review.
- B. Submit the number of copies which are required to be returned, plus five copies which will be retained by the Engineer.

### 2.3 SAMPLES

- A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.
- B. Number of Samples required:
  - 1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
  - 2. By prearrangement in specific cases, a single Sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Engineer.

### 2.4 COLORS AND PATTERNS

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



## 2.5 MANUFACTURERS' RECOMMENDED INSTALLATION PROCEDURES

- A. Maintain in a safe place at the site one copy of manufacturers' recommended installation procedures for all equipment and materials.
  - 1. Make these installation procedures readily available to the Engineer for reference.
- B. When the manufacturers' recommended installation procedures are submitted as part of the shop drawings required by the Contract Documents, approval of such installation procedures by the Engineer will not be required.

## PART 3 - EXECUTION

### 3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
  - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
  - 2. On resubmittals, cite the original submittal number for reference.
- B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
  - 1. Use Contractor's Submittal Transmittal Form, Attachment 01 33 01.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Submittal log:
  - 1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times.
  - 2. Make the submittal log available to the Engineer for the Engineer's review upon request.

### 3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
  - 1. Partial submittals may be rejected as not complying with the provisions of the Contract.
  - 2. The Contractor may be held liable for delays so occasioned.
  - 3. Do not submit unrelated items in group submittals.

### 3.3 TIMING OF SUBMITTALS

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

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

END OF SECTION

## ATTACHMENT 01 33 01

## CONTRACTOR'S SUBMITTAL TRANSMITTAL FORM

TO: BAXTER & WOODMAN, INC.  
2801 COHO STREET, SUITE 204  
MADISON, WI 53713

DATE: \_\_\_\_\_

ATTN: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

FROM: \_\_\_\_\_ SPEC NO. \_\_\_\_\_

\_\_\_\_\_ ENGR. DWG. NOS. \_\_\_\_\_

\_\_\_\_\_ TRANSMITTAL NO. \_\_\_\_\_

1. The following submittals are forwarded for your review:

<u>No. of Copies</u>	<u>Manufacturer</u>	<u>Description</u>	<u>Drawing No.</u>	<u>Date</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2. Have all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data been determined and verified?

Yes \_\_\_\_ No \_\_\_\_

3. Has work indicated in this submittal been coordinated with all trades?

Yes \_\_\_\_ No \_\_\_\_

4. Is work by all trades being provided as necessary to accommodate this submittal?

Yes \_\_\_\_ No \_\_\_\_

5. Contractor has approved submittal and has affixed his certification stamp.

Yes \_\_\_\_ No \_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Remarks: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

10/00

SAMPLE SHOP DRAWING INDEX AND INSTRUCTIONS

Shop Drawing Index

Const Job No: Bill-Grp-Id: 001

Client:

Substantial Completion:

Completion:

Project Manager:

Page 1 of

01/01/2008 00:00:00 AM

Spec No	Item Description	Supplier ID	Supplier Company Name	Supplier Contact	Supplier Phone	ITEM DELIVERY INFORMATION			
1	2		3	4	5	Date Ordered	Date Expected	Date Arrived	Item Cond
						6	7	8	9
01 31 14-001-1.02	PROJECT COORDINATION AND CONSTRUCTION PHASING								
01 50 00-001-1.02	JOB SIGN								
01 78 39-001-1.02	PROJECT RECORD DOCUMENTS								

See below left

SHOP DRAWING SUBMITTAL INFORMATION				EQUIP TEST INFORMATION				01 61 01 01 01 640 INFORMATION				01 78 26 O&M MANUAL			
Approval Needed	Due at B&W	Date Rec'd	Action Date	Test Rec'd	Test Date	Results		Required	Date	Cond		Required	Date	Cond	
10	11	12	13	15	16	17		18	19	20		21	22	23	

See above right

## **SHOP DRAWING INDEX (COMPUTERIZED)**

### **FORM PURPOSE:**

To provide the Contractor with a positive means of control on the placement of orders, shop drawings and operation and maintenance manuals, process, delivery of materials, and the completion of their Construction Progress Schedule.

To provide the Owner and/or Engineer with a positive means to monitor the Contractor's progress as it relates to the above items.

To provide a management tool for Project Managers (Owner or Engineer). Project management is determined by information controlled.

To provide the Owner with a record of equipment items, manufacturer's name, manufacturers or phone number, and individual most knowledgeable of that particular item of equipment.

### **FORM COMPLETED BY:**

#### **Baxter & Woodman, Inc.**

Column Nos. 1, 2, 15, 18, and 21. Copy furnished to Contractor for information at the time that the Notice to Proceed is sent to the Contractor.

Column Nos. 11, 12, 13, 14, 16, 17, 19, 20, 22, 23, and 24; as they occur.

#### **Contractor**

Column Nos. 3, 4, 5, 6, 7, and 10 and return to Engineer within 10 calendar days after the Notice to Proceed.

Column Nos. 8 and 9 as they occur. It is suggested that the information be updated and forwarded to Baxter & Woodman, Inc. no less than bi-weekly.

### **SPECIAL INSTRUCTIONS OR INFORMATION:**

Column 3. Company Name: Use complete company name (Baxter & Woodman, Inc.).

Column 5. Phone: A complete telephone number includes the area code.

Column 6. Contact Person: Use Individual's full name.

Columns 13 and 17. Action taken:

**NET** (No Exception Taken) - **NO FURTHER SUBMITTALS REQUIRED FOR THIS ITEM.**

**REJECT** (Rejected) - Complete resubmittal is required on all submittals until approved.

**MCN** (Make Corrections Noted) – **NO FURTHER SUBMITTALS REQUIRED FOR THIS ITEM.**

**R&R** (Revise & Resubmit) - Complete resubmittal is required on all submittals until approved.

**SSI** (Submit Specified Items) - Complete resubmittal is required on all submittals until approved.

Columns 9, 20, 23, and 24. Cond. (Conditions): Columns to be used by any party for communicating status. Entries to be used as follows:

**Sat.** (Satisfactory). Item is complete, correct, and ready for installation. No further action is required.

**Dmgd.** (Damaged). Item was received or has been damaged and must either be returned for repair or repair parts requested and repairs made on-site.

**Incp.** (Incomplete). Item is missing component(s).

**Wrng.** (Wrong). Item does not agree with the “ACCEPTED” shop drawings and must be replaced with an acceptable item.

**NA** (Not Applicable). Self-explanatory.

**EXAMPLE:**

9,	20,	23,	24
Incp.			Missing
components			Ordered 11/14/85 Due site 12/18/85

As an Owner, Contractor, or Resident Engineer supplies Baxter & Woodman, Inc., with additional information, the data will be logged into the computer, the records, updated, and upon request, copies made and furnished to the interested party(ies). It is suggested that this document be monitored continuously and update information furnished to Baxter & Woodman, Inc., no less than bi-weekly.

The furnishing of the Shop Drawings (Computerized) printout by the Engineer is a gratuitous assistance and the Engineer does not thereby assume responsibility for errors or omissions. Where such errors or omissions are discovered later, they must be made good by the Contractor irrespective of any prior review by the Engineer.

## SECTION 01 41 26

### PERMITS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This section describes permit requirements for building and electrical permits.

##### 1.2 BUILDING AND ELECTRICAL PERMITS

- A. Obtain all permits required, and pay all inspection fees for the respective work requiring such permits. Water Utility shall reimburse Contractor for all City inspection and permit fees.

##### 1.3 ENVIRONMENTAL PERMITS

- A. Conform with the requirements of the City of Madison, Dane County and Wisconsin Department of Natural Resources (WDNR) permits, as applicable.
- B. Obtain Air Quality Operating Permit for new generator.

END OF SECTION

### PERMITS

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## SECTION 01 42 13

## ABBREVIATIONS AND ACRONYMS

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 ABBREVIATIONS

## A. Referenced Standards:

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

## B. Abbreviations:

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

## ABBREVIATIONS AND ACRONYMS

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OSHA - U.S. Department of Labor, Occupational Safety and Health  
Department  
PS - United States Products Standards  
SSPC - Structural Steel Painting Council  
UL - Underwriter's Laboratories, Inc.  
WDOT - "STANDARD SPECIFICATIONS" - Wisconsin Department of  
Transportation, "STANDARD SPECIFICATIONS For Highway and Structure  
Construction"

END OF SECTION

## SECTION 01 45 29

### TESTING LABORATORY SERVICES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section describes testing to be provided by an independent testing laboratory service.
- B. Related work:
  - 1. Requirements for specific tests will be described in various Sections of these Specifications.
- C. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

- A. Provide the services of a testing laboratory approved by the Engineer.
- B. Upon completion of each test and/or inspection, promptly distribute copies of test or inspection reports to the Engineer, to governmental agencies requiring submission of such reports, and to such other persons as directed by the Engineer.

##### 1.4 DELIVERY, STORAGE, AND HANDLING – Reserved.

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

### TESTING LABORATORY SERVICES

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## 1.7 TESTING AGENCY DUTIES AND LIMITS OF AUTHORITY

- A. Cooperate with the Engineer and the Contractor; provide qualified personnel and equipment to perform the scope of testing work outlined.
- B. Acquaint the Engineer and the Contractor with testing procedures for special conditions encountered at the site.
- C. Perform specified monitoring, sampling, and testing of the materials and construction.
  - 1. Comply with specified standards, ASTM, other authorities, and as specified.
  - 2. Ascertain compliance with the Contract Documents.
  - 3. Obtain written acknowledgment of sampling or testing.
- D. Give prompt written notice to the Engineer and the Contractor of irregularities or deficiencies of work which are observed during performance of service.
- E. The Laboratory is not authorized to release, revoke, alter or enlarge the Contract requirements, nor to approve or accept any portion of the work, nor to perform the duties of the Contractor.

## PART 2 - PRODUCTS

### 2.1 PAYMENT FOR TESTING

- A. Include within the Contract Price an amount sufficient to cover all testing required of the Contractor under pertinent Sections of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction.
- B. The Owner will pay for all testing and inspecting specifically requested by the Engineer over and above those described in Paragraph 2.1 A. above.
- C. When tests indicate noncompliance with the Contract Documents, all testing and subsequent retesting occasioned by the noncompliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.

## PART 3 - EXECUTION

### 3.1 TAKING SPECIMENS

- A. Except as may be specifically otherwise approved by the Engineer, have the testing laboratory secure and handle all samples and specimens for testing.

### 3.2 COOPERATION WITH TESTING LABORATORY

- A. Provide access to the Work at all times and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.
- B. Furnish casual labor and facilities:
  - 1. To obtain and handle samples at the site or at the source of the product to be tested.
  - 2. To facilitate testing operations.
  - 3. For laboratory's exclusive use for storage and curing of test samples on site.
- C. Notify the testing agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of its operations.
- D. Provide the testing laboratory with copies of approved relevant shop drawings.

END OF SECTION

## SECTION 01 50 00

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section describes construction facilities and temporary controls required for the Work.
- B. Related work:
  - 1. Permanent installation and hookup of the various utility lines are described in other Sections.

##### 1.2 REQUIREMENTS

- A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
  - 1. Temporary utilities such as heat, water, electricity, and telephone.
  - 2. Field office for the Contractor's personnel.
  - 3. Temporary sanitary facilities.
  - 4. Enclosures such as fencing, tarpaulins, barricades, and canopies.
  - 5. Temporary fencing of the construction excavation.
  - 6. Fire extinguishers.
  - 7. Dust and mud control.
  - 8. Traffic control.
  - 9. Security.
  - 10. Right-of-way and property line control.

##### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

#### PART 2 - PRODUCTS

##### 2.1 UTILITIES DURING CONSTRUCTION

- A. Water:
  - 1. The Owner will provide water for use by the Contractor for miscellaneous construction activities. The Contractor will utilize water from devices provided by and at the location designated by the Owner. There will be no charge for the water utilized, but Contractor must coordinate the times of using water with the Owner.

### TEMPORARY FACILITIES AND CONTROLS

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## B. Electricity:

1. Provide and arrange for temporary electrical power, starter and controls to provide power for the 100 Hp booster pump, controls for the booster pump, building lighting, and temporary power for construction activities at no additional cost to the Owner, except that electrical demand and power consumption will be paid for by the Utility. Temporary power and controls envisioned to begin after installation of automatic transfer switch (ATS) which Contractor may tie into and route power to necessary devices. Contractor may utilize existing 100 HP starter from existing MCC in new location. Contractor to provide necessary transformer for 120 volt power supply. Contractor to provide Aquatrol pressure switch for control of booster pump based on discharge pressures within station.
2. Provide necessary temporary wiring for temporary electrical power and construction purposes; and upon completion of the Work. All work and temporary control shall be in accordance with electrical codes for temporary power and control.
3. Upon completion of the Work, remove such temporary electrical facilities.

## C. Heating: Owner will provide and maintain heat for normal building heating. Contractor will augment this as necessary for proper conduct of operations needed in the Work.

## D. Telephone:

1. Contractor shall provide cellular phone contacts for their key staff.

## 2.2 FIELD OFFICES AND SHEDS

## A. Contractor's facilities:

1. Provide a field office and sheds adequate in size and accommodation for Contractor's offices, supply, and storage; as desired for Contractor's use.

## 2.3 SANITARY FACILITIES

## A. Contractor may utilize Owner's toilet facilities during construction.

1. Maintain in a sanitary condition at all times.

## 2.4 ENCLOSURES

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

## 2.5 TEMPORARY FENCING

- A. Provide and maintain for the duration of excavation construction a temporary fence of design and type needed to prevent entry onto the Work by the public.

## TEMPORARY FACILITIES AND CONTROLS

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- B. Temporary work boundary fence (standard).
  - 1. Provide fence 36-inch to 48-inch in height.
    - a. Material: Polyethylene, PVC, or wood lath.
  - 2. Provide steel or wood posts.
    - a. Height: To support fence for total height after being driven.

## 2.6 FIRE EXTINGUISHERS

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

## PART 3 - EXECUTION

### 3.1 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Engineer.

### 3.2 DUST AND MUD CONTROL

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

### 3.3 TRAFFIC CONTROL

- A. Protect and maintain traffic by the proper use of barricades, warning lights, flares, and necessary traffic control and safety devices, conforming to federal, state, and local regulations regarding their use as required.
- B. Use forms of traffic control on public roadways required by the construction operations in accordance with the latest revision of "Part IV, Traffic Controls for Construction and Maintenance Operations of the Wisconsin Manual on Uniform Traffic Control Devices", and Section 643, TRAFFIC CONTROL, of the WDOT "Standard Specifications".

## TEMPORARY FACILITIES AND CONTROLS

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- C. The costs for traffic control will be considered incidental to the Contract and no additional compensation will be allowed.

#### 3.4 SECURITY

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

#### 3.5 RIGHT-OF-WAY AND PROPERTY LINE CONTROL

- A. Protect all right-of-way markers, property line iron pins, and easement line iron pins during construction.
  - 1. Flag such control points prior to construction and protect the points during the course of construction.
- B. Establish tie-down control for any right-of-way markers or iron pins that may be lost or damaged during the work.
- C. Re-establish any right-of-way markers or iron pins that are lost or damaged during construction, after completion of restoration work.
- D. Provide the services of a Registered Land Surveyor for replacement of lost markers and iron pins.
  - 1. The cost for this work will be considered incidental to the Contract, and no additional compensation will be allowed.

#### 3.6 TEMPORARY FENCE

- A. Provide fence along edges of all excavation limits until excavation is filled.

END OF SECTION

## SECTION 01 61 01

## GENERAL EQUIPMENT REQUIREMENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Sections 01 33 01 and 01 78 26.
- B. Submit manufacturer's certificate of inspection, Contractor's verification of equipment inspection, and Contractor's equipment guarantee as specified herein.

## PART 2 - PRODUCTS

## 2.1 LUBRICANTS

- A. Provide lubricants of the type recommended by the equipment manufacturer for each item of equipment in sufficient quantity for one-year of normal operation and maintenance.
- B. Provide lubrication fittings readily accessible from the outside of all equipment without removing covers or guards.

## 2.2 SAFETY GUARDS

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

## 2.3 ANCHORS

- A. Provide the size and number of anchor bolts, mechanical anchors and adhesive anchors determined by the equipment manufacturer unless otherwise indicated on the Drawings.
- B. Provide Type 316 stainless steel anchor bolts, threaded rods, nuts, washers, mechanical anchors, adhesive anchors, and other fastener parts for installing equipment, complying with ASTM F593 and F594.

## GENERAL EQUIPMENT REQUIREMENTS

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- C. Comply with the pertinent provisions of Section 05 50 00.

### PART 3 - EXECUTION

#### 3.1 SHOP ASSEMBLY AND MATCHMARKING

- A. Assemble, inspect, and test equipment in the manufacturer's shop as far as is practical.
- B. Provide accurate shopmarking and identification for items to be field erected in accordance with erection details furnished with the equipment.
- C. Provide all fasteners and miscellaneous small parts to be field erected individually packaged for shipment, and identify as to location in accordance with a schedule of fasteners with the equipment.

#### 3.2 INSTALLATION, INSPECTION, TESTING AND OPERATOR INSTRUCTIONS

- A. Provide the services of a qualified serviceman from the manufacturer of each piece of equipment to:
  - 1. Inspect the equipment installation including alignment, clearances, field erection where applicable, and initial lubrication where applicable.
  - 2. Ascertain that the installation is properly completed.
  - 3. Instruct the Owner's personnel in the proper operation and maintenance of the equipment in accordance with the manufacturer's recommendations.
- B. Make all changes or adjustments that may be required for a complete and proper installation and operation.
- C. After the installation has been completed in accordance with the manufacturer's instructions and in the presence of the manufacturer's serviceman, test the equipment and its appurtenances for proper operating condition and for performance in accordance with these Specifications, subject to the Engineer's approval.
- D. Provide three (3) copies of the Manufacturer's Certificate of Inspection and the Contractor's Verification of Equipment Inspection to the Engineer certifying and verifying that the equipment and all appurtenances supplied with it have been installed in accordance with the manufacturer's recommendations and that the test operation was satisfactory.
  - 1. Use the form, Attachment 01 61 01-1.

#### 3.3 EQUIPMENT GUARANTEE

- A. Guarantee all equipment, motors, electrical controls, and other mechanical devices to operate in accordance with the requirements of these Specifications and replace

and repair any guaranteed item found to be defective within two years, or longer period if specifically stated for any particular item, from the date of the Owner's acceptance for use of the equipment without additional expense to the Owner for labor or materials.

1. After obtaining Owner Authorized Representative's signature, provide three (3) copies of a Contractor's Equipment Guarantee to the Engineer, using the form, Attachment 01 61 01-2.

END OF SECTION

ATTACHMENT 01 61 01-1**MANUFACTURER'S CERTIFICATE OF INSPECTION**

Date: \_\_\_\_\_

Project: \_\_\_\_\_

Contractor: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Equipment: \_\_\_\_\_

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

I have instructed the Owner's operator, \_\_\_\_\_, in the proper operation and maintenance of the equipment which we have furnished for this project.

\_\_\_\_\_  
Manufacturer's Representative's Signature

\_\_\_\_\_  
Name and Title

**CONTRACTOR'S VERIFICATION OF EQUIPMENT INSPECTION**

Date: \_\_\_\_\_

Project: \_\_\_\_\_

Contractor: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Equipment: \_\_\_\_\_

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

\_\_\_\_\_  
Contractor's Representative's Signature

\_\_\_\_\_  
Name and Title

ATTACHMENT 01 61 01-2**CONTRACTOR'S EQUIPMENT GUARANTEE**

Date: \_\_\_\_\_  
Project: \_\_\_\_\_  
Contractor: \_\_\_\_\_  
Manufacturer: \_\_\_\_\_  
Equipment: \_\_\_\_\_

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

\_\_\_\_\_  
Contractor's Representative's Signature

\_\_\_\_\_  
Name and Title

ACCEPTED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, for Owner's use.

\_\_\_\_\_  
Owner's Representative's Signature

\_\_\_\_\_  
Name and Title

## SECTION 01 62 01

## PRODUCT OPTIONS AND SUBSTITUTIONS

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 PRODUCT OPTIONS

- A. The Contract is based on standards of quality established in the Contract Documents.
  - 1. In agreeing to the terms and conditions of the Contract, the Contractor has accepted a responsibility to verify that the specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
  - 2. Neither the Owner nor the Engineer has agreed to the substitution of materials or methods called for in the Contract Documents, except as they may specifically otherwise state in writing.
- B. Materials and/or equipment specified by name:
  - 1. Where materials and/or equipment are specified by naming one single manufacturer and/or model number, followed by words that indicate no substitution is permitted, only the material and/or equipment named is approved for incorporation into the Work.
  - 2. Should the Contractor demonstrate to the approval of the Engineer that a specified material or method was ordered in a timely manner and will not be available in time for incorporation into this Work, the Contractor shall submit to the Engineer such data on proposed substitute materials and/or equipment as are needed to help the Engineer determine suitability of the proposed substitution.
- C. Where materials and/or equipment are specified by name and/or model number, followed by the words "or equal":
  - 1. The material and/or equipment specified by name establishes the required standard of quality.
  - 2. Materials and/or equipment proposed by the Contractor to be used in lieu of materials and/or equipment so specified by name shall in all ways equal or exceed the qualities of the named materials and/or equipment.
    - a. The Engineer will evaluate the proposed alternate major equipment and materials as "substitute" items.
  - 3. The Engineer will record all time used by the Engineer to evaluate proposed substitute items. Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent evaluating proposed substitute items and deduct such costs from payments due the Contractor. Costs associated

## PRODUCT OPTIONS AND SUBSTITUTIONS

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with review of proposed "or equal" items will not be charged to the Contractor.

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

### 1.3 DELAYS

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

END OF SECTION



## SECTION 01 66 11

## STORAGE AND PROTECTION OF MATERIAL AND EQUIPMENT

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
  - 1. Additional procedures also may be prescribed in other Sections of these Specifications.

## 1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

## 1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Engineer, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

## 1.4 PACKAGING

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

## 1.5 STORAGE AND PROTECTION

- A. Comply with Section 01 14 11 for Contractor's storage area.
- B. Comply with the requirements of this Section for off-site storage.
  - 1. The Engineer reserves the right to inspect the off-site storage areas.

## STORAGE AND PROTECTION OF MATERIAL AND EQUIPMENT

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- C. Store equipment and materials in accordance with the manufacturer's instructions.
- D. Provide temporary weather-tight enclosures to protect products from damage by the elements.
- E. Protect finished surfaces through which equipment and materials are handled.
- F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.
- H. Do not store plant maintenance equipment, furniture, and laboratory equipment on site until they are needed by the Owner or for progress of work.

#### 1.6 REPAIRS AND REPLACEMENTS

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

END OF SECTION

## SECTION 01 73 29

### CUTTING AND PATCHING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:
  - 1. Make the several parts fit properly.
  - 2. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
  - 3. Remove and replace work not conforming to requirements of the Contract Documents.
  - 4. Remove and replace defective work.
- B. Related work:
  - 1. In addition to other requirements specified, upon the Engineer's request uncover work to provide for inspection by the Engineer of covered work, and remove samples of installed materials for testing.
  - 2. Do not cut or alter work performed under separate contracts without the Engineer's written permission.

##### 1.2 SUBMITTALS

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

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

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

## 2.2 PAYMENT FOR COSTS

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

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 PREPARATION PRIOR TO CUTTING

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

### 3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
- B. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
- C. Perform fitting and adjusting of products to provide finished installation complying with the manufacturer's recommendations for specified equipment, products, tolerances, and finishes.
- D. Perform slight alterations needed to make adjustable parts fit to fixed parts to provide a complete installation.
- E. Refinish surfaces as necessary to match adjacent finishes.

END OF SECTION

CUTTING AND PATCHING  
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## SECTION 01 74 23

### FINAL CLEANING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related work:
  - 1. In addition to standards described in this Section, comply with requirements for cleaning as described in other pertinent Sections of these Specifications.

##### 1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

#### PART 2 - PRODUCTS

##### 2.1 CLEANING MATERIALS AND EQUIPMENT

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

##### 2.2 COMPATIBILITY

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

#### PART 3 - EXECUTION

##### 3.1 PROGRESS CLEANING

- A. General:
  - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.

B. Site:

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

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
  - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
  - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.

### 3.2 FINAL CLEANING

- A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Paragraph 3.1 above.

- C. Site:
  - 1. Unless otherwise specifically directed by the Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
  - 2. Completely remove resultant debris.
- D. Structures:
  - 1. Exterior:
    - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
    - b. Remove all traces of splashed materials from adjacent surfaces.
    - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
    - d. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.
  - 2. Interior:
    - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
    - b. Remove all traces of splashed material from adjacent surfaces.
    - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
  - 3. Glass: Clean inside and outside.
  - 4. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.
- E. Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean Work.

### 3.3 CLEANING DURING OWNER'S OCCUPANCY

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

END OF SECTION

SECTION 01 77 01  
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes an orderly and efficient transfer of the completed Work to the Owner.
- B. Related work:
  - 1. Activities relative to Substantial Completion and Contract closeout are described in the EJCDC General Conditions.

1.2 QUALITY ASSURANCE

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

1.3 PROCEDURES

- A. Substantial Completion:
  - 1. Prepare a written request that Engineer issue a certificate of Substantial Completion.
  - 2. Within a reasonable time after receipt of the list, Owner, Contractor, and Engineer will jointly inspect the Work to determine status of completion.
  - 3. Should the Engineer determine that the Work is not substantially complete:
    - a. The Engineer will so notify the Contractor, in writing, giving the reasons therefore.
    - b. Remedy the deficiencies and notify the Engineer when ready for reinspection.
    - c. Owner, Contractor, and Engineer will reinspect the Work.
  - 4. When the Engineer concurs that the Work is substantially complete:
    - a. The Engineer will prepare a tentative "Certificate of Substantial Completion," accompanied by the Contractor's list of items to be completed or corrected, as verified by the Engineer.
    - b. The Engineer will submit the tentative Certificate to the Contractor for acceptance.
    - c. After Contractor signs and returns the tentative Certificate to Engineer, Engineer will submit the tentative Certificate to Owner accompanied by a tentative list of items to be completed or corrected before final payment.



- d. Owner will have seven days after receipt of the tentative Certificate during which to make objection to Engineer as to any provisions of the Certificate on attached list.
  - (1) If Owner objects, Engineer will consider Owner's objections. If, after considering Owner's objections, Engineer concludes that the Work is not substantially complete, Engineer will, within fourteen days after submission of the tentative Certificate to Owner, notify Contractor in writing, stating reasons therefor. If, after considering Owner's objections, Engineer considers the Work substantially complete, Engineer will within said fourteen days execute and deliver to Owner and Contractor, a definitive Certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative Certificate as Engineer believes justified after consideration of any objections of Owner.
  - (2) If Owner has no objections, Engineer will within fourteen days after submission of the tentative Certificate to Owner and Contractor issue a definitive Certificate of Substantial Completion.
- e. At the time of delivery of the tentative Certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, heat, utilities, insurance, warranties, and guarantees. Unless Owner or Contractor advise the Engineer in writing of any objections within seven days after delivery of the tentative Certificate of Substantial Completion, the Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

B. Final Completion:

- 1. Prepare and submit the notice required by the first sentence of Paragraph 14.06.A of the General Conditions.
- 2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 14.07.A of the EJCDC General Conditions.
- 3. Certify that:
  - a. Contract Documents have been reviewed.
  - b. Work has been inspected for compliance with the Contract Documents.
  - c. Work has been completed in accordance with the Contract Documents.
  - d. Equipment and systems have been tested as required, and are operational.
  - e. Work is completed and ready for final inspection.

4. Owner, Contractor, and Engineer will make a joint inspection to verify status of completion.
  5. Should the Engineer determine that the Work is incomplete or defective:
    - a. The Engineer will so notify the Contractor, in writing, listing the incomplete or defective work.
    - b. The Contractor will remedy the deficiencies promptly, and notify the Engineer when ready for reinspection.
  6. When the Engineer determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.
- C. Closeout submittals include, but are not necessarily limited to:
1. Project Record Documents described in Section 01 78 39.
  2. Manufacturer's Certificate of Inspection, Contractor's Verification of Equipment Inspection, and Contractor's Equipment Guarantee for each item of equipment as required in Section 01 61 01.
  3. Warranties and bonds.
  4. Keys and keying schedule.
  5. Spare parts and materials extra stock.
  6. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
    - a. Certificates of Inspection.
    - b. Certificates of Occupancy.
  7. Certificates of Insurance for products and completed operations;
  8. Evidence of payment and release of liens; and
  9. Affidavit of Compliance with Prevailing Wage Rate Determination and Affirmative Action requirements.
  10. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
- D. Final adjustment of accounts:
1. Submit a final statement of accounting to the Engineer, showing all adjustments to the Contract Price.
  2. If so required, the Engineer will prepare a final Change Order showing adjustments to the Contract Price which have not been made by previous Change Orders.

END OF SECTION

CONTRACT CLOSEOUT  
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## SECTION 01 78 26

### OPERATION AND MAINTENANCE MANUAL

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding products incorporated into the Work, furnish and deliver the manuals described in pertinent Sections of these Specifications.

##### 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Submit two electronic and three paper copies of the required manuals for each item of equipment to the Engineer no later than 30 days following the Engineer's approval of shop drawings for said item of equipment.

##### 1.3 QUALITY ASSURANCE

- A. Use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

#### PART 2 - PRODUCTS

##### 2.1 OPERATION AND MAINTENANCE MANUALS

- A. Where operation and maintenance manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format:
  - 1. Size: 8-1/2" x 11".
  - 2. Paper: White bond, at least 20 lb. weight.
  - 3. Text: Neatly written or printed.
  - 4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the manual and provide a drawing pocket inside rear cover or bind in with text.

### OPERATION AND MAINTENANCE MANUAL

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5. Flysheets: Separate each portion of the manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
  6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the manual; 3-ring binders will be acceptable.
  7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formulas, provide additional measurements in the "International System of Units" (SI).
- C. Provide front and back covers for each manual, using durable material, and clearly identified on or through the cover with at least the following information:

#### OPERATING AND MAINTENANCE MANUALS

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

- D. Contents: Include at least the following:
1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.
  2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
  3. Complete nomenclature of all parts of the equipment.
  4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
  5. Manufacturers' bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
  6. Such other data as required in pertinent other Sections of these Specifications.

### PART 3 - EXECUTION

#### 3.1 TIMING AND PAYMENT

- A. Make submittals far enough in advance of scheduled dates for equipment installation to provide at least ten (10) working days for review by the Engineer following the Engineer's receipt of the submittal.

#### OPERATION AND MAINTENANCE MANUAL

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

END OF SECTION

## SECTION 01 78 39

### PROJECT RECORD DOCUMENTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Paragraph 3.1 below and, upon completion of the Work, submit the recorded changes as described in Paragraph 3.2 below.
- B. Related work:
  - 1. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

##### 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.
- D. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer and secure his approval.

##### 1.3 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.
- B. Accuracy of records:
  - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
  - 2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

### PROJECT RECORD DOCUMENTS

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

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.
  - 1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.
  - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

### PART 2 - PRODUCTS

#### 2.1 RECORD DOCUMENTS

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

### PART 3 - EXECUTION

#### 3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1 A. above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".
- B. Preservation:
  - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set.
  - 2. Do not use the job set for any purpose except entry of new data and for review by the Engineer.
  - 3. Maintain the job set at the site of Work where designated by the Engineer.
- C. Making entries on Drawings:
  - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
  - 2. Date all entries.

3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
  4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Engineer.
- E. Conversion of schematic layouts:
1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
    - a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.
    - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
  2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in Paragraph 3.1 E. 1. above.

### 3.2 REVIEW AND SUBMITTAL

- A. Submit the completed set of Project Record Documents to the Engineer as described in Paragraph 1.2 D. above.
- B. Participate in review meetings as required.
- C. Make required changes and promptly deliver the final Project Record Documents to the Engineer.

### 3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

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

END OF SECTION



SECTION 01 91 58  
FACILITY START-UP

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes the Contractor's general equipment requirements for facility start-up.

1.2 SUBMITTALS

- A. Submit a detailed plan and schedule for start-up of the facility at least thirty (30) days prior to the scheduled start-up of the facility.

PART 2 - PRODUCTS

No products are required in this Section.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REQUIREMENTS

- A. In addition to the services required to comply with Section 01 61 01, Articles 3.2 and 3.3, provide the services of a qualified and experienced factory employed field service engineer from each equipment manufacturer:
  - 1. Ascertain that equipment has been installed in accordance with the manufacturer's recommended procedures.
  - 2. Ascertain that equipment is operational and ready for start-up.
  - 3. Make necessary repairs, corrections, and/or modifications prior to the scheduled start-up.
- B. Coordinate efforts of various equipment field service engineers with construction activities including painting and facility disinfection.
  - 1. Complete painting of equipment containing process water prior to disinfection.
  - 2. Successfully complete facility disinfection prior to start-up in accordance with appropriate provisions of AWWA C-653.
- C. Perform the above services at least two weeks prior to the scheduled start-up.
- D. Perform the facility start-up procedures in the presence of the Owner and Engineer.

- E. Operate the facility without problems for a period of fourteen (14) consecutive days prior to Owner's acceptance of the facility.

END OF SECTION

## SECTION 03 30 00

## CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide cast-in-place concrete, including formwork and reinforcement, as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Prior to placing concrete on the project, submit the following to the Engineer for approval:
    - a. Testing laboratory reports for each proposed concrete mix, design proportions and sieve analysis, and soundness tests for fine and coarse aggregates.
    - b. Test results for strength, slump, and entrained air content in accordance with the latest requirements of ASTM-C39 and ASTM-C192 on trial mix or field-testing records completed within previous 24 months. Perform strength tests on two test cylinders after 7 days curing and on two cylinders after 28 days curing.
    - c. Evidence of compliance with ASTM specifications for materials proposed to be used in the concrete mix.
    - d. Detailed reinforcing bar fabrication drawings prepared in accordance with ACI 315 including location of bar splices proposed by the Contractor in addition to those shown on the Drawings.
    - e. Casting plan indicating the location of construction joints which are proposed by the Contractor in addition to those shown on the Drawings.
  - 2. Submit, within 10 days of testing, duplicate copies of each laboratory report for concrete tests on samples taken at the jobsite, including the following information in each test report:
    - a. Project name.
    - b. Description of concrete work.
    - c. Quantity of concrete placed.
    - d. Dates of samples and testing.
    - e. Slump.
    - f. Total air content.
    - g. Compressive strength.
    - h. Air temperature at time of sampling.

## CAST-IN-PLACE CONCRETE

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3. Submit manufacturer's data to prove compliance with the specifications for the following products:
  - a. Non-shrink grout.
  - b. Epoxy adhesive.

- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

### 1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein.
- C. Provide access for, and cooperate with, the inspector and testing laboratory described in Section 01 45 29 of these Specifications.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Provide proper storage for reinforcing steel at the project site, including protective covering and blocking to keep steel off the ground.

### 1.5 SITE CONDITIONS – Reserved.

### 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 FORMS

- A. Use smooth, clean plywood or metal lined panels in good condition for forming exposed concrete surfaces including interior and exterior walls, beams, columns, and slabs. Coat the forms with a non-staining, non-reactive mineral oil.
- B. Use form liners for exposed ceilings.

- C. Provide 3/4-inch chamfers on exposed corners.
- D. When reusing lumber for formwork, remove nails, thoroughly clean, and fill and finish holes to produce smooth concrete surfaces free of defects.
- E. Provide temporary openings at the base of column and wall forms and elsewhere as required to facilitate cleaning and final inspection prior to concrete placement.
- F. Use form ties that will break off at least one inch behind the exposed concrete surface and not leave a hole larger than one inch in diameter. Do not use wire form ties.

## 2.2 REINFORCEMENT

- A. Comply with the following:
  - 1. Bars: Deformed billet steel conforming to ASTM A615, grade 60, unless otherwise shown on the Drawings.
  - 2. Welded wire reinforcement: Sheets of longitudinal and transverse cold drawn smooth steel wires electrically welded together at intersections, conforming to ASTM A185.
  - 3. Tie wire: 16 gauge annealed steel wire.
- B. Fabricate reinforcement in accordance with the latest provisions of ACI 318 "Building Code Requirements for Structural Concrete".
- C. Shop fabricate bars by cold bending to the dimensions and shapes shown on the detail shop drawings unless otherwise shown on the Drawings or approved by the Engineer.
- D. Use bars that are free from paint, oil, dirt, scale, or excessive rust which will destroy or reduce the bond when embedded in concrete.

## 2.3 CONCRETE

- A. Comply with the following:
  - 1. Portland cement: ASTM C150, Type I.
  - 2. Aggregate, general:
    - a. ASTM C33, uniformly graded and clean;
    - b. 35 to 50 percent ratio of fine aggregate to total aggregate by weight of surface dry materials.
  - 3. Aggregate, coarse: Pass a 1.500-inch sieve.
  - 4. Aggregate, fine: Pass a 0.375-inch sieve.
  - 5. Water: Fresh, clean, and free of oils, acids, alkalies, organic matter and deleterious substances.
- B. Provide concrete with the following properties:
  - 1. Minimum 28-day compressive strength: 4000 psi.
  - 2. Maximum water-cement ratio: 0.45 by weight.
  - 3. Minimum cement content: 520 pounds per cubic yard.

4. Minimum slump: 1-inch.
5. Maximum slump:
  - a. 3 inches for footings.
  - b. 4 inches for slabs, walls, beams, girders, and columns.
- C. Use air-entrained concrete except where a smooth steel trowel finish is required. Provide a total air content of 4 to 6 percent by volume.

## 2.4 GROUT

- A. Grout for non-structural fillets: One part Portland Cement, three parts fine aggregate, and sufficient water to obtain a consistency for easy placing and finishing.
- B. Non-shrink grout: Pre-mixed, non-shrink, non-metallic, high density, high strength grout mixture of well graded silica aggregate and blended cements formulated in compliance with the U.S. Corps of Engineers' Specification CRD C-621.

## 2.5 CONCRETE ADMIXTURES

- A. Air-entraining admixtures:
  1. Conform to the latest requirements of ASTM C260.
- B. Water reducing admixtures:
  1. Conform to the latest requirements of ASTM C494.
  2. Type A (normal setting type) for all concrete.
  3. Type D (retarding setting type) or Type E (accelerating setting type) when approved by the Engineer.
- C. Fly ash admixtures (when approved by the Engineer):
  1. Maximum sulfur trioxide content: 5 percent.
  2. Maximum loss of ignition: 5 percent.
- D. Do not add calcium chloride, salts, or chemical antifreeze compounds to concrete.

## 2.6 EPOXY ADHESIVE

- A. Provide a cartridge type, two-component, high solids epoxy adhesive system dispensed and mixed through a static mixing nozzle supplied by the manufacturer for use in anchoring threaded rod and reinforcing bars.
- B. Furnish material suitable for anchorage of threaded rods and reinforcing bars in cracked and uncracked concrete to resist long-term sustained loading, tested and qualified in accordance with the International Code Council Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements (AC308).
- C. Acceptable products:
  1. Hilti Inc., HIT-RE 500-SD.
  2. Simpson Strong-Tie, SET-XP.
  3. No substitution permitted.

## 2.7 OTHER MATERIALS

- A. Cement mortar: One part Portland Cement, 2½ parts fine aggregate, and sufficient water to obtain a maximum slump of 6 inches.
- B. Bonding grout: One part cement, one part fine aggregate, and sufficient water to obtain the consistency of thick cream.
- C. Patching mortar: One part cement, 2½ parts fine aggregate, and sufficient water to obtain a maximum slump of 1-inch.
- D. Joint sealants: Comply with Section 07 92 00.
- E. Expansion joint filler material: Asphalt type conforming to the latest requirements of ASTM D994.
- F. Clear curing and sealing compound: liquid membrane-forming clear high solids acrylic copolymer compound complying with ASTM C309, Type 1.
  - 1. Acceptable products:
    - a. Euclid Chemical Company, Super Rez-Seal.
    - b. Or equal.
- G. Dissipating curing compound: Liquid membrane-forming hydrocarbon resin dissipating curing compound complying with ASTM C309, Type 1.
  - 1. Acceptable products:
    - a. Euclid Chemical Company, Kurez DR.
    - b. Or equal.
- H. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 FORMS

- A. Design, erect, support, brace, and maintain formwork to safely support vertical and lateral loads until such loads can be supported safely by the concrete structure.
- B. Assemble forms with tight flush joints securely clamped to prevent leakage of mortar. Brace forms to safely support concrete without deformation under load.

- C. Construct forms within the tolerance limits of permissible variations from lines, grades, and dimensions shown on the Drawings, in accordance with ACI 347 "Recommended Practice for Concrete Formwork".
- D. Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.
- E. Support forms for slabs supported on steel or precast concrete beams from the same beams or framing so that deflection of structural supports will occur with the placing of the concrete.
- F. Notify the Engineer when formwork is complete so that a proper check may be made at least 24 hours prior to concrete placement.
- G. Carefully remove forms, ensuring complete protection of the structure.
- H. Remove forms for vertical sides of walls, beams, girders, columns, and other similar structural members 24 hours minimum after placement of concrete, provided the concrete has hardened sufficiently and will not be damaged.
- I. Do not remove forms and bracing for slabs, beams, girders, and similar structural members until the concrete structural members have attained sufficient strength to safely support their own weight and any construction or storage load.

### 3.3 REINFORCING

- A. Comply with the following, as well as the specified standards, for details and methods of reinforcing placement and supports.
  - 1. Clean reinforcement and remove loose dust and mill scale, earth, and other materials that reduce bond or destroy bond with concrete.
  - 2. Accurately place and secure reinforcing steel within the tolerances required by ACI 318 using tie bars, chairs, bolsters, wire, clips or other devices approved by the Engineer.
  - 3. Provide plastic protected bar supports for slab reinforcing.
  - 4. Place bar supports for grade beams and slabs on bearing plates or blocks to prevent displacement into the earth subgrade.
  - 5. Place reinforcement to obtain the following clear coverages for concrete protection, within tolerance limits specified in ACI 318 "Building Code Requirements for Structural Concrete":
    - a. Footings and slab surfaces on earth: 3 inches.
    - b. Walls and beams, column and slab surfaces exposed to weather or earth, or submerged: 2 inches.
    - c. Other beams and columns: 1½ inches.
    - d. Other slab surfaces: ¾-inch.
  - 6. Provide the following minimum clear distances between parallel reinforcing bars, between adjacent contact splices, and between a contact splice and an adjacent bar:
    - a. Columns: 1½ inches, 1½ times the bar diameter, or 1½ times the maximum size of the coarse aggregate, whichever is larger.



- b. Other elements: 1-inch, one bar diameter, or 1-1/3 times the maximum size of coarse aggregate, whichever is larger.
- 7. Reinforcing bar splices:
  - a. 40 bar diameters in length, unless otherwise shown on the Drawings.
  - b. Staggered in adjacent bars where practical.
  - c. Securely tied.
  - d. Welded only where shown on the Drawings, conforming to the requirements of AWS D12.1.
- 8. Install welded wire reinforcement in lengths as long as practicable, lapping adjoining pieces two full mesh panels minimum.

### 3.4 EMBEDDED ITEMS

- A. Provide for the proper placement and support of fittings, inserts, fixtures, and sleeves to be built into the concrete work under other sections of the Specifications.

### 3.5 MIXING CONCRETE

- A. Project site batched-mixed concrete:
  - 1. Mix in accordance with ACI 301, Chapter 7.
- B. Ready-mixed concrete:
  - 1. Pre-mix and transport to project site in accordance with ASTM C94.
  - 2. Record time of departure from the mixing plant and batch weights of cement and water on the delivery tickets.
  - 3. Water may be added to the ready-mixed concrete once after delivery, only if the maximum water cement ratio and slump will not be exceeded.
  - 4. Reject concrete not in place within 60 minutes after introducing water to the mix when transported in agitator trucks or within 30 minutes after introducing water to the mix when transported in nonagitator trucks.

### 3.6 PLACING CONCRETE

- A. Preparation:
  - 1. Remove hardened concrete and foreign material from conveying equipment.
  - 2. Remove foreign matter and excess water accumulated in forms.
  - 3. Rigidly close temporary openings left in formwork.
  - 4. Thoroughly sprinkle earth subgrades for structural slabs without vapor barrier protection to eliminate moisture absorption.
  - 5. Before depositing new concrete on or against concrete which has hardened:
    - a. Thoroughly clean hardened concrete and saturate with water.
    - b. Thoroughly cover hardened concrete surface with a 1/8-inch thick coating of neat cement mortar and place new concrete before the mortar has attained its initial set.
  - 6. Use only clean tools.

- B. Conveying:
  - 1. Convey concrete from the mixer to place of final deposit as rapidly as practical by methods which will prevent separation or loss of ingredients and assure the required quality of concrete.
  - 2. Deposit concrete as nearly as practicable to its final location to avoid separation due to rehandling and flowing.
  - 3. Do not allow free fall of concrete to exceed 5 feet.
  - 4. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
  - 5. Remove rejected concrete from job site.
- C. Placing concrete in forms:
  - 1. Deposit concrete continuously or in layers so that no concrete will be placed on concrete which has hardened sufficiently to cause cold joints in the work.
  - 2. If necessary, add construction joints, approved by the Engineer.
  - 3. Remove temporary spreaders, screeds, etc. as they become unnecessary.
- D. Placing concrete slabs:
  - 1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until placing of a panel or section is completed.
  - 2. Bring slab surfaces to correct level with a straightedge, and then strike off.
  - 3. Use bullfloats or darbies to smooth the surface, leaving it free of bumps and hollows.
  - 4. Do not sprinkle water on plastic surface. Do not disturb slab surface prior to start of finishing operations.
  - 5. Place beams, girders, brackets, column capitals, haunches, and drop panels integrally with slabs.
- E. Do not begin placement of concrete in supported structural members until concrete previously placed in columns and walls is no longer plastic.

### 3.7 CONSOLIDATION

- A. General:
  - 1. Consolidate each layer of concrete immediately after placing, by use of mechanical vibrators supplemented by hand spading, rodding, or tamping so that the concrete is thoroughly worked around reinforcement, embedded items, and into corners of the forms, eliminating all air or stone pockets which may cause honeycomb, pitting, or planes of weakness.
  - 2. Use mechanical vibrators with a minimum frequency of 7,000 revolutions per minute.
  - 3. Insert vibrator at points approximately 18 inches apart for approximately 5 to 15 seconds at each point, sufficient to consolidate concrete, but not to cause segregation.
  - 4. Do not overvibrate or use vibrators to transport concrete inside forms.
  - 5. Provide a spare vibrator and auxiliary power source at the site during placement operations.

### 3.8 JOINTS

#### A. Construction joints:

1. Do not relocate construction joints shown on the Drawings or add construction joints, unless approved by the Engineer. Where additional construction joints are approved by the Engineer, provide waterstops consistent with design.
2. Form construction joints perpendicular to main reinforcement and near quarter points of slabs, beams, and girders.
3. Limit spacing of vertical construction joints to 40 feet in any one direction.
4. Locate horizontal wall and column construction joints at the top of footings and grade slabs and the underside of slabs, beams, and girders.
5. Continue reinforcing steel across construction joints as shown on the Drawings or as required by the Engineer.
6. Form keyways in construction joints a minimum of 1½ inches deep and 3½ inches wide unless otherwise shown on the Drawings.
7. Provide the following minimum bearing lengths on concrete walls and columns unless otherwise shown on the Drawings:
  - a. Two inches for slabs.
  - b. Six inches for beams and girders.

#### B. Expansion joints:

1. Form expansion joints ½-inch wide with chamfered edges.
2. Fill expansion joints full depth with expansion joint material.
3. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any expansion joint.

#### C. Contraction joints:

1. Sawcut joints: Cut 1/8-inch wide joints to a minimum depth of 1/4 the thickness of the slab, but not less than 1-inch. Perform saw cutting within 12 hours of placement when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
2. Formed joints: Insert preformed plastic or hard board joint strips into the concrete to form 1/8-inch wide joints to a minimum depth of 1-inch.
3. Fully caulk joints with sealant.

### 3.9 CONCRETE FINISHING

- A. Finish concrete work to smooth, clean surfaces of uniform color with no roughness or imperfections.
- B. Remove roughness, projections, honeycomb, and other defects in formed concrete surfaces to sound concrete.
- C. Patch depressions and tie holes immediately after form removal.
  1. Thoroughly wet areas to be patched to prevent absorption of water from patching mortar.
  2. Thoroughly brush bonding grout on areas to be patched.

3. Consolidate patching mortar into place and strike off to leave a patch slightly higher than surrounding concrete surface to allow for initial shrinkage.
  4. Leave patch area undisturbed for at least one hour before final finishing.
  5. Prepared proprietary compounds for bonding grout and patching mortar may be used in lieu of or in addition to the above patching procedure, if approved by the Engineer.
- D. Unless otherwise shown on the Drawings, provide the following finishes at the indicated locations:
1. Scratch finish:
    - a. Monolithic slab surfaces that are to receive concrete floor topping or mortar setting bed.
  2. Float finish:
    - a. Monolithic slab surfaces that are to receive trowel finish and other slab finishes specified herein.
    - b. Slab surfaces which are to receive a separate concrete topping, terrazzo, quarry tile, waterproofing membranes, and roofing.
  3. Trowel finish:
    - a. Monolithic slab surfaces that are to be exposed to view, unless otherwise shown.
    - b. Slab surfaces that are to be covered with resilient flooring, carpeting, paint, or asphalt.
    - c. Slab surfaces of channels, tanks, reservoirs, basins, and chambers.
  4. Non-slip broom finish:
    - a. Walks, stairs, drives, ramps, and similar pedestrian and vehicular areas.
    - b. Apply by dragging coarse bristle broom or burlap belt across concrete with uniform parallel overlapping strokes.
  5. As-formed finish:
    - a. Surfaces adjacent to earth and more than 12 inches below finished grade level.
    - b. Other surfaces not exposed to view.
  6. Smooth rubbed grout finish:
    - a. Exposed concrete surfaces including walls, beams, columns, and other vertical and inclined surfaces.
    - b. Undersides of walkways and slabs.
    - c. Tops and vertical or inclined surfaces of walls, inside tanks, reservoirs, basins, and chambers.
    - d. Surfaces adjacent to earth, stone, sand, or other special media to a depth of 12 inches below the required material grade line or low water level.
    - e. Apply finish to freshly hardened concrete as soon as possible after removal of forms.
    - f. Apply grout slurry, consisting of one part cement to 1½ parts fine aggregate mixed with water, uniformly over a predampened surface with clean burlap pads or with sponge-rubber or cork floats.
    - g. Rub grout surface with carborundum stone or similar abrasive to produce a uniform color and texture.
    - h. Remove excess grout with a dry burlap pad or a brush.

### 3.10 CONCRETE CURING

- A. Protect fresh concrete and grout surfaces from premature drying and excessively hot or cold temperatures.
- B. Cure fresh concrete and grout surfaces in a moist condition at a relatively constant temperature for at least 7 days after placement of Type I Portland Cement concrete, or longer if necessary for hydration and proper hardening of the concrete.
- C. Perform curing by one of the following methods:
  - 1. Ponding or continuous water spraying on concrete surface.
  - 2. Covering concrete surfaces with continuously wetted burlap, cotton, or other absorptive mats or fabric.
  - 3. Covering concrete surfaces with impervious waterproof paper or polyethylene film having 4-inch tape-sealed laps at common edges and taped-sealed and weighted perimeter.
  - 4. Applying curing compound on concrete surfaces to which additional concrete will not be bonded:
    - a. For exposed interior floor surfaces which will not receive floor covering or other coatings: Apply first coat of clear curing and sealing compound at a minimum rate of 400 square feet per gallon, as soon as possible after finishing operations are completed. Apply second coat at a minimum rate of 450 square feet per gallon, at least 3 days after the first application or upon completion of construction whichever is later.
    - b. For all other surfaces: Apply one coat of dissipating curing compound at a minimum rate of 300 square feet per gallon and in strict accordance with the manufacturer's recommendations.
- D. Maintain temperature of fresh concrete between 50 degrees and 70 degrees F for the required curing period.
- E. Provide and erect necessary facilities for heating, covering, insulating, or housing the concrete work for cold weather protection.

### 3.11 CONCRETE TESTING

- A. Provide equipment and services required for sampling and testing concrete.
- B. Include the cost of testing in the total amount of the contract price for concrete work.
- C. Sample concrete in accordance with ASTM C172.
- D. Slump testing:
  - 1. Perform in accordance with ASTM C143.
  - 2. Perform one test minimum for each 50 cubic yards of concrete placed in one operation to check and maintain the required consistency of concrete.
  - 3. Perform whenever required by the Engineer.

- E. Air content testing:
  - 1. Perform concurrently with the taking of the concrete compression test cylinder specimens.
  - 2. Perform in accordance with one of the following methods:
    - a. ASTM C231 pressure method.
    - b. ASTM C173 volumetric method.
    - c. ASTM C138 gravimetric method.
- F. Compression testing:
  - 1. Make and cure compression test cylinder specimens in accordance with ASTM C31.
  - 2. Take one set of cylinders (4 cylinders) for every concrete pour for structural slabs, walls, beams, girders, footings, and columns, and additional sets for each 100 cubic yards of concrete placed in one operation.
  - 3. Take test cylinder specimens as directed by the Engineer to obtain representative samples of the concrete materials.
  - 4. Cure the specimens on the job site under the same field conditions as the concrete work they represent for a minimum of 72 hours after sampling.
  - 5. Test two of each set of concrete test cylinder specimens for compressive strength at 7 days and at 28 days in accordance with ASTM C39 (testing to be performed by an independent testing laboratory approved by the Engineer).
  - 6. In any case where test results of concrete cylinder specimens fail to meet minimum compressive strength requirements, make additional tests in accordance with ASTM C42 or perform load tests in accordance with ACI 318, as required by the Engineer.
  - 7. If these alternate strength tests show that concrete work does not meet minimum strength requirements, remove unsatisfactory concrete and reconstruct the work.

### 3.12 CUTTING AND PATCHING OF EXISTING CONCRETE

- A. Provide neat and smooth finished exposed surfaces.
- B. Provide one inch deep (minimum) saw cuts.
- C. Cut off exposed reinforcing bars a minimum of one inch back of finished surface and fill remaining cavity with patching mortar.
- D. Provide straight and square lines at finished openings and 3/4-inch chamfers at exposed corners.
- E. Core drill openings for new pipes and conduits and patch with non-shrink grout.
- F. Grind exposed finished surfaces flush to meet and match existing surfaces.

### 3.13 ANCHORING WITH EPOXY ADHESIVE

- A. Drill holes, prepare surface, mix and place epoxy adhesive, and set reinforcing steel bars and threaded rod anchors in accordance with the epoxy adhesive manufacturer's instructions.
  - 1. Identify location of reinforcing steel and other embedded items prior to drilling holes for bars and anchors. Do not cut or damage reinforcing steel, prestressed steel tendons, piping, conduits or other embedded items. Notify the Engineer of reinforcing steel or other embedded items encountered during drilling.
  - 2. Use drill type, bit type and diameter recommended by the manufacturer.
  - 3. Drill holes perpendicular to surface of concrete after concrete has achieved full design strength.
  - 4. Clean holes to remove loose material and drilling dust prior to installation of bars and anchors.
  - 5. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
  - 6. Inject sufficient adhesive in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim with device suitable to center the bars and anchors in the holes. Do not disturb or load bars and anchors before the specified cure time has elapsed.
  - 7. Observe recommendations with respect to installation temperatures.

### 3.14 REMEDIAL WORK

- A. Repair or replace deficient work as directed by the Engineer and at no additional cost to the Owner.

END OF SECTION

## SECTION 04 20 00

### UNIT MASONRY

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide unit masonry as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Laboratory testing completed within the last 12 months on brick and concrete masonry units sampled from lots ready for delivery to prove compliance with the specified requirements.
  - 2. Product data: Submit design mixes for mortar and grout including evidence of compliance with ASTM specifications for materials proposed.
  - 3. Detailed reinforcing bar fabrication drawings indicating location of the bar splices proposed in addition to those shown on Drawings.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Store masonry units off ground to prevent contamination by mud, dust or materials likely to cause staining or other defects.



- C. Store masonry units above ground on level platforms which allow air circulation under the stacked units.
- D. Cover and protect concrete masonry units against wetting prior to use.
- E. Store unopened cartons of glass block units in a clean, cool, dry area. Cover and protect opened cartons of glass block units against wetting prior to use.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 CONCRETE MASONRY UNITS

- A. Provide standard modular size concrete masonry units with uniform texture and color.
- B. Furnish concrete masonry units produced in advance to allow a minimum 28 day cure prior to use.
- C. Where concrete blocks are called for or indicated on the Drawings:
  - 1. Provide hollow concrete masonry units complying with ASTM C90 for load bearing and non-load bearing walls.
- D. Provide accessory shapes as indicated or otherwise required.

### 2.2 MORTAR MATERIALS

- A. General:
  - 1. Water: Provide potable water free from injurious amounts of acids, alkalis, oils, and organic matter.
  - 2. Color pigment: Provide pure ground mineral oxides, non-fading and alkali proof admixture complying with C979, approved by the Engineer.
  - 3. Admixtures: Do not use antifreeze compounds, salts, or admixture.
- B. Concrete masonry units :
  - 1. Portland Cement: Comply with ASTM C150, Type I. "Masonry" cement will not be acceptable.
  - 2. Hydrated lime: Comply with ASTM C207, Type S.
  - 3. Mortar aggregate: Comply with ASTM C144.

### 2.3 GROUT MATERIALS

- A. Grout:
  - 1. Portland Cement: Comply with ASTM C150, Type I. "Masonry" cement will not be acceptable.

2. Hydrated lime: Comply with ASTM C207, type S.
3. Grout aggregate: Comply with ASTM C404.
4. Water: Provide potable water free from injurious amounts of acids, alkalis, oils, and organic matter.
5. Admixtures: Do not use antifreeze compounds, salts, or admixture.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Layout modular masonry coursing to avoid using pieces less than 4 inches long.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- C. Foundations:
  1. Do not commence installation until foundations are clean, rough, and level.
  2. Remove laitance, loose aggregate and any foreign material that prevents mortar from bonding to the foundation.
  3. Verify that the foundation elevation is such that the bed joint thickness will be between 1/4-inch and 1/2-inch.

### 3.2 ENVIRONMENT AND PROTECTION

- A. Cold weather requirements: Comply with cold weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  1. Protect masonry work from freezing during cold weather:
  2. Provide enclosures and heating devices to keep the air temperature around the work above 40 degrees F.
  3. Maintain air temperature above 40 degrees F during construction and for 48 hours after work has been completed.
- B. Hot weather requirements: Comply with hot weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- C. Cover unfinished masonry work for protection when work is stopped at the end of the day.

### 3.3 MORTAR MIXING

- A. General:
  1. Measure ingredients accurately.
  2. Prepare mortar in accordance with C270 to produce a workable dense mixture.
  3. Preheat water and aggregate when necessary to produce a mortar temperature above 40 degrees F.
  4. Do not retemper mortar after initial set occurs.

5. Discard and do not use mortar which is unused after 1½ hours following initial mixing.
  6. Add color pigment to mortar mix in accordance with manufacturer's recommendations.
- B. For brick, concrete masonry units and ceramic glazed structural clay facing tile, provide type N mortar consisting of:
1. One part Portland Cement; to
  2. One part hydrated lime; to
  3. Six parts mortar aggregate measured damp and loose.

### 3.4 GROUT MIXING

- A. General:
1. Measure ingredients accurately.
  2. Prepare mortar in accordance with C476 to produce a workable dense mix having slump of 8 to 11 inches.
  3. Discard and do not use mortar which is unused after 1½ hours following initial mixing.
- B. Provide fine grout consisting of:
1. One part Portland Cement; to
  2. One-tenth part hydrated lime; to
  3. Three parts grout aggregate.

### 3.5 INSTALLATION

- A. Laying:
1. General:
    - a. Unless otherwise indicated on the Drawings, make the masonry work plumb, level, and true to line, with square angles and corners.
    - b. Construct masonry such that all exposed surfaces are free from chips, pinholes and other imperfections.
    - c. Use masonry that is clean and free from dust and other foreign matter.
    - d. Spalled, cracked or broken pieces of masonry can be used as backup where concealed.
    - e. Lay in running bond unless otherwise shown on the Drawings.
    - f. Toothing of masonry is not acceptable.
    - g. Completely fill mortar joints to provide a watertight surface.
    - h. Use a carborundum saw to make straight, smooth, sharp edges when cutting masonry.
    - i. Lay facing masonry and back up masonry simultaneously.
    - j. Where mortar has moved or shifted, remove and lay again in fresh mortar.
    - k. Build anchors, grounds, inserts, frames, thimbles, brackets, nailers, flashing, lintels, bearing plates and other items into the masonry as work progresses.

- l. Construct masonry such that the fit around windows, doors, panels, cut-out cabinets and openings is close and neat.
  - m. Set sills and ends of lintels in full mortar beds.
  - n. Use standard units to provide square internal corners and lintel edges.
  - o. Immediately remove mortar and grout from areas where they are not scheduled to be placed.
- B. Concrete masonry units:
- 1. Use only dry concrete masonry units.
  - 2. Provide 3/8-inch mortar joints.
  - 3. Provide fully grouted units for the top course of walls except where noted on the Drawings.

### 3.6 JOINERY

- A. General: On all joints exposed to the weather, tool and make smooth, solid, and watertight.
- B. Joint Pattern:
- 1. For brick, concrete masonry units, glass masonry units and ceramic glazed structural clay facing tile:
    - a. Provide a smooth uniform concave tooled mortar surface without voids for exposed areas.
    - b. Provide struck joints for all other areas.
  - 2. For cut stone:
    - a. Rake joints clean of mortar to a depth of 3/8-inch.
    - b. Point joints with joint sealant of a color to match the stone.

### 3.7 GROUTING

- A. Placement:
- 1. Place grout within 1½ hours from introducing water in the mixture and prior to initial set.
  - 2. Comply with maximum grout pour height and minimum grout space dimensions for grouting cells of hollow units for fine grout per Table 7 of ACI 530.1 Specification for Masonry Structures, latest edition.
  - 3. Limit grout lifts to maximum height of 5 feet.
  - 4. Provide cleanouts for grout pours over 5 feet. Locate cleanout openings in face shells of bottom course units containing dowels or vertical reinforcing and at maximum spacing of 32 inches for solidly grouted walls.
  - 5. Verify that vertical and horizontal reinforcement is in proper position and adequately secured before beginning pours.
  - 6. Place each grout pour continuously and consolidate immediately. Do not interrupt placements more than 1½ hours.
  - 7. Level off grout 1-inch below top of bed joint to create shear key between grout lifts.
  - 8. Place grout for spanning elements in single, continuous pour.

- B. Consolidation:
1. Consolidate grout placements 12 inches or less in height by mechanical vibration or by puddling.
  2. Consolidate grout placements exceeding 12 inches in height by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
  3. Do not overconsolidate.

END OF SECTION

SECTION 05 50 00  
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide miscellaneous metal work as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE

- A. Perform shop and/or field welding required in connection with the work of this Section in strict accordance with pertinent recommendations of the American Welding Society.
  - 1. Structural Welding Code Steel: D1.1.
  - 2. Structural Welding Code Aluminum: D1.2.
  - 3. Structural Welding Code Sheet Steel: D1.3.
  - 4. Structural Welding Code Stainless Steel: D1.6.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.
- B. Comply with pertinent provisions of the following standards, latest edition.
  - 1. Aluminum castings: ASTM B26.
  - 2. Aluminum sheet and plate: ASTM B209, Alloy 6061-T6.
  - 3. Aluminum drawn seamless tubes: ASTM B210, Alloy 6063-T5.
  - 4. Aluminum extrusions: ASTM B221, Alloy 6063-T6.
  - 5. Aluminum seamless pipe: ASTM B241, Alloy 6061-T6.
  - 6. Aluminum forgings: ASTM B247, Alloy 6061-T6.
  - 7. Aluminum structural shapes: ASTM B308, Alloy 6061-T6.
  - 8. Aluminum structural pipe and tube: ASTM B429, 6061-T6.
  - 9. Aluminum tread plate: ASTM B632, Alloy 6061-T6.
  - 10. Steel plates, shapes, and bars: ASTM A36.
  - 11. Steel plates to be bent or cold-formed: ASTM A283, Grade C.
  - 12. Steel tubing (hot-formed, welded, or seamless): ASTM A501, Grade B.
  - 13. Steel bars and bar-size shapes: ASTM A663, Grade 65, or ASTM A36.
  - 14. Cold-finished steel bars: ASTM A108.
  - 15. Cold-rolled carbon steel sheets: ASTM A1008.
  - 16. Galvanized carbon steel sheets: ASTM A653, with G90 zinc coating.
  - 17. Stainless steel bars, angles and shapes: ASTM A276, Type 316 (Type 316L for welded connections).
  - 18. Welded stainless steel mechanical tubing: ASTM A554, Type 316 (Type 316L for welded connections).
  - 19. Stainless steel fasteners: ASTM F593 and F594, Type 316.
  - 20. Stainless steel wire fabric, sheet and plates: ASTM A240, Type 316 (Type 316L for welded connections).
  - 21. Gray iron castings: ASTM A48.
  - 22. Malleable iron castings: ASTM A47.
  - 23. Steel pipe: ASTM A53, Grade A, Schedule 40, black finish unless otherwise noted.
  - 24. Concrete inserts: Threaded or wedge type galvanized ferrous castings of malleable iron complying with ASTM A27.

### 2.2 ANCHORS AND FASTENERS

- A. Provide Type 316 stainless steel anchor bolts, threaded rods, bolts, nuts, screws, staples, washers, rivets, lock nuts, nails, pins, hooks, clamps, and all other metal fasteners.
- B. Post installed mechanical anchors:
  - 1. Provide Type 316 stainless steel wedge, sleeve and drop-in expansion anchors of size and number required for the particular use.

2. Furnish anchors suitable for installation in cracked and uncracked base materials to resist short and long-term sustained loading.
  3. Acceptable manufacturers:
    - a. Simpson Strong-Tie Company, Inc.
    - b. Hilti, Inc.
    - c. ITW Redhead.
    - d. Or equal.
- C. Post installed adhesive anchors:
1. Provide Type 316 stainless steel threaded rods set in place with a cartridge type, two-component, high solids epoxy adhesive system dispensed and mixed through a static mixing nozzle supplied by the manufacturer.
  2. Concrete base material: Furnish material suitable for anchorage of threaded rods in cracked and uncracked concrete to resist long-term sustained loading, tested and qualified in accordance with the International Code Council Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements (AC308).
    - a. Acceptable products:
      - (1) Hilti Inc., HIT-RE 500-SD.
      - (2) Simpson Strong-Tie, SET-XP.
      - (3) No substitution permitted.
  3. Solid grouted masonry base material: Furnish material suitable to resist long-term sustained loading, tested and qualified in accordance with the International Code Council Acceptance Criteria for Adhesive Anchors in Concrete and Masonry Elements (AC58).
    - a. Acceptable products:
      - (1) Hilti Inc., HIT-HY 150 MAX.
      - (2) Simpson Strong-Tie, ET Epoxy-Tie.
      - (3) No substitution permitted.
  4. Hollow masonry base material: Furnish material suitable to resist long-term sustained loading, tested and qualified in accordance with the International Code Council Acceptance Criteria for Adhesive Anchors in Unreinforced Masonry Elements (AC60). Provide screen tubes for anchorage of threaded rods in hollow concrete masonry, hollow brick masonry and unreinforced masonry applications.
    - a. Acceptable products:
      - (1) Hilti Inc., HIT-HY 20.
      - (2) Simpson Strong-Tie, ET Epoxy-Tie.
      - (3) No substitution permitted.
- D. Provide Type 304 stainless steel screw anchors of size and number required for the particular use.
1. Acceptable products:
    - a. Powers Fasteners, Tapper Screw Anchor.
    - b. Or equal.



## 2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## 2.4 FABRICATION

- A. Except as otherwise shown on the Drawings or the approved Shop Drawings, use materials of size, thickness, and type required to produce reasonable strength and durability in the work of this Section.
- B. Fabricate with accurate angles and surfaces which are true to the required lines and levels, grinding exposed welds smooth and flush, forming exposed connections with hairline joints, and using concealed fasteners wherever possible.
- C. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the item.
- D. On surfaces inaccessible after assembly or erection, apply two coats of the specified primer. Change color of second coat to distinguish it from the first.

## PART 3 - EXECUTION

### 3.1 SHOP TREATMENT OF METAL SURFACES

- A. Clean ferrous metal surfaces, except stainless steel and work to be galvanized, by sandblasting to bare metal in accordance with the Steel Structures Painting Council Specifications (SSPC) SP-10 and shop prime as specified under the Section 09 90 00.
  - 1. Do not shop prime or paint contact surfaces which are to be field bolted or welded.
- B. Clean cast iron surfaces by sandblasting to bare metal in accordance with SSPC SP-6 and shop paint with a two-coat system of bituminous paint using Thnemec 46-465 Heavy Duty Black, or equal.
- C. Clean stainless steel surfaces to remove oil, grease, hand and finger prints, and any other surface contaminants after fabrication and passivate in a 20 percent nitric acid solution.
  - 1. Protect polished stainless steel surfaces with removable plastic coatings or coverings during delivery, handling, and installation.

- D. Provide standard mill finish for aluminum surfaces unless clear anodized or color finish is otherwise specified.
  - 1. Provide caustic etch and anodic oxide treatment for aluminum surfaces to be anodized, conforming to the Aluminum Association Standard AA-M12C22A.
- E. Properly clean copper and bronze metal surfaces and shop coat with a high quality clear finishing lacquer.
- F. Shop paint non-ferrous metal surfaces which will contact dissimilar metals, mortar, concrete, plaster, or any other corrosive material with one heavy coat of bituminous paint, using Tnemec 46-465, or equal.

### 3.2 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

### 3.3 INSTALLATION

- A. General:
  - 1. Set work accurately into position, plumb, level, true, and free from rack.
  - 2. Anchor firmly into position.
  - 3. Where field welding is required, comply with AWS recommended procedures of manual-shielded metal-arc welding for appearance and quality of weld and for methods to be used in correcting welding work.
  - 4. Grind exposed welds smooth and touch-up shop prime coats.
  - 5. Do not cut, weld, or abrade surfaces which have been hot-dip galvanized after fabrication and which are intended for bolted or screwed field connections.
  - 6. Immediately after erection, clean the field welds, bolted connections, and abraded areas of shop priming. Paint the exposed areas with same material used for shop priming.
- B. Post installed anchors:
  - 1. Perform anchor installation in accordance with manufacturer's instructions.
  - 2. Identify location of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not cut or damage reinforcing steel, prestressed steel tendons, piping, conduits or other embedded items. Notify the Engineer of reinforcing steel or other embedded items encountered during drilling.
  - 3. Use drill type, bit type and diameter recommended by the anchor manufacturer.
  - 4. Drill holes perpendicular to surface of concrete or masonry after concrete, mortar or grout has achieved full design strength.
  - 5. Clean holes to remove loose material and drilling dust prior to installation of anchors.

6. Mechanical anchors:
  - a. Protect threads from damage during anchor installation.
  - b. Use a torque wrench to set anchors to manufacturer's recommended torque.
7. Adhesive anchors:
  - a. Install screen tubes for anchorage of threaded rods in hollow masonry base materials.
  - b. Follow manufacturer's recommendations to ensure proper mixing of adhesive components.
  - c. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
  - d. Inject sufficient adhesive in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer's specified cure time has elapsed.
  - e. Observe manufacturer's recommendations with respect to installation temperatures.
8. Provide the following minimum embedment, edge distance and spacing unless indicated otherwise by the anchor manufacturer's instructions or shown otherwise on the Drawings:

Anchor Type	Min Embedment (Bolt Diameters)	Min Edge Distance (Bolt Diameters)	Min Spacing (Bolt Diameters)
Wedge	9	6	10
Sleeve	4	6	12
Drop-In	4	6	12
Adhesive	9	9	14

END OF SECTION

SECTION 06 10 00  
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide wood, nails, bolts, screws, framing anchors, miscellaneous hardware and other items needed to perform carpentry for construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with the pertinent codes and regulations of governmental agencies having jurisdiction.
- C. Comply with pertinent provisions of the following codes and standards:
  - 1. American Wood Council (AWC): National Design Specifications for Wood Construction, ANSI/AF&PA NDS-latest edition.
  - 2. National Institute of Standards and Technology:
    - a. American Softwood Lumber Standard, PS 20-latest edition.
    - b. Standard for Construction and Industrial Plywood, PS 1-latest edition.
  - 3. American Lumber Standards Committee (ALSC): National Grading Rule.
  - 4. American Plywood Association (APA): Grades and Specifications.
  - 5. American Wood Preservers Association (AWPA):
    - a. Lumber, Timber, Bridge Ties and Mine Ties -- Pressure Treatment, AWPA C2-latest edition.

- b. Plywood Pressure Treatment, AWPAC9-latest edition.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
- C. Identify framing lumber as to grades, and store each grade separately from other grades.
- D. Use extreme care in off loading of lumber to prevent damage, splitting and breaking of materials.
- E. Protect metals with adequate waterproof outer wrapping.

#### 1.5 SITE CONDITIONS – Reserved.

#### 1.6 MAINTENANCE– Reserved.

### PART 2 - PRODUCTS

#### 2.1 GRADE STAMPS

- A. Identify framing lumber by the grade stamp of the National Lumber Grades Authority (NLGA), or such other grade stamp as is approved in advance by the Engineer.
- B. Identify plywood as to species, grade, and glue type by the stamp of the American Plywood Association (APA).
- C. Identify other materials of this Section by the appropriate stamp of the agency approved in advance by the Engineer.

#### 2.2 MATERIALS

- A. Provide materials in the quantities needed for the Work shown on the Drawings, and meeting or exceeding the following standards of quality:
  - 1. Framing lumber for studs, plates, rafters, beams, and joists: Douglas Fir-Larch or Spruce-Pine-Fir, Grade No. 2 or better.
  - 2. Plywood: APA EXT Grade C-D or better.
  - 3. Finish lumber for trim: Grade C Select White Pine, thoroughly seasoned or kiln dried, and uniform in color.
  - 4. Rough hardware:
    - a. Steel items: Comply with ASTM A36.
    - b. Bolts: Comply with ASTM A307.
    - c. Lag screws: Comply with ASTM A307.
    - d. Nails: Use common except as otherwise noted.

- e. Connectors: Simpson, Teco, or equal as approved by the Engineer.
  - f. Provide ASTM A653, G185 hot dip galvanized coating for rough hardware at exposed exterior locations or at locations in contact with treated wood.
    - (1) Steel items, bolts, lag screws and nails: Comply with ASTM A153.
    - (2) Connectors: Comply with ASTM A123.
- B. Treated wood:
- 1. Provide pressure treated lumber and plywood where shown on the Drawings.
  - 2. Pressure treat above ground wood members in contact with concrete or masonry with waterborne alkaline copper quaternary (ACQ) preservative system containing no arsenic and no chromium to a minimum retention of 0.25 lb./cu.ft.
  - 3. Pressure treat wood members in contact with ground or fresh water with waterborne alkaline copper quaternary (ACQ) preservative system containing no arsenic and no chromium to a minimum retention of 0.45 lb./cu.ft.
  - 4. Kiln dry all wood to a 19 percent maximum moisture content before and after pressure treatment.

## 2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 DELIVERIES

- A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.
- B. Make as many trips to the job site as are needed to deliver materials of this Section in a timely manner to ensure orderly progress of the Work.

### 3.3 COMPLIANCE

- A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.

- B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

### 3.4 WORKMANSHIP

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Finish trim jointing:
  - 1. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
  - 2. Install trim in pieces as long as possible, jointing only where solid support is obtained.
- C. Selection of lumber pieces:
  - 1. Carefully select the members.
  - 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
  - 3. Cut out and discard defects which render a piece unable to serve its intended function.
  - 4. Lumber may be rejected by the Engineer, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- D. Do not shim any framing component.

### 3.5 GENERAL FRAMING

- A. General:
  - 1. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.
  - 2. Set horizontal and sloped members with crown up.
  - 3. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Engineer.
- B. Bearings:
  - 1. Make bearings full unless otherwise indicated on the Drawings.
  - 2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.
  - 3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

### 3.6 BLOCKING AND BRIDGING

- A. Install blocking as required to support items of finish and to cut off concealed draft openings, both vertical and horizontal, between ceiling and floor areas.

- B. Bridging:
  1. Install wood cross bridging (not less than 2" x 3" nominal), metal cross bridging of equal strength, or solid blocking between joists where the span exceeds 8' - 0".
  2. Provide maximum distance of 8' - 0" between a line of bridging and a bearing.
  3. Cross bridging may be omitted for roof and ceiling joists where the omission is permitted by code, except where otherwise indicated on the Drawings.
  4. Install solid blocking between joists at points of support and wherever sheathing is discontinuous. Blocking may be omitted where joists are supported on metal hangers.

### 3.7 ALIGNMENT

- A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8-inch from the plane of surfaces of adjacent furring and framing members.

### 3.8 FASTENING OF FRAMING LUMBER

- A. Nailing:
  1. Provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2-inch (nominal) thickness.
  2. Nail without splitting wood.
  3. Prebore as required.
  4. Remove split members and replace with members complying with the specified requirements.
- B. Bolting:
  1. Drill holes 1/16-inch larger in diameter than the bolts being used.
  2. Drill straight and true from one side only.
  3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.
- C. Screws:
  1. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.

### 3.9 FASTENING OF TRIM

- A. Install items straight, true, level, plumb, and firmly anchored in place.
- B. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
- C. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.



- D. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or the sealant.
  - E. On exposed work, set nails for putty.
  - F. Screw, do not drive, wood screws; except that screws may be started by driving and then screwed home.
- 3.10 FINISHING
- A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.
  - B. No coarse grained sandpaper mark, hammer mark, or other imperfection will be accepted.

END OF SECTION

## SECTION 07 92 00

### JOINT SEALANTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide joint sealants as shown on the Drawings, as required by other Sections, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

##### 1.7 DEFINITION

- A. The terms sealant and caulk shall be considered synonymous whenever and wherever used in Contract Documents.

## PART 2 - PRODUCTS

### 2.1 SEALANTS

- A. Type A – Silicone Sealant:
  - 1. Low modulus silicone sealant conforming to the latest requirements of ASTM C920, Type S, Grade NS, Class 100/50, Uses NT & M.
  - 2. Acceptable products:
    - a. Silpruf LM SCS2700 by GE Silicones.
    - b. Dow Corning 790 Silicone Building Sealant by Dow Corning.
    - c. Or equal.
  - 3. Color as selected by Engineer.
- B. Type B – Acrylic Sealant:
  - 1. Acrylic latex plus silicone sealant conforming to the latest requirements of ASTM C834, Type OP, Grade NF single component, paintable.
  - 2. Acceptable products:
    - a. AC20+Silicone by Pecora Corporation.
    - b. DAP ALEX Plus Acrylic Latex Caulk Plus Silicone by DAP.
    - c. Or equal.
- C. Type C – Polyurethane Sealant (General Purpose):
  - 1. Polyurethane sealant conforming to the latest requirements of ASTM C920, Type S, Grade NS, Class 25, Uses NT, M, A, G and O.
  - 2. Acceptable products:
    - a. DynaTrol I-XL by Pecora Corporation.
    - b. Sikaflex-1a by Sika Concrete Restoration Systems.
    - c. Sonolastic NP1 by Degussa Construction Chemicals.
    - d. Or equal.
- D. Type D – Polyurethane Sealant (Continuous Water Immersion):
  - 1. Polyurethane sealant approved by manufacturer for continuous water immersion conforming to latest requirements of ASTM C920, Type S, Grade P or NS, Class 25, Uses I, M and A.
  - 2. Acceptable products:
    - a. Sikaflex-1a by Sika Concrete Restoration Systems.
    - b. Sikaflex-1 CSL by Sika Concrete Restoration Systems.
    - c. Or equal.
- E. Primer: Non-staining type as recommended by sealant manufacturer.
- F. Joint Backing: Flexible, compressible, closed cell polyethylene compatible with sealant.
- G. Bond Breaker: Pressure sensitive tape as recommended by sealant manufacturer.

- H. Joint cleaner: Non-corrosive and non-staining type as recommend by sealant manufacturer and compatible with joint forming material.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### 3.2 INSTALLATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with sealant manufacturer's instructions.
- C. Protect elements surrounding the work from damage or disfigurement.
- D. Install in accordance with sealant manufacturer's instructions.
- E. Measure joint dimensions and size joint backers to achieve width to depth ratios, neck dimension, and surface bond area as recommended by sealant manufacturer.
- F. Install bond breaker where joint backing is not used.
- G. Install sealant free from air pockets, foreign embedded matter, ridges and sags.
- H. Tool joints.

### 3.3 CLEANING

- A. Clean adjacent soiled surfaces in accordance with sealant manufacturer's instructions.

### 3.4 SCHEDULE

- A. Contracting joints in concrete: Type C.
- B. Exposed joints between precast concrete roof deck units and precast concrete roof deck units and adjacent work: Type B.
- C. Interior and exterior joints between precast concrete roof deck units and adjacent work: Type A.

- D. Control joints in masonry, and between masonry and adjacent work: Type A, color as selected by Owner.
- E. Joints between interior and exterior frames of doors, windows, wall panels and other device set in masonry: Type A, color as selected by Owner.
- F. Exterior joints for which no other sealant type is indicated: Type C, color as selected by Owner.
- G. Interior joints for which no other sealant type is indicated: Type B, color as selected by Owner.
- H. Water immersion joints for which no other sealant type is indicated: Type D.

END OF SECTION

## SECTION 08 11 19

## FIBERGLASS REINFORCED PLASTIC DOORS, FRAMES, AND HARDWARE

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide fiberglass reinforced plastic doors, frames, and hardware where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's specifications, product literature, fabrication descriptions, installation instructions, and other data needed to prove compliance with the specified requirements.
  - 2. Frames: Frame type, frame configuration, location of cutouts for hardware, reinforcement, finish, details of openings, and details of construction, installation, and anchorage types and spacing.
  - 3. Doors: Elevations of door designs, and internal reinforcement.
  - 4. Hardware: Manufacturer's literature and cut sheets to show materials of construction and relevant information to meet specification intent.
- B. Operation and Maintenance Manuals:
  - 1. Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

## 1.3 QUALITY ASSURANCE

- A. Provide fiberglass work manufactured by a single firm specializing in the production of this type of work, including:
  - 1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
  - 2. Door and frame components from same manufacturer.
  - 3. Evidence of a compliant documented quality management system.

## FIBERGLASS REINFORCED PLASTIC DOORS, FRAMES AND HARDWARE

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#### 1.4 DELIVERY, STORAGE, AND HANDLING

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

#### 1.5 SITE CONDITIONS – Reserved.

#### 1.6 MAINTENANCE – Reserved.

#### 1.7 REGULATORY REQUIREMENTS

- A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.
- B. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.27 psf. Door shall not exceed 0.58 cfm/ft<sup>2</sup>.
- C. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.
- D. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.
- E. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000 cycles.
- F. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.
- G. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.
- H. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.
- I. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.
- J. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Minimum of 55 CRF value.
- K. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
  - 1. Flame Spread: Maximum of 200, Class C.
  - 2. Smoke Developed: Maximum of 450, Class C.
- L. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
  - 1. Flame Spread: Maximum of 25.
  - 2. Smoke Developed: Maximum of 450.

- M. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 14.0 foot-pounds per inch of notch.
- N. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 13,000 psi.
- O. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.
- P. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.
- Q. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.
- R. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.
- S. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.
- T. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.
- U. Chemical Resistance, ASTM D 543. Excellent rating.
  - 1. Acetic acid, Concentrated.
  - 2. Ammonium Hydroxide, Concentrated.
  - 3. Citric Acid, 10%.
  - 4. Formaldehyde.
  - 5. Hydrochloric Acid, 10%
  - 6. Sodium hypochlorite, 4 to 6 percent solution.
- V. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.
- W. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.
- X. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.
- Y. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site [www.special-lite.com](http://www.special-lite.com). E-Mail [info@special-lite.com](mailto:info@special-lite.com).



- B. Or equal:
  - 1. Substitution of another manufacturer will not be considered unless the proposed substitute manufacturer's door has successfully demonstrated door approval and design features of the door from Owner.

## 2.2 FRP DOORS

- A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.
- B. Door Opening Size as Indicated within Door Schedule in Paragraph 2.7 of these specifications.
- C. Construction:
  - 1. Door Thickness: 1-3/4 inches.
  - 2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.
  - 3. Corners: Mitered.
  - 4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.
  - 5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
  - 6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
  - 7. Rail caps or other face sheet capture methods are not acceptable.
  - 8. Extrude top and bottom rail legs for interlocking continuous weather bar.
  - 9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
  - 10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
  - 11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.
- D. Face Sheet:
  - 1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout.
  - 2. Protective coating: Abuse-resistant engineered surface. Provide FRP with SpecLite3 protective coating, or equal.
  - 3. Texture: Pebble.
  - 4. Color: Dark Bronze.
  - 5. Adhesion: The use of glue to bond face sheet to foam core is prohibited.
- E. Core:
  - 1. Material: Poured-in-place polyurethane foam.
  - 2. Density: Minimum of 5 pounds per cubic foot.
  - 3. R-Value: Minimum of 9.
- F. Cutouts:
  - 1. Manufacture doors with cutouts for required vision lites, louvers, and panels.

2. Factory install vision lites, louvers, and panels.

G. Hardware:

1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
2. Factory install hardware.

## 2.3 DOOR AND FRAME MATERIALS

A. Aluminum Members:

1. Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Components: Door and frame components from same manufacturer.

C. Fasteners:

1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Screws with finish matching items to be fastened.

## 2.4 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated in the table at the end of these specifications.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:

1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:

1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

## 2.5 HARDWARE

A. Pre-machine doors in accordance with templates from noted hardware manufacturers and schedule noted below.

- B. Door 101:
1. 2 SL17 Doors.
  2. 260 Framing.
  3. 2 Hinges SL11hd.
  4. 1 Power Transfer Pt1000.
  5. 1 Electric Lockset Dorma C880EU LRC.
  6. 2 Flush Bolts 1555.
  7. 1 Closer - Dorma 8916DST.
  8. 1 Overhead Stop 9010 –Inactive Door.
  9. 2 Kickplates 8".
  10. 1threshold 428 – Field Verify Width.
  11. 2 Integral Sweeps SL301.
  12. 2 Door Position Switches MC4.
  13. 1astragal By Door Mfg.
  14. Reuse Card Reader/Security.
- C. Door 102:
1. 1 SL17 Doors.
  2. 260 Framing.
  3. 1 Hinge SL11hd.
  4. 1 Power Transfer Pt1000.
  5. 1 Electric Lockset Dorma C880EU LRC.
  6. 1 Exit Device 9300 X Prt03 X Cyl.
  7. 1 Dorma 8916 Ds.
  8. 1 Kickplate 8".
  9. 1threshold 428 – Field Verify Width.
  10. 1 Integral Sweeps SL301.
  11. 1 Door Position Switch MC4.
  12. 1 Latch Guard.
- D. Door 103:
1. 1 SL17 Door.
  2. 260 Framing.
  3. 1 Hinge SL11HD.
  4. 1 Dorma C880 LRC.
  5. 1 Dorma 8916 DS.
  6. 1 Kickplate 8".
  7. 1threshold 428 – Field Verify Width.
  8. 1 Integral Sweeps SL301.
  9. 1 Door Position Switch MC4.
  10. 1 Latch Guard.

## 2.6 ALUMINUM FINISHES

- A. Anodized Finish: Class I finish, 0.7 mils thick.
1. Dark Bronze, AA-M10C12C22A44, Class I, 0.7 mils thick.

## 2.7 DOOR SCHEDULE

- A. Provide doors as noted below.

Door Number	Door Sizes	Nominal M.O.	Swing	Frame Size
101	46" by 84" & 62" by 84"	112" by 88"	LHR (active), RHR (inactive)	2 x 3.5
102	36" by 84"	40" by 88"	LHR	2 x 3.5
103	36" by 84"	40" by 88"	LHR	2 x 3.5

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

- A. Examine the areas, substrates, and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

### 3.2 INSTALLATION

- A. General: Install FRP doors, frames and accessories in accordance with final shop drawings, as herein specified, and in accordance with manufacturer's written instructions.
- B. Placing frames:
1. When practical, place frames prior to construction of enclosing walls and ceilings.
  2. Set frames accurately into position, plumbed, aligned, and braced securely until permanent anchors are set.
  3. Place anchors at hinge locations and extend at least 8 inches into the masonry.
  4. Paint inside of frames with bituminous coating and fill the space between the frames and the wall with grout.
  5. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
    - a. To avoid damaging finish, do not drill frame for brace supports.
- C. Door Installation:
1. Fit FRP doors accurately in frames, within adequate clearances.

### 3.3 PROTECT, ADJUST AND CLEAN

- A. Protect fiberglass reinforced plastic work and finish against harmful substances and construction activities.

- B. Final adjustments:
  - 1. Check and readjust all operable components to ensure they are properly installed and that they function smooth and freely.
  - 2. Leave work in complete and proper operating condition.
  - 3. Remove defective work and replace with work complying with the specified requirements.
  
- C. Remove dirt and excess sealant from exposed surfaces.
  - 1. Follow the manufacturer's recommended cleaning techniques and procedures for cleaning all surfaces.
  - 2. Use only cleaning products that will not scratch or damage the surfaces, and are recommended by the manufacturer.
  - 3. Repair or replace materials damaged resulting from the use of other cleaning materials.

END OF SECTION

## SECTION 08 80 00

### GLAZING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide glazing and glazing accessories as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

- A. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in:
  - 1. Flat Glass Marketing Association:
    - a. "Glazing Sealing Systems Manual".
    - b. "Glazing Manual".

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. During storage and handling of glass, provide cushions at edges to prevent impact damage.

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Window glass:
  - 1. Provide clear DSB sheet glass unless otherwise noted on the Drawings.

### 2.2 SHEET GLASS

- A. Provide 1/4-inch clear, conforming to Federal Specification DD-G-451a.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

- A. Clean glazing channels, stops, and rabbets to receive the glazing materials, making free from obstructions and foreign substances which might impair the work.
  - 1. Remove protective coatings which might fail in adhesion or interfere with bond of sealants.
  - 2. Comply with manufacturers' instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.
  - 3. Prime surfaces to receive glazing compounds in accordance with manufacturers' recommendations.

### 3.2 INSTALLATION

- A. Inspect each piece of glass immediately prior to start of installation.
  - 1. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded, or damaged in any other manner.
  - 2. Do not remove labels from glass until so directed by the Engineer.
  - 3. Install glass so distortion waves, if present, run in the horizontal direction.
- B. Locate setting blocks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.
  - 1. Use blocks of proper size to support the glass in accordance with the manufacturer's recommendations.
  - 2. Provide spacers for all glass sizes larger than 50 inches in length or width, to separate glass from stops; except where continuous glazing gaskets or felts are provided.
    - a. Locate spacers no more than 24 inches apart, and no closer than 12 inches to a corner.
    - b. Place spacers opposite one another.
    - c. Make bite of spacer on glass 1/4-inch or more.
- C. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.

## GLAZING

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- D. Do not use two different glazing materials in the same joint system unless the joint use is approved in advance by the Engineer.
  - E. Mask, or otherwise protect, surfaces adjacent to installation of sealants.
  - F. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required.
- 3.3 PROTECTION
- A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons, or other items directly to the glass except as specifically directed by the Engineer.

END OF SECTION



## SECTION 09 90 00

### PAINTING AND COATING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Paint and finish exposed surfaces using the combination of materials listed on Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.
- C. References:
  - 1. Reserved.
- D. Work included:
  - 1. Existing floors.
  - 2. New masonry CMU addition in chemical room.
  - 3. Any damaged areas.
- E. Definitions:
  - 1. "Paint" as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - 3. Color charts for selection of colors by the Owner.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees:
  - 1. Contractor Qualifications - Provide certification of previous experience and equipment necessary to apply/install the specified painting and coating systems.
- D. Lubricants – None Required.

- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

### 1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Paint coordination:
  - 1. Within 35 calendar days after the Contractor has received the Engineer's Notice to Proceed, arrange a conference with a technical representative of the paint manufacturer, Engineer, Contractor, and the Owner to:
    - a. review the paint systems to be used;
    - b. select colors;
    - c. review painting procedures; and
    - d. establish painting schedule.
  - 2. Notify the equipment manufacturers and miscellaneous metals fabricators of the correct shop primer to be used to assure compatibility of the total coating system.
  - 3. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system.
  - 4. Provide barrier coats over non-compatible primers, or remove the primer and reprime as required.
  - 5. Notify the Engineer in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.
- C. Resinous Floor Systems Sample Panels:
  - 1. At an area on site where approved by the Engineer, prepare sample panel.
    - a. Prepare sample panel approximately 4' x 4' using the same materials, tools, equipment, and procedures intended for actual surface preparation and installation.
    - b. Sample panel will be used as datum point for comparison with finished floor coating system for purpose of acceptance or rejection.

### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
  - 1. Store materials in a safe, ventilated location.
  - 2. Remove oily rags, waste, etc. every day and do not allow to accumulate under any circumstances.
  - 3. Take precautions to prevent spontaneous combustion.

## 1.5 SITE CONDITIONS

- A. Do not apply paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 50 degrees F, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer.
- B. Weather conditions:
  - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer.
  - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

## 1.6 MAINTENANCE

- A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10 percent, but not less than one gallon, of each color, type, and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and location where used.

## PART 2 - PRODUCTS

### 2.1 PAINT MATERIALS

- A. Acceptable materials:
  - 1. The Painting Schedule in Part 3 of this Section is based on products of the Tnemec Company, Inc., except where another manufacturer is named for a specific application.
  - 2. Products of other manufacturers may be submitted for review in accordance with provisions of the Contract. These products will be considered substitutions and reviewed at Contractors additional costs.
  - 3. Where products are proposed other than those specified by name and number in the Painting Schedule, provide submittal required by Article 1.2 of this Section and a new painting schedule compiled in the same format used for the Painting Schedule included in this Section.
- B. Undercoats:
  - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
  - 2. Insofar as practicable, use undercoat and finish coat material as parts of a unified system of paint finish.
- C. Provide all paints and materials supplied by one manufacturer.

## 2.2 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Engineer.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

## 2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

# PART 3 - EXECUTION

## 3.1 SURFACE CONDITIONS

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

## 3.2 MATERIALS PREPARATION

- A. General:
  - 1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations as approved by the Engineer.
  - 2. When materials are not in use, store in tightly covered containers.
  - 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.
- B. Stirring:
  - 1. Stir materials before application, producing a mixture of uniform density.
  - 2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

## 3.3 SURFACE PREPARATION

- A. General:
  - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations as approved by the Engineer.
  - 2. Remove removable items such as hardware, accessories, nameplates, fixtures which are in place and are not scheduled to receive paint finish;

- or provide surface applied protection prior to surface preparation and painting operations.
  - 3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
  - 4. Clean each surface to be painted prior to applying paint or surface treatment.
  - 5. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces and other surfaces.
- B. Preparation of wood surfaces:
- 1. Fill, prime and clean wood surfaces until free from dirt, oil, and other foreign substance.
  - 2. Smooth finished wood surfaces exposed to view, using the proper sandpaper to produce a uniformly smooth and unmarred wood surface.
- C. Preparation of metal surfaces:
- 1. Thoroughly clean surfaces until free from dust, dirt, black oxide, scale, rust, paint, oil, and grease in accordance with The Society for Protective Coatings (SSPC) Specifications required in Paint Schedule.
  - 2. On galvanized surfaces, prepare in accordance with the methods outlined in ASTM D 6386-99 Standard Practice for Preparation of Zinc (Hot Dipped Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.
- D. Preparation of concrete and masonry surfaces:
- 1. Clean concrete and masonry surfaces by the methods outlined in SSPC SP-13, Surfaces Preparation of Concrete. Use wire brushing, scraping, high pressure water cleaning, mechanical abrasion, blast tracking, or sandblasting as necessary and as required on the Paint Schedule. Vacuum clean, air blast clean or water clean to remove dirt, dust and loose material. Steam clean or detergent clean to remove oils and grease, efflorescence, stains and contaminants.
  - 2. Allow new concrete and masonry to cure a minimum of 28 days before paint application.
  - 3. Level protrusions and mortar spatter.
- E. Preparation of Ductile and Cast Iron Surfaces:
- 1. Solvent clean in accordance with NAPF 500-03-01 Surface Preparations Standard for Solvent Cleaning.
  - 2. Abrasive Blast Cleaning of Ductile and Cast Iron:
    - a. For external pipe surfaces, abrasive blast clean in accordance with NAPF 500-03-04 Surface Preparations Standards for Abrasive Blast Cleaning – External Pipe Surfaces.
    - b. For internal pipe surfaces, abrasive blast clean in accordance with NAPF 500-03-04 Surface Preparations Standards for Abrasive Blast Cleaning – Internal Pipe Surfaces.

### 3.4 PAINT APPLICATION

- A. General:
  - 1. Touch-up shop-applied prime coats which have been damaged, and touch-up bare areas prior to start of finish coats application.
  - 2. Notify the Engineer or the Owner of the completion of each coat.
    - a. Do not apply additional coats until the completed coat has been inspected and approved.
    - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
  - 3. Do all necessary touching up after other mechanics have finished and leave entire work in a neat and clean condition.
  - 4. Do not leave paint spots on glass, hardware, floors, or other finished work.
  - 5. If required by the Engineer, tint by mixing a small amount of white paint of the exact same type with any or all paint used prior to the final coat so that the area covered by the application of each coat is readily discernible.
  - 6. Provide an approved gauge for determining the mil thickness of the paint on a surface.
- B. Drying:
  - 1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
- C. Brush applications:
  - 1. Apply the painting materials by brush and work the brush coats onto the surface in an even film.
  - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.
- D. Spray application:
  - 1. Except as specifically otherwise approved by the Engineer, confine spray application to metal and similar surfaces where hand brush work would be inferior.
  - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
  - 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
  - 4. Protect other surfaces from over spray.
- E. For completed work, match the approved texture, color, and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.

### 3.5 PAINTING SCHEDULE

#### Dry Film - mils

- A. Steel, iron, galvanized and non-ferrous metal; pipes, conduits, electrical boxes, and equipment:
1. Interior, non-immersion: System Series N69 Hi-Build Epoxoline II.
    - a. Surface preparation: SSPC-SP6 Commercial Blast Cleaning for ferrous metal; ASTM D 6386-99 for galvanized; scarify non-ferrous metal; NAPF 500-03 for cast & ductile iron.
    - b. 1<sup>st</sup> Coat: Tnemec Series 1 Omnithane. 2.5 - 4.0
    - c. 2<sup>nd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. (2-3 mil dft for galvanized and non-ferrous metal.) 4.0 - 6.0
    - d. 3<sup>rd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. (2-3 mil dft for galvanized and non-ferrous metal.)  

4.0 - 6.0  
 10.5 - 16.0
  2. High temperature surfaces: System Series 39 Silicone Aluminum.
    - a. Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning.
    - b. 1<sup>st</sup> Coat: Tnemec Series 39-1261 Silicone Aluminum. 1.0 - 1.5
    - c. 2<sup>nd</sup> Coat: Tnemec Series 39-1261 Silicone Aluminum.  

1.0 - 1.5  
 2.0 - 3.0
- B. Concrete:
1. Interior, exposed except floor: System Series N69 Hi-Build Epoxoline II.
    - a. Surface Preparation: SSPC SP-13, fill voids with Tnemec Series 218 MortarClad.
    - b. 1<sup>st</sup> Coat: Tnemec Series N69-W6160 Hi-Build Epoxoline II. (80-100 sq. ft./gal.)
    - c. 2<sup>nd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. 3.0 - 4.0
    - d. 3<sup>rd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.  

3.0 - 4.0  
 (Topcoats) 6.0 - 8.0
  2. Interior floor: 1/4" Resinous Epoxy flooring for high physical abuse. MICOR Company Inc., Milwaukee, WI. Phone (414-872-2071), or equal.
    - a. Surface Preparation: Allow new concrete to cure 28 days, verify dryness. Moisture content not to exceed 3 lbs per 1,000 sq. ft. in a 24-hour period. Shot blast or mechanically abrade to remove laitance

Dry Film - mils

curing compounds, hardeners, sealers and other contaminants and to create profile. Reference ICRI CSP 5-9. Fill large holes and voids as recommended by the coating manufacturer.

- b. Primer: MICOROX® 103 epoxy primer.
- c. Decorative Resinous liquids shall be blended silica aggregated in an epoxy resin binder.
- d. Decorative broadcast with colored quartz aggregate and top coated with 100% solids, cycloaliphatic amine cured sealer. Nominal application to be 1/4 inch thick.
- e. Ceramic-coated aggregate shall be used to achieve color. Color to be chosen by OWNER.Epoxy.
- f. Sealer: Clear, two component 100% solids epoxy seal coat(s) MICOROX® 1882.

B. Concrete Block and Split Face Concrete Block:

- 1. Interior: System Series N69 Hi-Build Epoxoline II.
  - a. Surface Preparation: Allow new mortar to cure 28 days, level protrusions and mortar spatter.
  - b. 1<sup>st</sup> Coat: Tnemec Series N69-W6160 Hi-Build Epoxoline II.
  - c. 2<sup>nd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.
  - d. 3<sup>rd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.

(75-100 sq. ft./gal.)

3.0 - 4.0

3.0 - 4.0

(Topcoats) 6.0 - 8.0

C. Plaster and Gypsum Wallboard:

- 1. Interior: System Series 113 H.B. Tneme-Tufcoat.
  - a. Surface preparation: Clean and dry.
  - b. 1<sup>st</sup> Coat: Tnemec Series 151-1051 Elasto-Grip FC.
  - c. 2<sup>nd</sup> Coat: Tnemec Series 113 H.B. Tneme-Tufcoat.
  - d. 3<sup>rd</sup> Coat: Tnemec Series 113 H.B Tneme-Tufcoat.

1.0 - 1.5

2.0 - 3.0

2.0 - 3.0

5.0 - 7.5

D. Wood:

- 1. Interior and exterior: System Series 113 HB Tneme-Tufcoat.
  - a. Surface Preparation: Clean and dry.

PAINTING AND COATING

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Dry Film - mils

- |    |  |   |
|----|--|---|
| b. | 1 <sup>st</sup> Coat: Tnemec Series 151-1051 Elasto-Grip FC.                           | 1.0 - 1.5   |
| c. | 2 <sup>nd</sup> Coat: Tnemec Series 113 H.B. Tnemec Tufcoat.                           | 2.0 - 3.0   |
| d. | 3 <sup>rd</sup> Coat: Tnemec Series 113 H.B Tnemec Tufcoat.                            | <u>2.0 - 3.0</u><br>5.0 - 7.5                               |
|    |  |   |
| E. | Face brick and Exterior Concrete Block:  |   |
| 1. | Exterior: Water repellant system & Graffiti Shield system. Series V626 Dura-A-Pell GS. |   |
| a. | Surface preparation: Clean and dry.  |   |
| b. | 1 <sup>st</sup> Coat: Tnemec Series V626 Dura-A-Pell GS.                               | (Brick: 125-150 sq. ft./gal.)<br>(CMU: 65 -85 sq. ft./gal.) |
| c. | 2 <sup>nd</sup> Coat: Tnemec Series 626 Dura-A-Pell GS.                                | (Brick: 125-150 sq. ft./gal.)<br>(CMU: 65 -85 sq. ft./gal.) |
|    |  |   |
| F. | Insulated pipe:  |   |
| 1. | Interior and exterior: System Series 1029 Enduratone.                                  |   |
| a. | Surface Preparation: Clean and dry.  |   |
| b. | 1 <sup>st</sup> Coat: Tnemec Series 1029 Enduratone.                                   | 2.0 - 3.0   |
| c. | 2 <sup>nd</sup> Coat: Tnemec Series 1029 Enduratone.                                   | <u>2.0 - 3.0</u><br>4.0 - 6.0                               |
|    |  |   |
| G. | PVC:   |   |
| 1. | Interior: System Series N69 Hi-Build Epoxoline II.                                     |   |
| a. | Surface Preparation: Hand Sand to Scarify.   |   |
| b. | 1 <sup>st</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.                   | 2.0 - 3.0   |
| c. | 2 <sup>nd</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.                   | <u>2.0 - 3.0</u><br>4.0 - 6.0                               |
| 2. | Exterior: System Series 1075 Endura-Shield II.   |   |
| a. | Surface Preparation: Hand Sand to Scarify.   |   |
| b. | 1 <sup>st</sup> Coat: Tnemec Series N69-Color Hi-Build Epoxoline II.                   | 2.0 - 3.0   |
| c. | 2 <sup>nd</sup> Coat: Tnemec Series 1075 Endura-Shield II.                             | <u>2.0 - 3.0</u><br>4.0 - 6.0                               |

Dry Film - mils

3.6 EXISTING SURFACES

A. General:

1. Paint existing structures, equipment, piping, conduit, and appurtenances that remain in use as part of the Project and are damaged, modified, or cut into.
2. Comply with coating manufacturer's recommendations for surface preparation and painting of existing surfaces.
3. Refer to 3.7 Schedule for coating systems.

B. Containment & Disposal requirements:

1. When required by federal, state or local regulation, enclose the entire tank or structure and contain surface preparation debris. Refer to SSPC-GUIDE 6 (CON), "Guide for Containing Debris Generated During Paint Removal Operations".
2. Dispose of surface preparation debris in accordance with applicable federal, state and local regulations. Refer to SSPC-GUIDE 7 (DIS).
3. Provide containment, tests, permits, transportation and disposal of all waste resulting from surface preparation in strict accordance with Wisconsin DNR regulations.

END OF SECTION

## SECTION 22 19 33

### PIPE INSULATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide pipe insulation as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's specifications and other data needed to assure compliance with specified requirements.
  - 2. Manufacturers' recommended installation procedures.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

##### 1.3 QUALITY ASSURANCE – Reserved.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 EXHAUST PIPE INSULATION

- A. Provide exhaust pipe insulation with the following features:
  - 1. Molded high temperature hydrous calcium silicate.
    - a. Thickness: 4 inches minimum.

- b. Temperature range: to 1,200 degrees F.
- 2. Jacketing: 0.016-inch stucco pattern aluminum with stainless steel bands.
  - a. For flanges and fittings: Glass fabric covered with weatherproof mastic finish.

- B. Acceptable products:
  - 1. Manville Thermo-12.
  - 2. Owens-Corning Kaylo.
  - 3. Or equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install over clean, dry surfaces and in strict accordance with the manufacturer's recommended installation procedures.
- B. Exhaust pipe:
  - 1. Except expansion pieces, apply insulation to exhaust piping, including silencer and all flanges and fittings, to the specified thickness.
  - 2. Wire first layer of insulation in place. Apply second layer with joints staggered.

END OF SECTION

## SECTION 26 05 19

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

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

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Comply with the following standards:
  - 1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.

2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and cross-linked thermosetting polyethylene insulated wire and cable.

B. Provide copper wire only.

## 2.2 WIRE AND CABLE IN RACEWAY

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

## 2.3 JOINTS, TAPS, SPLICES, AND TERMINATIONS

- A. Conductors No. 10 AWG and smaller: Use twist type insulated wire nut solderless connectors.
- B. Conductors No. 8 AWG and larger: Use solderless compression type connectors of type that will not loosen under vibration or normal strains.
- C. Control and instrumentation conductors: Use crimp type spade connectors where control wires are connected to screw terminals of equipment.
- D. Joints, taps, and splices located in enclosures subject to moisture: Use watertight splice kits.

## LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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## 2.4 PERMANENT WIRE MARKERS

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

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wiring system in accordance with manufacturer's recommendations.
- B. Install wire and cable in conduit unless otherwise shown on the Drawings.
- C. Maintain barrier or conduit separation between power conductors and instrumentation conductors to avoid magnetic interaction where such conductors enter and pass through same box, or enclosure.

### 3.2 WIRE AND CABLE IDENTIFICATION

- A. Install permanent wire markers on wire and cable in junction boxes, pull boxes, wireways, and wiring gutters of panels. Markers to identify wire or cable number.
- B. Provide schedule identifying various power and lighting conductors from power source to equipment or device served.

### 3.3 FIXTURE OUTLETS

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

END OF SECTION

## SECTION 26 05 23

### CONTROL-VOLTAGE ELECTRICAL POWER CABLES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide control-voltage wires, cables, and connectors as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Comply with the following standards:
  - 1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.

### CONTROL-VOLTAGE ELECTRICAL POWER CABLES

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2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and cross-linked thermosetting polyethylene insulated wire and cable.

B. Provide copper wire only.

## 2.2 WIRE AND CABLE

A. Shielded instrumentation cable:

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

B. Multi-conductor shielded instrumentation cable:

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

## CONTROL-VOLTAGE ELECTRICAL POWER CABLES

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- C. Multi-conductor thermostat cable, low voltage:
  - 1. Conductors: Solid No. 18 AWG copper.
    - a. Minimum of 4 conductors per cable.
  - 2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use, rated for circuits operating at less than 50 volts.
  
- D. Telephone cable:
  - 1. Conductors: Solid No. 24 AWG tinned copper.
    - a. Minimum of 4 twisted pairs per cable.
  - 2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use.
  
- E. Data cables:
  - 1. Verify unique cable requirements of individual data systems shown on Drawings with Systems Integrator.
  - 2. Provide Belden, or equal, copper data cable systems:
    - a. DeviceNet Applications:
      - (1) No. 3083A CPE (Thick).
      - (2) No. 3085A CPE (Thin).
      - (3) No. 3082A PVC (Thick).
      - (4) No. 3084A PVC (Thin).
    - b. ControlNet Applications:
      - (1) No. 3092A RG-6 PVC Quad shield coax suitable for outdoor.
      - (2) No. 3093A RG-6 FEP Quad shield coax, plenum, suitable for outdoor & burial.
    - c. E/IP application:
      - (1) No. 7933A Cat 5e – 2 pair, bonded, shielded.
      - (2) No. 7929A Cat 5e – 4 pair, bonded, stranded, shielded.
      - (3) No. 7937A Cat 5e – 4 pair, bonded, shielded, burial.
    - d. Profibus DP Applications:
      - (1) No. 3079A 22AWG 300V Twinax.
      - (2) No. 3079E 22AWG 300V Twinax, Flex Version.
    - e. Modbus application:
      - (1) No. 8777 22 AWG, 3 pair modem drop cable.
  - 3. Provide data cable suitable for flooded burial and freeze/thaw conditions where installed in duct banks, underground conduits, or conduits in and on unheated structures.
  - 4. Provide data cables UL listed for intended use.
  
- F. Fiber optic cables:
  - 1. Number of fibers in cable: 6 fibers.
  - 2. Type of fiber (optical): 50/125/250 micron Multimode.
  - 3. Insulation and jacket:
    - a. Polyethylene (PE).
    - b. Polyvinyl chloride (PVC).
    - c. Polybutylene terephthalate (PBT).
  - 4. Storage and operating properties: -50 to +70 deg C.
  - 5. Rated for both indoor and outdoor application and burial in conduit.
  - 6. Flame resistance UL 1666.
  - 7. Gel filled, loose tube construction.

8. Maximum installation bend radius: 7.6".
9. Acceptable manufacturer:
  - a. Belden No. M9A510T.
  - b. Or equal.

## 2.3 JOINTS, TAPS, SPLICES, AND TERMINATIONS

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

## 2.4 PERMANENT WIRE MARKERS

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

# PART 3 - EXECUTION

## 3.1 INSTALLATION

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

## 3.2 WIRE AND CABLE IDENTIFICATION

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

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

END OF SECTION

## SECTION 26 05 26

## GROUNDING AND BONDING OF ELECTRICAL SYSTEMS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide grounding and bonding as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE

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

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

## 1.5 SITE CONDITIONS – Reserved.

## 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

## 2.1 GENERAL

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

## GROUNDING AND BONDING OF ELECTRICAL SYSTEMS

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3. Use high strength cast bronze ground rod clamp listed for direct burial for ground rod.
- B. Ground rods:
  1. Provide copper or copper-clad steel core.
  2. Use 5/8-inch diameter minimum and 10-foot long.
- C. Ground wires:
  1. Use copper wire only.
  2. Size as shown on the Drawings.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Grounding electrode system:
  1. Attach ground wire to a point ahead of water meter or service shut-off valve, when available.
  2. Attach ground wire to building steel where available.
- B. Main and supplemental grounding electrode conductors:
  1. Install jumper or shunt around water meter and/or shut-off valve when applicable.
  2. Attach nonferrous metal tag at water pipe connection to warn against removal.
- C. Install properly terminated equipment grounding conductor in all flexible conduits.
- D. Drive ground rod to a depth that allows for physical protection and concealment below finished floor or grade. Leave approximately 4 inches of rod exposed for inspection prior to concealment.
- E. Make connections to ground rods with molded exothermic weld process, or a listed and approved ground rod clamp.

### 3.2 FIELD QUALITY CONTROL

- A. Perform and record resistance-to-earth measurements witnessed by Engineer with all grounding electrode conductors.
  1. Isolate ground under test from other grounds.
  2. Measure in normally dry conditions not less than 48 hours after rainfall.
  3. Measure at each ground rod and other ground connections when applicable.
- B. Maximum D.C. resistance allowable is 5 ohms.
- C. Use the three-point method of measurement, unless specified otherwise.

END OF SECTION

## SECTION 26 05 29

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide hangers and supports as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Provide zinc galvanized, cadmium plated steel, or malleable iron supporting devices.

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

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- B. Provide drilled expansion insert type sleeve anchors, lag shields, or plastic anchors suitable for load and application.

## 2.2 LIGHTING FIXTURE SUPPORT

- A. Provide stems, hickies, bar hangers, clips, etc. as required to securely attach light fixtures to ceilings or walls.
- B. Provide auxiliary supports where required to allow fixtures to be drawn up tightly, tilted or rotated, and not be affected by vibrations.
- C. Provide fixture grid hangers for mounting surface fluorescent fixtures to exposed grid ceilings.
- D. Provide arms, supports or support clips as required for lay-in troffers in exposed grid ceilings.

## 2.3 CONDUIT SUPPORTS

- A. Provide one-hole or two-hole conduit straps as required.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install supporting devices in accordance with manufacturer's recommendations.
- B. Do not use perforated hanger iron.

END OF SECTION



## SECTION 26 05 33

### RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide raceway and boxes as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- C. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Provide conduit system of the types of conduit as indicated in the Conduit Usage Schedule in Part 3 of this Section.
- B. Provide junction boxes as necessary to facilitate pulling and/or splicing of wires.

### 2.2 METAL RACEWAY AND FITTINGS

- A. Galvanized rigid steel conduit (GRC) and fittings:
  - 1. Conduit: Comply with ANSI C80.1 and UL 6 standards.
  - 2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.
- B. Electrical metallic tubing (EMT) and fittings:
  - 1. Conduit: Comply with ANSI C80.3 and UL 797 standards.
  - 2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.

### 2.3 FLEXIBLE METAL RACEWAY AND FITTINGS

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

### 2.4 NON-METALLIC RACEWAY AND FITTINGS

- A. Rigid conduit: Comply with ANSI C80.3, ASTM F512, NEMA TC-2 and UL 651 standards.
  - 1. Use heavy wall, sunlight resistant, PVC Schedule 40 or 80 as shown on the Drawings.
  - 2. Rated for use with 90 degree C. conductors.
- B. Fittings:
  - 1. Comply with UL 514C and NEMA TC3 standards.
  - 2. Schedule 40 or 80 to match conduit.

### 2.5 CONDUIT BODIES

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

- B. Non-metallic conduit bodies:
  - 1. Comply with ASTM F512 and UL 514 and 651 standards.
    - a. Compatible with Schedule 40 or 80 conduit.
    - b. UL listed for use.
- C. Provide removable cover with gasket and corrosion-resistant screws.

## 2.6 EXPANSION FITTINGS

- A. Expansion fittings: Comply with UL 514 standards.
  - 1. Provide copper grounding strap and clamps.
  - 2. Use Crouse-Hinds Type XJ, or equal.
- B. For non-metallic conduit system, use expansion fittings of material to match conduit installed.

## 2.7 FLEXIBLE SEALING COMPOUND

- A. Use Panduit DS-5 duct sealing compound, or equal, where air and vaportight conduit sealing is required.

## 2.8 OUTLET BOXES AND JUNCTION BOXES

- A. Flush mounted: Provide galvanized steel boxes and accessories suitable for application and type construction.
- B. Surface mounted: Provide corrosion-resistant single or multiple gang malleable iron or aluminum Type FS or FD cast boxes with threaded hubs, or pressed steel boxes as permitted under Part 3 of this Section.
- C. Weatherproof boxes: Provide gasketed covers and corrosion-proof fasteners.

## 2.9 PULL BOXES AND SPECIAL PURPOSE OUTLET BOXES

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

# PART 3 - EXECUTION

## 3.1 INSTALLATION - RACEWAY

- A. Install conduit and fittings in accordance with manufacturer's recommendations.
- B. Run exposed conduits parallel to or at right angles with lines of building or structure.
- C. Keep conduit plugged, clean and dry during construction.
- D. Install expansion fittings on conduits attached to two separate structures.

- E. Conduit runs extending through areas of different temperature or atmospheric conditions, or partly indoors and partly outdoors must be sealed, drained, and installed in a manner preventing drainage of condensed or entrapped moisture into cabinets, boxes, fixtures, motors, or equipment enclosures.
- F. Install bushings with ground lugs and integral plastic linings at equipment with open-bottom conduit entrances.
- G. Exterior underground conduit:
  - 1. Provide conduits or ducts terminating below grade with means to prevent entry of dirt or moisture.

### 3.2 INSTALLATION – BOXES

- A. Install boxes in accordance with manufacturer's recommendations.
- B. Use weatherproof boxes for interior and exterior locations exposed to weather or moisture.
- C. Set outlet boxes parallel to construction.
- D. Thoroughly clean boxes prior to installing wiring devices.

### 3.3 CONDUIT USAGE SCHEDULE

- A. Install GRC or EMT for exposed runs at or higher than 8 feet above the floor unless otherwise shown on the Drawings.
- B. Install GRC for exposed runs lower than 8 feet above the floor unless otherwise shown on the Drawings:
- C. Install PVC conduit only when shown on the Drawings.
- D. Install liquidtight flexible metal conduit and fittings for connections to motors, instrumentation, and equipment subject to vibration and at locations shown on the Drawings.

### 3.4 EXPOSED OUTLET AND JUNCTION BOXES

- A. Use cast boxes up to 45 inches above floor.
- B. Pressed steel boxes acceptable over 45 inches above floor in dry, indoor locations.
- C. Install weatherproof outlet, switch, and junction boxes outdoors and in any area where Drawings show weatherproof (WP) wiring devices.

### 3.5 OUTLET BOX ACCESSORIES

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

### 3.6 OUTLET BOX LOCATIONS

- A. Location of outlets and equipment is approximate. Exact location to be verified and determined by:
  - 1. Conflict with equipment of other trades.
  - 2. Equipment manufacturer's drawings.
  - 3. Engineer in field.
- B. Minor modification in location of outlets and equipment is considered incidental up to distance of 10 feet with no additional compensation, providing necessary instructions are given prior to roughing-in of outlet boxes and equipment.
- C. Nominal mounting heights for devices and equipment to be measured from either above finished floor (AFF) or above finished grade (AFG) to center line of device and, unless otherwise shown on the Drawings, are as follows:
  - 1. Switches: 48 inches AFF.
  - 2. AC receptacles: 48 inches AFF or AFG.
  - 3. Thermostats: 60 inches above floor.

END OF SECTION

## SECTION 26 05 53

## IDENTIFICATION FOR ELECTRICAL SYSTEMS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide identification for electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE – Reserved.

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

## 1.5 SITE CONDITIONS – Reserved.

## 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

## 2.1 NAMEPLATES AND TAGS

- A. Provide nameplates or tags for identification of panels, panel components, and field mounted devices with the following requirements.
  - 1. Engraved laminated plastic.
  - 2. White or black letters on background of opposite color. Match and coordinate color of nameplate or tag background with other panels.
- B. Panel nameplates to have 1/2-inch high letter engraving.
- C. Device and component nameplates or tags to have 3/16-inch high letter engraving.

## IDENTIFICATION FOR ELECTRICAL SYSTEMS

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

## PART 3 - EXECUTION

### 3.1 INSTALLATION

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

END OF SECTION

## SECTION 26 09 95

### PUSHBUTTONS, SELECTOR SWITCHES, AND PILOT LIGHTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide pushbuttons, selector switches, and pilot lights as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts:
  - 1. Two (2) pilot light lamps of each type.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.



## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Provide oil-tight, heavy duty NEMA 4 rated pushbutton switches, selector switches, and pilot lights.
- B. Provide all devices with legend plates.
  - 1. Material: Non-tarnish metal or laminated plastic.
  - 2. Use white or black letters on background of opposite color for laminated plastic.
- C. Use two-circuit contact blocks (one N.O. and one N.C. contact set) for pushbutton switches and selector switches.

### 2.2 PUSHBUTTON SWITCHES

- A. Stop pushbuttons:
  - 1. Provide non-illuminated momentary operation type operators.
  - 2. Use red color button.
- B. Start pushbuttons:
  - 1. Provide non-illuminated momentary operation type operators.
  - 2. Use black color button.
- C. Stop-hold switches:
  - 1. Use stop pushbutton as specified above.
  - 2. Include sliding latch with padlock provision to engage stop button in the OFF position.
- D. Provide pushbuttons for other functions as shown on the Drawings.

### 2.3 SELECTOR SWITCHES

- A. Provide selector switches including the operating knob, operating cam and contact block(s).
- B. Use black color operating knob.
- C. Select operating cam and contact block combination to provide operating sequence as required.

### 2.4 PILOT LIGHTS

- A. Provide pilot lights with colored plastic lens as shown on the Drawings.
- B. Provide 120 volt or 24 Vdc, push-to-test type with LED lamp.

## 2.5 ENCLOSURES

- A. Provide for individual remote control or monitor stations the following type enclosure:
  - 1. Indoor locations: NEMA 1.
  - 2. Outdoor or wet locations: NEMA 3R or NEMA 4 steel construction.
  - 3. Corrosive locations: NEMA 4X stainless steel construction.
  - 4. Hazardous locations: NEMA 7/9 cast iron, or copper free cast aluminum alloy.
- B. Provide nameplate on enclosure for device being controlled.
  - 1. Provide engraved laminated plastic type.
  - 2. Use 3/16-inch high white or black letters on background of opposite color.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

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

END OF SECTION

## SECTION 26 22 13

### LOW VOLTAGE DISTRIBUTION TRANSFORMERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide transformers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Physical dimensions, nameplate data, electrical ratings, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GENERAL PURPOSE TRANSFORMERS

- A. Provide transformers manufactured and tested to meet or exceed NEMA ST 20, UL 1562, ANSI C57.12, and IEEE standards.
- B. Provide KVA rating and voltages as shown on the Drawings.
- C. Provide overload capacity of not less than 10 percent for intermittent operation.
- D. Construct transformer to include:
  - 1. Below 30 KVA: Class F or better insulation having a 115 degree C. rise average maximum over a 40 degree C. ambient temperature.
  - 2. 30 KVA and above: Class H or better insulation having a 150 degree C. rise average maximum over a 40 degree C. ambient temperature.
  - 3. High grade, non-aging cores with sheet silicone steel laminations having core plating insulation on both sides of each lamination.
  - 4. Two 2-1/2 percent primary taps above and below nominal voltage.

### 2.2 CONTROL TRANSFORMERS

- A. Provide UL listed transformers designed to handle high in-rush currents associated with contactors and relays.
- B. Provide continuous VA rating: Size for 1.25 times capacity required for all components in circuit.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install transformers in accordance with manufacturer's recommendations.
- B. Adjust voltage taps for required system voltage when necessary.

END OF SECTION

## SECTION 26 24 19

## MOTOR-CONTROL CENTERS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide motor control centers (MCC) as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- C. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Schematic diagrams for each compartment.
  - 2. Wiring and interconnection diagrams.
  - 3. Frontal elevation and dimension drawings.
  - 4. Listing of ratings, sizes and style of all components, including bus work.
  - 5. Nameplate listings.
  - 6. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE

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

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Comply with the requirements of UL 845 and NEMA ICS-18.
- B. Rating: 480 volt AC, 3 phase, 3 wire, 60 Hertz unless otherwise shown on the Drawings.
- C. Provide individual units in MCC sized and rated as shown on the Drawings and specified herein.
- D. Acceptable manufacturer:
  - 1. Rockwell/Allen-Bradley.
  - 2. No substitution permitted.

### 2.2 MATERIAL AND EQUIPMENT

- A. Provide structure as follows:
  - 1. Sectionalized construction of one or more totally enclosed, dead front, vertical sections joined together to form a rigid, free-standing assembly.
  - 2. Steel base channels and steel lifting angles per manufacturer's standard.
  - 3. NEMA 1A 20-inch wide by 20-inch deep basic sections with gasketing. Other widths and depths for special sections as required.
  - 4. Provisions for future add-on of sections.
  - 5. Laminated plastic engraved tag number identification nameplate on each MCC with 1/2-inch high white or black letters on background of opposite color.
  - 6. Prime coated, baked enamel finish.
  - 7. Open bottom and removable top plate on each section for conduit entry.
  - 8. Overall size not to exceed allocated space or maximum dimensions shown on the Drawings.
  - 9. Labeled to indicate suitability for use as service entrance equipment when Drawings show service wires terminated to MCC.
- B. Provide bus bars and terminations as follows:
  - 1. Front accessible, silver or tin plated copper over entire length, braced to withstand a fault current of 65,000 RMS symmetrical amperes.
  - 2. Minimum 600 amp continuous horizontal bus or greater as determined from frame size of protective device feeding bus.
  - 3. Minimum 300 amp continuous vertical bus or greater to accommodate total connected load with all connected circuit breakers or fuses considered at full rating.

4. Bus barriers with plug-in openings at 1/2 space factor intervals and snap-in closing plates for unused openings.
  5. Bottom covers over vertical bus.
  6. Continuous horizontal ground bus in bottom of MCC sized at 28 percent minimum of main horizontal bus cross-sectional area.
  7. Provide line and load terminations accessible from front, suitable for the size, number of conductors, and conductor material as shown on the Drawings.
- C. Provide wiring as follows:
1. NEMA Class II, Type B wiring.
  2. Track-mounted, pull apart terminals in unit.
  3. Vertical wireway with separate door in each section, isolated from bus and control units.
  4. Continuous horizontal wireway, top and bottom, throughout entire length.
  5. Pre-wired for communications protocol compatible with control system provided by Altronex Control Systems Division of L.W. Allen, Inc.
- D. Provide MCC units as follows:
1. Combination reduced-voltage starters:
    - a. Comply with Section 26 29 13.16.
  2. Motor Drives:
    - a. Provisions for installation of variable frequency drive furnished by the Owner as shown on the Drawings.
  3. Molded case thermal magnetic circuit breakers: Comply with Section 26 28 00.
  4. Operating handles for unit-mounted circuit breakers:
    - a. Engaged with device at all times.
    - b. Up and down motion with down as OFF.
    - c. Interlocked with unit door.
    - d. Position for padlocking in off position.
  5. Transformers: Comply with Section 26 22 13.
  6. Pushbuttons, selector switches, and pilot lights: Comply with Section 26 09 95.
  7. Self-aligning, silver or tin plated, plug-on connections to vertical bus.
  8. Doors:
    - a. Pan type.
    - b. Rugged concealed hinges.
    - c. 1/4 turn latches or captive knurled thumb screws engaging with cage nuts.
  9. Padlock provision to lock unit with plugs disengaged from bus. Units supported and guided by unit support pan:
    - a. Pan easily relocated without tools.
    - b. Unit manufacturer's identification tag fastened to unit saddle.
  10. Engraved laminated plastic unit identification nameplates:
    - a. Use 3/16-inch high white or black letters on background of opposite color.
    - b. On each unit.
  11. Unit compartments enclosed and isolated from adjacent units, busses, and wireways except for openings for conductor entrance into units.

12. General purpose relays, time delay relays, timers and power control relays:  
Comply with Section 40 95 92.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install MCC in accordance with manufacturer's recommendations.
- B. Install on concrete pad as shown on the Drawings, and secure with steel bolts.

#### 3.2 ADJUSTMENT AND CLEANING

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

END OF SECTION



## SECTION 26 27 26

### WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide wiring devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Provide wiring devices in type and electrical rating for service indicated.
- B. See symbol schedule on Drawings for identification of device type.

C. Acceptable manufacturers:

1. Hubbell.
2. Leviton.
3. Or equal.

## 2.2 SWITCHES

A. General use lighting switches:

1. Comply with UL 20, NEMA WD-1, and Federal Specification W-S-896 standards.
2. Provide industrial grade, 20 ampere, toggle type switches.

## 2.3 RECEPTACLES

A. Comply with UL 498, NEMA WD-1 & WD-6, and Federal Specification W-C-596 standards.

B. General use single and duplex, 125 volt receptacles:

1. Provide industrial grade, NEMA 5-20R grounding type receptacles rated at 20 amperes.

C. Ground fault circuit interrupter receptacles:

1. Comply with UL 943 Class A standard.
2. Provide industrial grade, GFCI duplex receptacles rated at 20 amperes, 120 volts.
3. Provide construction as follows:
  - a. Shallow depth and NEMA 5-20R configuration.
  - b. Feed-through feature.

## 2.4 WIRING DEVICE PLATES AND COVER

A. Comply with UL 514D.

B. Provide wall plates for wiring devices with mounting screws colored to match plate finish.

C. Plates of interior flush mounted devices: Provide high impact thermoplastic polycarbonate, nylon or stainless steel.

D. Device plates for surface mounted Type FS or FD boxes: Provide type FSK galvanized steel covers.

E. Device plates for surface mounted, 4-inch square boxes: Provide 1/2-inch raised galvanized steel covers.

F. Weatherproof (WP) plates and covers: Provide with gasketed, lift cover.

1. Provide lift cover designed to be fully closed when plug for dedicated equipment is inserted in receptacle.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wiring devices in accordance with manufacturer's recommendations.
- B. Install devices at height as specified in Section 26 05 33 or as shown on the Drawings.
- C. Do not use combination type switch/switch or switch/receptacle devices.
  - 1. Provide separate box gang for each switch and receptacle.
- D. Thoroughly clean box interiors from construction dust, debris, etc. prior to installing wiring devices.

### 3.2 FIELD QUALITY CONTROL

- A. Provide operational testing for devices.
- B. Test receptacles for correct polarity, proper ground connection, and wiring faults.

END OF SECTION

## SECTION 26 28 00

## LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide overcurrent protective devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Electrical ratings, physical size, interrupt ratings, trip curves, I<sup>2</sup>t curves, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – Provide the following spare parts to the Owner that match items specified:
  - 1. In three phase circuits: Three (3) fuses of each type and rating.
  - 2. In single phase circuits: Two (2) fuses of each type and rating.

## 1.3 QUALITY ASSURANCE

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

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

## 1.5 SITE CONDITIONS – Reserved.

## 1.6 MAINTENANCE – Reserved.

## LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

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## PART 2 - PRODUCTS

### 2.1 FUSES

- A. General purpose fuses for protection of motors, transformers, feeders, and main service:
  - 1. Use UL Class RK-1 fuses:
    - a. Single end rejection or to fit mountings specified.
    - b. 0-600 ampere rating.
    - c. 200,000 ampere interrupting capacity.
    - d. Dual element, time delay.
    - e. Use Bussman Low Peak LPN-RK, or equal: 250 volt rating.
    - f. Use Bussman Low Peak LPS-RK, or equal: 600 volt rating.
  - 2. Use UL Class L fuses:
    - a. Bolt-in type.
    - b. 601-6,000 ampere rating.
    - c. 200,000 ampere interrupting capacity.
    - d. Time delay.
    - e. Use Bussman HI-CAP, KRP-C, or equal: 600 volt rating.
- B. General purpose fuses for protection of motor control circuits, lighting ballasts, control transformers, and street lighting fixtures:
  - 1. Use UL Class CC, fast acting, single element fuses.
  - 2. Rated for 0-30 amperes.
  - 3. Provide 200,000 ampere interrupting capacity.
  - 4. Use Bussman Limitron KTK-R, or equal: 600 volt rating.

### 2.2 MOLDED CASE CIRCUIT BREAKERS

- A. General:
  - 1. Comply with UL 489 requirements.
  - 2. Provide thermal and magnetic protection.
- B. Provide permanent trip lighting panel circuit breakers as follows:
  - 1. UL listed SWD (switching duty) on 120 volt circuits where switched circuits are indicated.
  - 2. Short circuit rating (integrated equipment rating):
    - a. Up to 240 volt: 10,000 RMS symmetrical amps minimum.
    - b. Up to 480 volt: 14,000 RMS symmetrical amps minimum.
- C. Provide permanent trip MCC and generator circuit breakers as follows:
  - 1. Single magnetic trip adjustment.
  - 2. Bolt-on type.
  - 3. Short circuit rating (integrated equipment rating):
    - a. Main: 42,000 RMS symmetrical amps minimum.
    - b. Branch: 14,000 RMS symmetrical amps minimum.
- D. Provide circuit breakers with ground fault protection of equipment for solidly grounded wye systems of more than 150 volts to ground and not exceeding 600

## LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

26 28 00-2 (120581.41)

volts from phase to phase when circuit breaker trip rating is 1,000 amps or more as follows:

1. Ground fault protection of equipment on utility main circuit breakers shall operate to cause those circuit breakers to open all ungrounded conductors of the faulted circuit.
2. Ground fault protection of equipment on generator main circuit breakers shall operate to indicate a ground fault only – not to open all ungrounded conductors of the faulted circuit.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install overcurrent protective devices in accordance with manufacturer's recommendations.

### 3.2 ADJUSTMENT

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

END OF SECTION

SECTION 26 28 16  
ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide enclosed switches as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Electrical ratings, physical dimensions, NEMA rating, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

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

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide disconnect with the following ratings:
  - 1. 240 volt or 600 volt AC as required by circuit voltage.

ENCLOSED SWITCHES  
26 28 16-1 (120581.41)

2. Ampere value as shown on Drawings.
3. UL listed short circuit rating of 200,000 RMS amps with Class R fuses where a fused disconnect is indicated.
  - a. Comply with Section 26 28 00.

## 2.2 SAFETY SWITCH

- A. Provide NEMA heavy-duty, quick-make and quick-break type:
  1. Cover interlock mechanism with handle attached to box.
    - a. Handle position indication of ON in up position and OFF in down position.
  2. Padlock provision in the ON and OFF positions.
  3. Provisions for insulated or bonded neutral.
  4. Provision for control circuit interlock.

## 2.3 ENCLOSURES

- A. Indoor: Provide NEMA 1 steel construction or as otherwise shown on the Drawings.
- B. Outdoor area: Provide NEMA 3R or NEMA 4 steel construction.
- C. Corrosive area: Provide NEMA 4X stainless steel construction.
- D. Hazardous area: Provide NEMA 7/9 cast iron or copper free cast aluminum alloy.

## 2.4 NAMEPLATES

- A. Provide engraved laminated plastic type.
- B. Use 3/16-inch high white or black letters on background of opposite color.
- C. Identify disconnect means as follows:
  1. Disconnect: For purpose of switch or equipment controlled.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Install motor and circuit disconnects in accordance with manufacturer's recommendations.

END OF SECTION

ENCLOSED SWITCHES  
26 28 16-2 (120581.41)



## SECTION 26 29 13.16

## REDUCED-VOLTAGE MOTOR CONTROLLERS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide Solid State Reduced Voltage Starters (SSRVS) as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- C. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
  - 1. Documentation showing final configuration of each SSRVS.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
  - 1. NFPA 70 (latest edition) - National Electrical Code (NEC).
  - 2. Local codes and ordinances.
  - 3. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

## 1.5 SITE CONDITIONS – Reserved.

## REDUCED-VOLTAGE MOTOR CONTROLLERS

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## 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Design programmable microprocessor controlled SSRVS utilizing a thyristor (SCR) bridge consisting of at least two SCRs per phase to control starting and stopping of industry standard motors.
- B. Protect driven motor from solid state component failure by means of isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted thyristor.
- C. All protective features and deceleration control options to be available even when a shorting contactor is employed.
- D. Provide complete with magnetic only circuit breaker for Type 1 short circuit protection. Short circuit withstand rating shall be based on the motor horsepower as defined in UL 508.
- E. Acceptable manufacturer:
  - 1. Rockwell/Allen-Bradley.
  - 2. No substitution permitted.

### 2.2 RATINGS

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

### 2.3 ADJUSTMENTS AND CONFIGURATIONS

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

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

## 2.4 INPUTS AND OUTPUTS

- A. Provide the following output relays:
  - 1. One Form A and one Form B minimum for indication of fault or control of an isolation contactor.
  - 2. One Form A for indication that torque ramp is complete and current is below 130% motor FLA (End of start).
  - 3. One Form A for indication of FAULT status to remote Pump Control Panel.
- B. Provide the following additional I/O:
  - 1. One logic input for force to freewheel, indication of external fault, force to local control, or external motor overload reset.
  - 2. One analog output for 4-20 or 0-20 milliamp indication of motor current, torque, thermal state or power factor.
- C. Provide relay and I/O functions listed above isolated with respect to common.

## 2.5 PROTECTION

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

## 2.6 CONTROLS

- A. Provide control transformer within the enclosure to operate soft start control circuitry 120 Vac, 60 Hz.
- B. Provide door-mounted operator devices as shown on the Drawings.
- C. Provide communication module to communicate with PLC as provided by Altronex Control Systems Division of L.W. Allen, Inc.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install SSRVS in motor control center as shown on the Drawings and in accordance with manufacturer's recommendations.

### 3.2 FIELD QUALITY CONTROL

- A. Conduct field tests prior to energization per manufacturers recommendations.
- B. Record and provide results of tests to Engineer.

### 3.3 START-UP AND TESTING

- A. Provide programming, calibration and operational testing.
- B. Set operating parameters as required.

END OF SECTION

## SECTION 26 32 13.33

## DIESEL FUELED ENGINE-GENERATORS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide diesel fueled engine-generators with sound enclosure as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work under this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- C. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Submit shop drawings in compliance with pertinent provisions of Section 01 33 01.
  - 2. Engine-generator set, exhaust system, cooling system, control panel, auxiliary equipment, controls, stairs, railings, landing platform, sound enclosure, concrete base and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Permits – Obtain Operating Air Quality Permit for Generator
- F. Spare Parts – None Required
- G. Test reports:
  - 1. Submit certified test reports of prototype and production tests.
  - 2. Submit field test reports on engine-generator start-up.

## 1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
  - 1. NFPA 70, National Electrical Code (NEC).
  - 2. NFPA 110, Emergency and Standby Power Systems.

3. Local codes and ordinances.
4. Conduct factory prototype tests.
5. Conduct factory production tests simulating the field load conditions and verify proper operation of all components prior to shipping equipment.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

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

#### 1.5 SITE CONDITIONS – Reserved.

#### 1.6 MAINTENANCE – Reserved.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Provide engine-generator set and factory authorized service and support from a manufacturer who shall warranty the complete engine-generator package with accessories as described herein.
  1. Third party and/or individual warranties for components and accessories of the engine-generator package do not meet this requirement of the specifications.
- B. Provide engine-generator set with direct 1:1 mechanical connection from engine output shaft to alternator shaft:
  1. Engine-generator sets that employ gear reduction between the engine and the alternator do not meet this requirement of the specifications.
- C. Acceptable manufacturers:
  1. Caterpillar: 100 North East Adams Street, Peoria, Illinois USA 61629.
  2. Cummins Power Generation: 1400 73<sup>rd</sup> Ave. NE, Minneapolis, MN USA 55432.
  3. Kohler: 444 Highland Drive, Kohler, WI 53044.
  4. MTU Onsite Energy: 100 Power Drive, Mankato, MN 56001.
  5. Or equal.

#### 2.2 ENGINE-GENERATOR RATINGS

- A. Provide standby engine-generator set for emergency duty having the following minimum ratings:
  1. Standby rating: 500 KW; 625 KVA.
  2. Power factor: 0.8.
  3. Frequency: 60 Hertz.
  4. Starting KVA at 25 percent transient voltage dip: 1,332 KVA.
  5. Output voltage: 480 VAC.
  6. Three phase, 4-wire, wye connected.

7. Rating based upon operating conditions at 1,000-foot elevation and 38 degree C ambient temperature.

- B. Provide regulator system suitably filtered and capable of regulating the generator output to permit the starting of and running of connected loads as shown on the Drawings, simultaneously with a maximum of 25 percent transient voltage dip with return to steady state in less than 2 seconds. Steady state is defined as operation with terminal voltage remaining constant within  $\pm 1/2$  of 1 percent of rated voltage.

## 2.3 ENGINE CONSTRUCTION

- A. Provide heavy duty industrial type, liquid-cooled, four-cycle compression ignition engine.
- B. Operates on No. 2 diesel fuel. Engines requiring premium fuels will not be accepted.

## 2.4 ENGINE ACCESSORY EQUIPMENT

- A. Provide the following engine accessories in addition to manufacturer's standard equipment for each system required:
  1. Isochronous electronic governor: Control engine speed to maintain a frequency regulation not exceeding  $\pm 0.25$  percent from no load to full rated load.
  2. Oil drain extension through side of skid base to outside of generator enclosure.
  3. Heavy duty air cleaner.
  4. Fuel priming pump or self-priming fuel pump per manufacturer's standard.
  5. Fuel/water separator.
  6. Lubricating oil cooler.
  7. Overcrank cut-out.
  8. Overspeed cut-out.
  9. Low oil pressure cut-out.
  10. High coolant temperature cut-out.
  11. Battery charging alternator.
  12. Flexible fuel connections.
  13. Engine coolant heater with shut-off valves, 4,000 watt, 480 volt, single phase with adjustable thermostat.
  14. Manufacturer's standard vibration isolators located between engine-generator and skid base.

## 2.5 STARTING BATTERIES AND CHARGER

- A. Provide starting batteries:
  1. Sufficient number of heavy duty 12 volt DC lead acid type batteries as recommended by the generator set manufacturer.
  2. Stranded copper battery cables and clamps.
  3. Acid resistant metal battery rack.
  4. Locate batteries and rack near engine starter.

- B. Provide automatic battery charger:
  1. Transistor controlled battery charger for continuous taper charging.
  2. Two charge ranges, float and equalize at manufacturer recommended voltage.
  3. Automatic surge suppressors.
  4. DC ammeter and voltmeter.
  5. Fused AC input and DC output.
  6. Housing: Manufacturer's standard enclosure for wall mounting.
  7. Operate on input voltage of 120 VAC.
  8. Charger malfunction and low battery voltage alarms.

## 2.6 COOLING EQUIPMENT

- A. Unit mounted radiator:
  1. Engine driven blower type fan sized to maintain safe operation at 105 degrees F maximum ambient temperature.
  2. Duct adapter flange with ductwork and flexible connection section between radiator and discharge louver frame.
  3. Total air flow restriction across the radiator not to exceed 0.5 inches W.C.
  4. Sized for 50 percent ethylene-glycol solution at 40 degrees C ambient and 1,000 feet elevation.
- B. Ethylene-glycol antifreeze with rust-inhibitor to -40 degrees C.

## 2.7 EXHAUST EQUIPMENT

- A. Silencer:
  1. Provide critical grade silencer (mounted inside the generator set enclosure).
  2. Provide inlet and outlet flanges conforming to American Standard 125-150 pound drilling, along with gaskets for sizes 4-inch diameter and larger.
  3. Mount so that weight is not supported by engine.
- B. Piping:
  1. Use ASTM A-53 and AP1-5L black seamless and welding pipe, ASA Schedule 40 weight and wall thickness, suitable for exhaust piping.
  2. Sized to insure that exhaust backpressure does not exceed the maximum limitations specified by the generator set manufacturer.
  3. Provide condensate drain tap, connecting nipple, and drain valve with operating handle.
  4. Provide stainless steel flexible connector.
  5. Provide suitable rain cap.
- C. Insulation:
  1. Provide insulation for piping, fittings, and silencer, except expansion pieces, such that surface temperatures do not exceed 150 degrees F.



## 2.8 GENERATOR CONSTRUCTION

- A. Provide three phase, 60 Hertz, single bearing, synchronous type generator of drip-proof construction with the following requirements:
  - 1. Extended stack as required to compensate for effects of non-linear loads (variable frequency motor controllers).
  - 2. Reconnectable broadrange wiring.
  - 3. Radio suppression meeting commercial standards.
  - 4. Constructed to NEMA, IEEE, and ANSI standards.
  - 5. Class H insulation for both stator and rotor.
    - a. Protect both stator and rotor windings with 100 percent epoxy impregnation to reduce possible fungus and/or abrasion deterioration.
  - 6. Voltage regulation: +/-0.5 percent steady state within 40 degree ambient temperature change from no load to full load.
  - 7. Provide readily accessible voltage droop, voltage level and voltage gain adjustments (minimum of ±5 percent).
  - 8. Provide short-circuit current sustaining device to enable the generator to sustain 300 percent of rated current for a period of up to 10 seconds.
  - 9. Provide molded-case, 3-pole circuit breaker as follows:
    - a. Rated 800 amperes.
    - b. Located on generator unit.
    - c. Includes lugs for line and load connections.
    - d. Includes an isolated neutral and a copper ground bus.
    - e. Complies with Section 26 28 00.

## 2.9 ENGINE/GENERATOR CONTROLLER

- A. General:
  - 1. Digital, open protocol, microprocessor based system.
  - 2. True RMS sensing, 0.5% metering.
  - 3. Programmable protective relaying with alarm set-points for under-voltage, over-voltage, under-frequency, over-frequency, over-current, and reverse power.
  - 4. Programmable load demand relay.
  - 5. User-friendly, quick access, keypad programming.
- B. Construction:
  - 1. IP22, dust proof cabinet designed to withstand 20 G shock (22 G @ 18-500 Hz.).
  - 2. Processor and associated alarm components sealed in die-cast aluminum housings.
  - 3. Control panel and components to meet E.M.I. Immunity IEC 801-2, IEC 801-3, IEC 801-4, and EN 5082-2.
  - 4. UL 508A listed.
- C. Generator mounted electronic modular control panel to include:
  - 1. Standard generator control and monitoring:
    - a. Digital ammeter, voltmeter, and frequency meter (0.5% accuracy).

- b. Ammeter/voltmeter phase selector switch.
  - c. Voltage adjust rheostat.
- 2. Standard engine controls and monitoring:
  - a. Automatic/manual start-stop control.
  - b. Engine control switch for off/reset, auto start, manual start.
  - c. Cycle cranking.
  - d. Cool-down timer.
  - e. Emergency stop pushbutton.
- 3. Safety shutdown protection and LED indicators for:
  - a. Low oil pressure.
  - b. High coolant temperature.
  - c. Over-crank.
  - d. Over-speed.
  - e. Emergency stop pushbutton.
  - f. Spare.
- 4. Digital display for:
  - a. Coolant temperature.
  - b. Oil pressure.
  - c. Service hours.
  - d. Engine RPM.
  - e. System DC volts.
  - f. System diagnostic codes.
- 5. Three (3) dry contact sets wired to terminal strip as follows:
  - a. One normally open set to indicate engine failure (closes when engine-generator fails to run).
  - b. One normally closed set for motorized damper (opens when engine-generator is running).
  - c. One normally open set for running status (closes when engine-generator is running).

## 2.10 FUEL SUPPLY EQUIPMENT

- A. Provide a UL listed dual wall subbase fuel tank assembly with closed top rupture basin located below engine-generator walk-in enclosure as follows:
  - 1. Fuel tank:
    - a. Fabricate to fit specified engine-generator enclosure.
    - b. Minimum fuel capacity: 24 hours engine running time when generator is running at maximum electrical KW rating.
    - c. Minimum of 12 gauge steel top, bottom, ends and baffles.
    - d. Minimum of 7 gauge steel support channels.
    - e. Design load capacity to support engine-generator and walk-in enclosure specified.
    - f. Structural angle supports at mounting holes for walk-in enclosure .
    - g. Engine fuel supply and return openings with tubes: ½-inch NPT minimum.
    - h. Manual fill tube with lockable cap: 2-inch.
    - i. Vent opening: sized per NFPA requirements.
    - j. Fuel level gauge.

- k. Low fuel detection system with red warning light on engine-generator control panel and dry contacts for remote indication, powered from engine starting batteries, and activated when fuel level is at 25 percent of tank capacity.
    - l. Comply with ANSI/NFPA 30.
  - 2. Rupture basin:
    - a. Adequate capacity to contain fuel tank leakage.
    - b. Minimum of 12 gauge steel bottom and ends.
    - c. Structural steel floor channels with mounting holes for anchoring to concrete base.
    - d. Fuel in rupture basin leak detection system with red warning light on engine-generator control panel, powered from engine starting batteries.
  - 3. Symmetrical to engine-generator walk-in enclosure footprint.
  - 4. Includes conduit stub-up area with removable cover.

## 2.11 WEATHERPROOF, SOUND ATTENUATING, WALK-IN ENCLOSURE/BASE ASSEMBLY

- A. General:
  - 1. The intent of this specification is to provide the owner with a "walk-in" type generator set enclosure complete in every detail and requiring no additional field modifications or assembly, except where specifically allowed by these specifications. The enclosure is to be accurately dimensioned so as to be in compliance with the National Electric Code (NEC), and the National Fire Protection Association (NFPA) for clearance of all specified items included therein, and all applicable fire codes for a structure and application of this type.
- B. Provide enclosure with the following requirements:
  - 1. Formed steel (minimum thickness of 14 gauge) or sheet aluminum (minimum thickness of 0.10") construction.
  - 2. Modular design and construction such that the side panels, doors, and louvers do not exceed 36" in width.
  - 3. Roof strengthened in such a manner as to support the largest commercially available exhaust silencer, recommended by the engine manufacturer, from the inside on the enclosure.
  - 4. 26-inch minimum walk way on either side of the generator and 36-inch minimum behind the generator.
  - 5. Minimum 96-inch walk way clear height.
- C. Provide doors with the following requirements:
  - 1. Strategically located in areas as to allow ease of maintenance on the generator set and allow good access to and visibility of instruments, controls, engine gauges, etc.
  - 2. Fitted with hinges rated at 1.5 times the actual door weight.
  - 3. Fitted with adjustable, keyed alike latches and inside emergency egress hardware.
  - 4. Frames equipped with drip rails for water run off and fully gasketed to form a weather-tight seal.

5. 24-inch maximum width.
- D. Provide finish as follows:
1. Prime finished assembly with a minimum of two (2) coats of rust-inhibiting primer.
  2. Paint a minimum of two (2) final coats of industrial enamel in color selected by the Owner.
- E. Provide engine exhaust silencer as follows:
1. Provide a complete engine exhaust system installed inside the envelope of the module with all interior exposed surfaces insulated (except expansion pieces) such that surface temperatures do not exceed 150 degrees F.
  2. Provide complete exhaust system consisting of, but not limited to, the following:
    - a. Critical grade silencer.
    - b. Seamless steel flexible connection with a flanged fitting at each end of the flexible section.
    - c. Rain skirt and rain flapper as recommended by manufacturer.
- F. Provide sound attenuation to meet the following requirements:
1. Maximum 70 dBA at a distance of 23 feet in any quadrant from the package.
  2. Sound attenuation material mechanically attached to the interior surfaces of the unit walls and ceiling, except for the louvered openings.
  3. Sound attenuation material is capable of thermo-insulating the enclosure to meet the heating requirement specified elsewhere.
  4. Discharge and intake plenums as follows:
    - a. Integral 90 degree insulated radiator air discharge plenum to direct the radiator air upward.
    - b. Integral 90 degree insulated air intake plenum to draw air from the grade level.
    - c. Include a service access panel for general maintenance of the plenum area.
    - d. Openings include a galvanized wire mesh screen.
- G. Provide a Packaged Power Center as follows:
1. Mounted inside the generator enclosure where shown on the Drawings.
  2. Rated at 7.5 kVA.
  3. Includes 20 amp/2-pole primary main circuit breaker and 40 amp/2-pole secondary main breaker.
  4. Includes five (5) 1-pole branch circuit breakers rated as shown on the Drawings and empty spaces with covers for five (5) additional 1-pole branch circuit breakers.
  5. Transformer wound for 480 volt, 1-phase primary and 120/240 volt, 1-phase, 3-wire secondary.
  6. Enclosure rated NEMA-3R.
  7. Acceptable manufacturers:
    - a. Eaton/Cutler-Hammer "Mini-Power Center".
    - b. Schneider Electric/Square D "Mini Power Zone".
    - c. Or equal.

- H. Provide housing features as follows:
1. Provide louvers with the following requirements
    - a. All aluminum construction and designed to help prevent snow and rain infiltration.
    - b. Have sufficient free area to allow for 120% of the total engine-generator set air flow requirements.
    - c. Motorized 120 VAC intake louver, closes when energized, spring returns (fail-safe) open.
    - d. Gravity type discharge louvers sized for proper air discharge velocity from the enclosure.
  2. Provide duct assembly as follows:
    - a. Directs engine cooling air to the exterior of the module through the louver provided.
    - b. Required to carry engine cooling air only and provides unrestricted removal of module cover(s).
  3. Provide heater as follows:
    - a. Electric forced air heat, thermostatically controlled, with a minimum capability of maintaining 50 degrees F temperature within the module in an outside ambient of -20 degrees F.
    - b. Operates on 480 volts, 3-phase AC.
- I. Provide interior and exterior lighting fixtures as shown on the Drawings.
1. Controlled by 3-way switches located adjacent to the entrance doors.
- J. Provide convenience receptacles as follows:
1. Two (2) weather-proof, 120 VAC duplex GFCI with "in-use" type cover installed on the exterior of the enclosure.
  2. Four (4) 120 VAC duplex installed within the enclosure.
  3. Powered from the packaged power center specified elsewhere in this Section.
- K. Provide conduits, fittings, boxes, hangers and wires as shown on the Drawings:
1. Comply with Sections 26 05 33, 26 05 29 and 26 05 19.
- L. Oil and Water Drains:
1. All necessary fittings, hoses, shut-off valves, etc. shall be provided by the manufacturer of the weatherproof enclosure to facilitate lube oil and water drain at the exterior of the enclosure. In addition, engines equipped with crankcase breather tubes shall have this tube terminate at the exterior of the enclosure directly under the radiator air discharge louver. Additionally, isolation ball valves must be installed in each jacket water heater line to facilitate replacement of the jacket water heater without draining the engine coolant.
- M. Provide fuel supply as follows:
1. No. 2 diesel fuel supplied from the integral sub-base fuel tank assembly specified elsewhere.

## 2.12 ALUMINUM STAIRS, RAILING AND LANDING PLATFORM

- A. General:
  - 1. Provide the owner with an aluminum stairway and platform landing to access the sound enclosure main access door.
  - 2. Provide adequately dimensioned stairs, railing and platform so as to be in compliance with OSHA and capable of supporting minimum concentrated loading of 1,000 pounds.
- B. Provide two sets of stairs, railing and platform with the following requirements:
  - 1. Heavy duty aluminum construction meeting OSHA Standard for Industrial Stairs.
  - 2. 4-foot wide serrated and abrasive nosed stairs with adequate number of risers to access the enclosure, with angle of stairway rise as denoted in OSHA 1910.24(e).
  - 3. 4-foot wide by 8-foot long serrated platform landing.
  - 4. 24-inch diameter, four foot deep concrete pier anchors at each stair and platform corner post and contact with the ground.

## 2.13 REINFORCED CONCRETE GENERATOR PAD

- A. Provide reinforced concrete generator pad and granular backfill as shown on drawings and specified in related sections to allow for proper routing of conduits and other penetrations.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install engine-generator package on concrete pad in accordance with manufacturer's recommendations.
  - 1. Anchor unit to concrete pad with masonry anchors.
  - 2. Provide diesel fuel required for start-up.
  - 3. Provide full tank of diesel fuel upon satisfactory completion of start-up and testing.
  - 4. Anchor stairs and platform to concrete pier at each corner contact point with ground.
- B. Fill batteries and connect cables with suitable lugs.
- C. Mount battery charger where shown on the Drawings and connect to batteries per manufacturer's recommendations.
- D. Install exhaust system piping for neat appearance and to avoid clearance issues.
  - 1. Provide with drip pocket and drain valve.
  - 2. Size pipe as recommended by the engine manufacturer.
  - 3. Equip outlet with rainguard and stainless steel bird screen.
  - 4. Install silencer in accordance with manufacturer's recommendations.

5. Insulate silencer and piping in compliance with Section 22 19 33.
- E. Install fuel supply piping with designated features and safety measures to meet installation requirements and local fire/safety codes.

### 3.2 ENGINE-GENERATOR START-UP

- A. After all engine-generator equipment has been installed, provide a portable load bank test using the services of a manufacturer's representative to perform the following:
  1. Connect the engine-generator set to the load bank and conduct a continuous 4-hour load test which varies the load on the generator from 10 percent to 100 percent to determine that the voltage, frequency, capacity, fuel, combustion air, cooling, and ventilation systems are adequate.
    - a. Apply 10 percent load for 15 minutes, 25 percent load for 15 minutes, 50 percent load for 15 minutes, 75 percent load for 15 minutes, and 100 percent load for 3 hours.
    - b. Apply each load increment in single steps.
    - c. Observe and record the following parameters at 15 minute intervals throughout the test: voltage, frequency, amperes, oil pressure, coolant temperature, and battery charge rate (record battery charge rate at 5 minute intervals for the first 15 minutes, then at 15 minute intervals thereafter).
  2. Perform an automatic transfer switch test in accordance with NFPA 110.
    - a. Provide a comprehensive demonstration to Owner of the system maintenance and operation after the load bank test.
  3. Perform sound level readings during the three-hour period when the engine-generator is undergoing load bank testing at 100 percent load.
    - a. Use properly calibrated test instrument.
    - b. Measure sound levels at 23 feet (7 meters) from front, sides and rear surfaces of generator set enclosure.

END OF SECTION

SECTION 26 36 00  
TRANSFER SWITCH

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide transfer switch as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Electrical ratings, wiring schematics, single-line diagrams, NEMA rating, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
  - 1. NFPA 70 National Electric Code (NEC).
  - 2. NFPA 110 Emergency and Standby Power Systems.
  - 3. UL 1008.
  - 4. NEMA ICS10-1993 Automatic Transfer Switches.
  - 5. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.



## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Rating:
  1. 480Y/277 volts, 3 phase, 4 wire, 60 Hertz.
  2. Continuous current rating as shown on the Drawings.
  3. Minimum 65,000 RMS symmetrical amperes short circuit current.
- B. Provide automatic transfer switch with the following requirements:
  1. Double throw contact configuration with mechanical and electrical interlocks to prevent load circuits from being connected to normal and emergency power sources simultaneously.
  2. Industrial type pilot devices, relays, and time delays.
  3. Front accessibility for ease of maintenance.
  4. Programmable mid-point switch position for motor load decay with the following requirements:
    - a. Transfer time adjustable from 0-30 seconds.
    - b. Time delay occurs for both transfer directions.
    - c. Mechanical interlock to prevent both sets of contacts from being closed at the same time.
  5. Undervoltage sensing (phase to ground) for each phase of normal source as follows:
    - a. Pick-up voltage adjustable from 85 to 100 percent of nominal (set at 95 percent).
    - b. Drop-out voltage adjustable from 75 to 98 percent of nominal (set at 85 percent).
  6. Frequency and voltage sensing devices to prevent transfer to the emergency source until the engine-generator has reached its rated frequency and voltage as follows:
    - a. Voltage adjustable from 85 to 100 percent of nominal (set at 90 percent).
    - b. Frequency adjustable from 90 to 100 percent of nominal (set at 95 percent).
  7. Time delay for override of normal source voltage sensing adjustable from 1 to 6 seconds (set at 1 second) to delay transfer and engine start signals.
  8. Time delay for retransfer to normal source adjustable from 0 to 30 minutes (set at 10 minutes) beginning when normal source voltage has been restored to 95 percent of rated voltage on all three phases.
  9. Test switch to simulate a normal source failure.
  10. Position indicator lights to indicate which source is connected to the load.
  11. Source available indicating lights controlled by normal and emergency source sensing circuits.
    - a. Normal Source Available: green light with engraved nameplate.
    - b. Emergency Source Available: red light with engraved nameplate.
  12. Unassigned auxiliary switch position contacts: normally open, single pole, double throw, rated 10A at 240Vac/32Vdc.
  13. Engine start contacts: one normally closed, one normally open rated 10A at 32 Vdc.

14. Engine shutdown contacts time delay adjustable from 0 to 10 minutes (set at 5 minutes) after retransfer to normal source.
  15. Engine generator exerciser: solid state, programmable time switch as follows:
    - a. Exercise cycle selectable for weekly, bi-weekly, or calendar schedule and time of day.
    - b. Exercise period adjustable with automatic retransfer to normal source at end of period.
    - c. Integral battery operation of exerciser when normal control power is not available.
- C. Provide enclosure as follows:
1. Indoor: NEMA 1 rating.
- D. Acceptable manufacturer:
1. ASCO Power Technologies, 7000 Series.
  2. No substitution permitted.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install transfer switch in accordance with manufacturer's recommendations.

#### 3.2 FIELD QUALITY CONTROL

- A. Provide the services of a factory authorized service representative to inspect, test, and adjust the automatic transfer switch to verify proper operation.

#### 3.3 DEMONSTRATION

- A. Provide training on adjustment, operation and maintenance of the automatic transfer switch.
- B. Coordinate training with that for the engine generator equipment.

END OF SECTION

## SECTION 26 43 00

### SURGE-PROTECTIVE DEVICES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide surge protection as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

##### 1.3 QUALITY ASSURANCE

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

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 SURGE PROTECTION

- A. Design surge-protective device to protect AC secondary power line from line transients and other damaging voltage spikes.

### SURGE-PROTECTIVE DEVICES

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- B. Provide surge-protective device with the following requirements:
  - 1. Meets or exceeds the following standards:
    - a. ANSI/IEEE C62.41, C62.45 and C62.11.
    - b. UL 1449.
  - 2. Suitable for service entrance, Category C.
  - 3. Suitable for operation on 480Y/277 volt, 3 phase, 4 wire system, at 60 Hertz.
  - 4. Capable of repeated operations.
  - 5. Replaceable modular protection.
  - 6. Backup redundant protection.
  - 7. 200,000 amperes per phase surge current capacity.
  - 8. Monitoring of normal operation, protection event and protection reduced through indication lamps.
  - 9. Integral disconnecting means to facilitate maintenance.
  - 10. Lifetime warranty on protection modules and 20-year warranty on unit.
- C. Acceptable manufacturer:
  - 1. MCG Electronics, Inc.
  - 2. No substitution permitted.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install surge-protective device in accordance with manufacturer's recommendations.
- B. Install surge protective device on side of ATS enclosure as shown on the Drawings.
- C. Connect surge protective device with "Micro-Z" cabling (furnished by manufacturer) to MCC phase and ground buses as shown on the Drawings.

END OF SECTION

## SECTION 26 51 13

## LIGHTING FIXTURES, LAMPS, AND BALLASTS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide lighting fixtures, lamps, and ballasts as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Photometric data, and manufacturer's detailed specifications.
    - a. Provide fixture shop drawings in booklet form with index and a separate sheet for each fixture, assembled in luminaire "type" alphabetical order, with specified fixture and accessories clearly indicated on each sheet.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
  - 1. NFPA 70 National Electrical Code (NEC).
  - 2. Local codes and ordinances.
- B. Fixtures as specified in lighting fixture schedule establish standard of quality for project as determined by Engineer.
- C. Equivalency of fixtures will be determined by Engineer based upon the following criteria:
  - 1. Efficiency.
  - 2. Photometric data (Efficacy, Distribution).
  - 3. Appearance.
  - 4. Construction.
  - 5. Design compatibility.

- D. Provide fixtures that bear UL label and manufacturer's name.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

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

#### 1.5 SITE CONDITIONS – Reserved.

#### 1.6 MAINTENANCE – Reserved.

### PART 2 - PRODUCTS

#### 2.1 GENERAL

- A. Provide lighting fixtures of type, size, and rating shown in lighting fixture schedule, complete with, but not necessarily limited to, lamps, lamp holders, ballast, reflectors, starters, wiring, and any other details required for a complete working installation.
- B. Verify ceiling system compatibility with recessed fixture mounting before placing order.
- C. Provide proper trim for each fixture as required for various types of ceiling; plaster rings, fixture ends or caps, suspension units, mounting brackets, and/or other auxiliary parts necessary to make complete fixture.

#### 2.2 FLUORESCENT FIXTURES

- A. Provide ballast so that case temperature does not exceed 90 degrees C. (194 degrees F).

#### 2.3 BALLASTS

- A. Fluorescent ballast:
  1. Electronic, high power factor (HPF) type.
  2. Certified ballast manufacturers (CBM) approved, "A" sound rated.
  3. Produces less than 20 percent total harmonic distortion (THD).
  4. Meets FCC regulations for EMI and RFI.
  5. Non-resetting thermal protectors.
  6. Use 1-lamp or 2-lamp ballasts only.
  7. Ballast factor: 0.88.
  8. Minimum starting temperature: 50 degrees F.

#### 2.4 LAMPS

- A. Fluorescent lamps: Standard cool white color, instant start, sized per lighting fixture schedule.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install lighting fixtures in accordance with manufacturer's recommendations.
- B. Verify pendant lengths and placement of outlets and surface-mounted fixtures to maintain alignment, spacings, layout, and general arrangement as shown on the Drawings.
  - 1. Contractor may vary dimensions slightly to clear obstructions.
  - 2. Any major changes in arrangement must be approved by Engineer.
- C. Coordinate with other trades so lighting fixtures are properly aligned with items such as diffusers, grilles, and piping.
  - 1. If necessary, relocate fixtures as directed by Engineer to avoid conflict with other equipment.
- D. Install wires in pendants and seal all fixture pendants to prevent moisture from entering fixture.

### 3.2 FIXTURE SUPPORTS

- A. Fixture support items and retaining clips: Comply with Section 26 05 29.

### 3.3 ADJUSTMENT

- A. Adjust and plumb fixtures for proper installation.
- B. Align adjustable fixtures to satisfaction of Engineer.

### 3.4 FIELD QUALITY CONTROL

- A. At time of Substantial Completion, replace lamps in lighting fixtures observed to be noticeably dimmed after Contractor's use and testing, as judged by Engineer.

END OF SECTION

## SECTION 31 16 00

### SITE PREPARATION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section describes clearing and grubbing the site as shown on the Drawings and specified in this Section.

##### 1.2 QUALITY ASSURANCE

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

##### 1.3 DELIVERY, STORAGE, AND HANDLING

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

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

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

#### PART 3 - EXECUTION

##### 3.1 SURFACE CONDITIONS

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

##### 3.2 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by plank wrappers securely wired in place or by providing a fence around the tree or shrub of sufficient



distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.

1. Do not permit any equipment to operate within 5 feet of any trees or shrubs that are to remain or in a manner as to harm overhanging branches.

C. Protection of persons and property:

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

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

E. Maintain access to the site at all times.

### 3.3 CLEARING

A. Tree removal:

1. No tree removal is needed.

### 3.4 CONSERVATION OF TOPSOIL

A. After the area has been cleared of vegetation, strip the existing topsoil in areas shown on the Drawings to be seeded or planted, and to fill planters, without contamination with subsoils.

B. Stockpile in an area clear of new construction.

C. Maintain the stockpile in a manner which will not obstruct the natural flow of drainage.

1. Maintain stockpile free from debris and trash.
2. Keep the topsoil damp to prevent dust and drying out.
3. Provide silt fences around perimeters of all stockpiles.
4. Provide temporary seeding of stockpiles.
5. Comply with erosion and sediment control requirements of these specifications and all permitting agencies.

### 3.5 DISPOSAL

A. General:

1. Remove and dispose of all debris from clearing and demolition work.
2. Dispose away from the site in a legal manner.
3. Do not store or accumulate debris at the job site.

- B. Do not burn debris at the site.
- C. Do not conduct any generation, transportation, or recycling of construction or demolition debris, clean or general or uncontaminated soil generated during construction, remodeling, repair, and demolition of utilities, structures, and roads that is not commingled with any waste, without the maintenance of documentation identifying the hauler, generator, place of origin of the debris or soil, the weight or volume of the debris or soil, and the location, owner, and operator of the facility where the debris or soil was transferred, disposed, recycled or treated. Maintain documentation for three years.

### 3.6 UTILITIES

- A. Coordinate with utility companies and agencies as required.
- B. Where utility cutting, capping, or plugging is required, pay Utility Company to do the work or perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

END OF SECTION

## SECTION 31 22 22

### EARTHWORK FOR ROADS, DRIVEWAYS, AND WALKS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section describes earthwork, including clearing, tree removal, hedge removal, excavation, embankment, compaction, and subgrade preparation for constructing roads, driveways, and sidewalks as shown on the Drawings, as specified herein, and as needed for a complete installation.
- B. Construct the work of this section in accordance with the WDOT "Standard Specifications" except as herein modified.
- C. Related works:
  - 1. Section 32 10 00.13 "Roads, Driveways, and Walks".

##### 1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- C. Comply with requirements of governmental agencies having jurisdiction.

#### PART 2 - PRODUCTS

##### 2.1 (As specified in Part 3)

#### PART 3 - EXECUTION

##### 3.1 GENERAL CONSTRUCTION REQUIREMENTS

- A. Strip topsoil and stockpile for use with final grading.
- B. Construct to the lines and grades as shown on the Drawings.

- C. Use excess excavated materials for embankment in areas as shown on the Drawings and as directed by the Engineer.

### 3.2 CLEARING, TREE REMOVAL, AND HEDGE REMOVAL

- A. Description:
  - 1. These items consist of the removal and disposal of all obstructions, such as fences, walls, foundations, buildings, accumulations of rubbish of whatever nature and existing structures, logs, shrubs, brush, and other vegetation; the cutting, grubbing, removal and disposal of all trees and stumps.
- B. Perform these items of work within the right of way, of excavation, and as directed by the Engineer in accordance with Section 201 of the WDOT "Standard Specifications".

### 3.3 ROADWAY EXCAVATION

- A. Description:
  - 1. Roadway excavation consists of excavation, removal and satisfactory disposal of all materials including pavement, taken from within the right of way for the construction of embankments, subgrade, sub-base, shoulders, intersections, ditches, waterways, and incidental work.
  - 2. Roadway excavation does not include excavation for structures, subgrade, or rock excavation.
- B. Perform roadway excavation in accordance with Section 205 of the WDOT "Standard Specifications".
  - 1. Terminate excavation with a full depth sawcut and provide a smooth vertical surface between the existing to be removed and the existing to remain as directed by the Engineer.

### 3.4 SPECIAL EXCAVATION

- A. Description:
  - 1. Special excavation consists of the removal and disposal of all existing structures, including all types of pavement surfaces, curbs, gutters, sidewalks, driveways, walls, foundations, and drainage structures, and the placement of all suitable excavated materials in the subgrade, or embankment, or as replacement.
  - 2. Special excavation does not include rock excavation.
- B. Comply with applicable articles of Section 204 of the WDOT "Standard Specifications".
  - 1. Terminate the existing structure with a full depth saw cut and provide a smooth vertical surface between the existing to be removed and the existing to remain as directed by the Engineer.

### 3.5 EMBANKMENT

- A. Description:
  - 1. This work consists of the construction of embankments by depositing, placing and compacting earth, stone, gravel, or other materials of acceptable quality above the existing grade.
- B. Comply with applicable articles of Section 207 of the WDOT "Standard Specifications".

### 3.6 SUBGRADE

- A. Description:
  - 1. This work consists of preparing the subgrade including shaping and final compaction of the earth for the construction of sub-base, base, and surface course.
- B. Comply with applicable articles of Section 211 of the WDOT "Standard Specifications".
- C. Proof-roll the prepared subgrade for structural acceptance before pavement construction:
  - 1. Provide 55,000-pound load on a rubber-tired, single-unit truck.
  - 2. Drive slowly over area to be inspected.
  - 3. Repair areas which show depressions or deflections greater than 1-inch deep.
    - a. Remove and dispose unsuitable material from failed area no more than 2 feet below proposed subgrade unless otherwise directed by Engineer.
    - b. Backfill excavation with material meeting the approval of Engineer or breaker run materials as specified in Section 311 of the WDOT "Standard Specifications".
    - c. Provide and install geotextile fabrics where directed by the Engineer.
      - (1) Comply with Section 645.2.5, Geotextile Fabric, Type SR (Subgrade Reinforcement) of the WDOT "Standard Specifications".
  - 4. Repeat proof-roll and/or repair until approved by the Engineer.

END OF SECTION

## SECTION 31 23 39

### EXCAVATING, BACKFILLING, AND COMPACTING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Excavate, backfill, compact, and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

##### 1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirements of governmental agencies having jurisdiction.

##### 1.3 DELIVERY, STORAGE, AND HANDLING

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

#### PART 2 - PRODUCTS

##### 2.1 FILL AND EXCAVATED BACKFILL MATERIALS

- A. Provide excavated backfill materials free from organic matter, rubble, or frozen material, containing no rocks or lumps over 6 inches, and with not more than 15 percent of the rocks or lumps larger than 2 inches.
- B. Fill material is subject to the approval of the Engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from organic matter and other foreign matter.
- C. Do not permit rocks having a dimension greater than 1-inch in the upper 12 inches of fill or embankment.

### EXCAVATING, BACKFILLING, AND COMPACTING

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## 2.2 TOPSOIL

- A. Topsoil is specified under Section 32 92 00.13 of these Specifications.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

## 2.3 STRUCTURAL BACKFILL MATERIAL

- A. Provide well graded, 100 percent crushed gravel or crushed stone aggregate free of clay, loam, dirt, calcareous or other foreign matter, conforming to the Section 210 of the WDOT—"Standard Specifications" with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
3.0-inch	100%
No. 4	Not less than 25%
No. 200	Not more than 15%

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 GENERAL CONSTRUCTION REQUIREMENTS

- A. Protection of existing facilities, persons, and property:
  1. Unless shown to be removed, protect existing structures, conduits, active utility lines and all other facilities shown on the Drawings or otherwise made known to the Contractor. If damaged, repair or replace to a condition equal to or better than the original condition at no additional cost to the Owner.
  2. Notify all persons, firms, corporations, or agencies owning or using any existing structures, conduits, or utilities which may be affected by the Work prior to the start of construction.
  3. Make arrangements to locate, maintain, protect, and/or relocate facilities in order to complete the Work.
  4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
  5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.
  6. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.

7. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
  8. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
- B. Dewatering:
1. Remove all water, including rain water, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
  2. Keep excavations and site construction area free from water.
    - a. Whenever during construction operations any loose material is deposited in the flow line of gutters, drainage structures, or ditches such that the natural flow line of water is obstructed, remove this loose material at the close of each working day. At the conclusion of construction operations, keep all drainage structures and flow lines free from dirt and debris.
- C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- D. Maintain access to adjacent areas at all times.

### 3.3 EXCAVATING

- A. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades, and elevations indicated and specified herein.
- B. Satisfactory excavated materials:
1. Transport to, and place in, fill or embankment areas within the limits of the Work.
- C. Unsatisfactory excavated materials:
1. Excavate to a distance below grade as directed by the Engineer, and replace with satisfactory materials.
  2. Include excavation of unsatisfactory materials, and replacement by satisfactory materials, as parts of the work of this Section.
- D. Surplus materials:
1. Dispose of unsatisfactory excavated material, and surplus satisfactory excavated material, away from the site at disposal areas arranged and paid for by the Contractor.
- E. Topsoil materials:
1. Strip and stockpile topsoil materials from areas to be excavated and regraded for use in final grading.



- F. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.
- G. Ditches and gutters:
  - 1. Cut accurately to the cross sections, grades, and elevations shown.
  - 2. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the Work.
  - 3. Dispose of excavated materials as shown on the Drawings or directed by the Engineer; except do not, in any case, deposit materials less than 3'-0" from the edge of a ditch.
- H. Unauthorized excavation:
  - 1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Engineer.
  - 2. Under footings, foundations, or retaining walls:
    - a. Fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
    - b. When acceptable to the Engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
  - 3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Engineer.
- I. Stability of excavations:
  - 1. Slope sides of excavations to 1:1 or flatter, unless otherwise directed by the Engineer.
  - 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
  - 3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- J. Sheet piling and bracing:
  - 1. Design, provide, and install sheet piling and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
  - 2. Maintain sheet piling and bracing in excavations regardless of the time period excavations will be open.
  - 3. Remove sheet piling and bracing after the excavation has been backfilled to an elevation which will prevent caving of exposed sidebanks.
  - 4. Fill voids left by the withdrawal of sheet piling with compacted sand.
  - 5. Leave sheet piling and bracing in place whenever necessary to protect adjacent facilities or property.
- K. Excavating for structures:
  - 1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft, and extending a sufficient distance from footings and foundations to permit

placing and removing concrete formwork, installation of services, other construction required, and for inspection.

2. In excavating for footings and foundations, take care not to disturb bottom of excavation:
  - a. Excavate by hand tools to final grade just before concrete is placed.
  - b. Trim bottoms to required lines and grades to leave solid base to receive concrete.
3. Excavate for footings and foundations only after general site excavating, filling, and grading are complete.
4. Minimum soil bearing capacity: 2500 psf or as otherwise required on the Drawings.

L. Excavating for pavements:

1. Cut surface under pavements to comply with cross sections, elevations, and grades.

M. Cold weather protection:

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

### 3.4 FILLING AND BACKFILLING

A. General:

1. For each classification listed below, place acceptable soil material in layers to required subgrade elevations.
2. In excavations:
  - a. Use satisfactory excavated backfill or borrow fill materials.
3. Under concrete or bituminous pavements:
  - a. Use subbase materials as specified under Section 32 10 00.13 of these Specifications.
4. Under slabs, footings, conduits and other structures and facilities:
  - a. Use structural backfill material.

B. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing and water-proofing.
2. Inspecting, testing, approving, and recording locations of underground utilities.
3. Removing concrete formwork.
4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removing trash and debris.
6. Placement of horizontal bracing on horizontally supported walls.

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- C. Ground surface preparation:
  - 1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious matter from ground surface prior to placement of fills.
  - 2. Plow, strip, or break up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.
  - 3. When existing ground surface has a density less than that specified under "compacting" for the particular area, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placing and compacting:
  - 1. Place excavated backfill and fill materials in layers not more than 12 inches in loose depth.
  - 2. Place structural granular material in layers not more than 6 inches in loose depth.
  - 3. Compact each layer to the required density for the area.
  - 4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
  - 5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
  - 6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
  - 7. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.
  - 8. Compact each layer of structural backfill material with vibratory rollers, pneumatic tampers, or other compacting equipment approved by the Engineer.

### 3.5 GRADING

- A. General:
  - 1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
  - 2. Smooth the finished surfaces within specified tolerance.
  - 3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
- B. Grading around structures:
  - 1. Grade areas adjacent to structures to achieve drainage away from the structures, and to prevent ponding.
  - 2. Finish the surfaces to be free from irregular surface changes, and:
    - a. Shape the surface of areas scheduled to be under walks to line, grade, and cross-section, with finished surface not more than 0.10 ft above or below the required subgrade elevation.

### EXCAVATING, BACKFILLING, AND COMPACTING

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- b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross-section, with finished surface not more than 0.05 ft above or below the required subgrade elevation.

### 3.6 COMPACTING REQUIREMENTS

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557 or AASHTO T-180.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the Engineer.
  - 1. Structures:
    - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 95 percent of maximum density.
  - 2. Lawn and unpaved areas:
    - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 85 percent of maximum density.
    - b. Compact the upper 12 inches of filled areas, or natural soils exposed by excavating, at 85 percent of maximum density.
  - 3. Walks:
    - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 90 percent of maximum density.
  - 4. Pavements:
    - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 90 percent of maximum density.
- C. Moisture control:
  - 1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
  - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
  - 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing.

### 3.7 MAINTENANCE

- A. Protection of newly graded areas:
  - 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
  - 2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

END OF SECTION

## SECTION 31 23 79

## TRENCHING, BACKFILLING, AND COMPACTING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Trench, backfill, and compact as specified herein and as needed for installation of underground pipelines and utilities associated with the Work.
- B. References:
  - 1. The following detailed SPECIFICATIONS FOR TRENCHING, BACKFILLING, AND COMPACTING shall govern where they alter/or add to the requirements and specifications set forth in the STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN, latest edition and the WISCONSIN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, latest edition.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- C. Comply with requirements of governmental agencies having jurisdiction.

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 GRANULAR PIPE BEDDING AND COVER MATERIALS

A. Provide well graded, washed, mixture of 100 percent crushed gravel or crushed stone aggregate free of clay, loam, dirt, calcareous or other foreign matter conforming to the "Standard Specifications for Sewer and Water Construction in Wisconsin".

1. For pipe 18 inches in diameter and smaller, use material of 3/8-inch crushed stone chips with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1/2-inch	100%
3/8-inch	90-100%
No. 8	0-15%
No. 30	0-3%

2. For water mains with polyethylene wrap, use sand consisting of durable particles ranging in size from fine to coarse in a substantially uniform combination.

- a. Acceptable alternatives: Unwashed bank-run sand, rejected concrete sand, and crushed bank-run gravel.
- b. Include approximately 6 percent of fine clay or loam particles; do not allow clay or loam lumps.
- c. Moisture content: 10 percent maximum.
- d. Gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1-inch	100%
No. 16	45-80%
Material finer than No. 200	2-10%

3. For flexible thermoplastic pipes: Comply with ASTM D2321, Class I or II as modified below:

- a. Exclude sharp angular granular materials.
- b. Limit maximum particle size to 1/2-inch.
- c. Do not use Class II materials in wet conditions.

4. For rigid pipes comply with ASTM C12, Bedding Class B.

### 2.2 EXCAVATED BACKFILL MATERIALS

A. Provide soil materials free from organic matter, rubble, or frozen material, containing no rocks or lumps over 6 inches, and with not more than 15 percent of the rocks or lumps larger than 2 inches.

## 2.3 GRANULAR BACKFILL

- A. Provide either sand, pit run gravel, granular material, or excavated granular materials.
1. Sand: Well graded, free from organic matter, cohesionless, complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin" with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1-inch	100%
No. 16	45-80%
Material finer than No. 200	2-10%

2. Pit run gravel: Free from organic matter, cohesionless granular material obtained from natural deposits of sand and gravel, passing 3/4-inch sieve, and not more than 15 percent passing the No. 200 sieve.
3. Granular material: Use granular materials consisting of durable particles ranging in size from fine to coarse in a substantially uniform combination complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin" with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
2-inch	95-100%
No. 4	35-60%
Finer than No. 200	5-15%

4. Excavated granular materials: A mixture of sand and gravel, free from organic matter, clay, loam, dirt, and other foreign material, passing the 1½-inch sieve, with not more than 15 percent passing the No. 200 sieve.
  5. No. 2 Crushed stone: Clean, hard, tough, durable, angular material crushed from bedrock limestone, dolomite, or granite.
- a. Gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
3-inch	100%
2-1/2-inch	90-100%
2-inch	35-70%
1-1/2-inch	0-15%
3/4-inch	0-5%

## 2.4 TEMPORARY AGGREGATE PAVEMENT MATERIAL

- A. Provide well graded, 100 percent crushed gravel or crushed stone aggregate free of clay, loam, dirt, calcareous or other foreign matter conforming to the "Standard Specifications for Sewer and Water Construction in Wisconsin".
1. Graded aggregate: Comply with ASTM D1241 except as modified by these Specifications.
    - a. Gravel, crushed gravel, or stone: Composed of hard, sound, durable particles and a filler of sand, stone dust, or other finely divided mineral material, free of clay lumps and vegetable matter.
      - (1) Fraction passing No. 200 sieve: Less than one-half the fraction passing a No. 40 sieve for gravel aggregate, and less than 0.7 for crushed stone aggregate.



- (2) A minimum of 50 percent of the particles held on a No. 4 sieve shall have at least one fractured surface.

b. Gradation requirements:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>		
	<u>Crushed Road Gravel</u>	<u>3/4" Graded Crushed Stone</u>	<u>1-1/2" Graded Crushed Stone</u>
1-1/2"			100%
1"		100%	100%
3/4"		85-100%	85-100%
3/8"	50-80%	50-80%	30-65%
No. 4	35-60%	35-65%	25-55%
No. 10	25-50%	15-40%	
No. 40	15-30%	15-30%	
No. 200	5-15%	5-15%	2-12%

## 2.5 GEOTECHNICAL FABRIC

- A. Provide geotechnical fabric for separation of granular material and native soil in areas where trench is overexcavated to remove unsuitable materials.
1. Acceptable manufacturers:
    - a. Mirafi: 160N.
    - b. Synthetic Industries: 601.
    - c. Amaco: 4551.

## 2.6 WATER MAIN REPAIR

- A. Repair water main or water services damaged during construction utilizing products of type and manufacturers as approved by the Owner.
- B. Pipe couplings for joining of sections of cut water main where a section of new pipe is used to replace a broken pipe.
1. Acceptable manufacturers:
    - a. Dresser Style 38;
    - b. Smith-Blair CC-441;
    - c. Or equal.
- C. Repair clamps for broken or cracked pipe and sealing of existing corporation stop opening:
1. Use full-circle single band all stainless steel clamps.
  2. Acceptable Manufacturers:
    - a. Dresser Style 360;
    - b. Smith-Blair 200 Series;
    - c. Or equal.
  3. Replace damaged service corporation stops by installation of full-circle single band all stainless steel clamps, with service outlet, matching manufacturer's and styles used for repair of a cracked pipe.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 GENERAL CONSTRUCTION REQUIREMENTS

- A. Protection of existing facilities:
  - 1. Unless shown to be removed, protect existing structures, conduits, active utility lines and all other facilities shown on the Drawings or otherwise made known to the Contractor. If damaged, repair, replace, or restore to a condition equal to or better than the original condition at no additional cost to the Owner.
  - 2. Notify all persons, firms, corporations, or agencies owning or using any existing structures, conduits, or utilities which may be affected by the Work prior to the start of construction.
  - 3. Make arrangements to locate, maintain, protect, and/or relocate facilities in order to complete the Work.
  - 4. Make such exploration as is necessary to determine the exact location of underground utilities.
  - 5. Exercise care during the progress of work in the area to prevent damage to the utilities.
  - 6. Whenever it becomes necessary to relocate underground gas mains, telephone conduit, or electrical lines, the utility company involved will make such relocation. Notify the utility company promptly.
  - 7. Whenever it becomes necessary to relocate water or other pipes or conduits in direct conflict with the proposed pipe (exclusive of culverts) which are not shown on the Drawings, obtain the direction from the Engineer for the relocation. Compensation will be allowed only for such quantities as directed by the Engineer.
  - 8. Do not block or obstruct sidewalks, streets, and pavements.
  - 9. Whenever during construction operations any loose material is deposited in the flow line of gutters, drainage structures, or ditches such that the natural flow line of water is obstructed, remove this loose material at the close of each working day. At the conclusion of construction operations, keep all drainage structures and flow lines free from dirt and debris.
  - 10. Do not obstruct accessibility of fire hydrants.
  - 11. Maintain access to adjacent areas at all times.
- B. Protection of Trees and Shrubs:
  - 1. Protect trees and shrubs from damage.
  - 2. Provide exhaust deflectors or other devices for machinery as required to prevent damage to trees and shrubs from exhaust gases.
  - 3. Do not remove trees or shrubs unless indicated on the Drawings or authorized in the field by the Engineer.

4. Where trees which are to remain interfere with normal excavation operations, use the following procedures:
    - a. Prior to excavation, carefully remove trees with trunk diameters of less than 4 inches, shrubs, and other plantings in the way of construction.
    - b. Do not machine excavate within a distance of three trunk diameters or 12 inches (whichever is greater) of any tree, and do not cut roots over 2-inch diameter unless approved by the Engineer.
    - c. Excavate by hand when closer than three tree trunk diameters or 12 inches (whichever is greater).
    - d. Tree tunneling where necessary to be determined by the Engineer.
    - e. Tie back shrubs and tree limbs to prevent loss or damage.
    - f. Prune and seal damaged limbs and branches.
    - g. Provide plank wrappers wired in place to protect tree trunks from being damaged by trench machinery, tractors, or trucks; remove protective planking as soon as practical after work in vicinity has been completed.
    - h. Remove spoil banks from around trees by hand to prevent damage to trunks by construction machinery.
  5. Replace trees and shrubs which cannot be protected or are damaged during construction:
    - a. Replant or replace with stock of like character, quality, variety, size, shape, color and condition upon completion of the construction.
    - b. Replace 4-inch diameter and larger trees with one 4-inch diameter size tree for each 6-inches of original tree diameter or fraction thereof.
    - c. Replace trees smaller than 4-inch diameter and shrubs with same kind and type.
    - d. As an option, replant trees smaller than 2-inch diameter or shrubs which are not damaged.
  6. Remove and replace trees and shrubs which do not survive in good condition for a period of 18 months after time of planting.
- C. Work on private property:
1. Construct work on private property within easements obtained by the Owner as shown on the Drawings.
    - a. The Contractor will be permitted construction privileges within construction easement lines as shown on the Drawings.
    - b. Perform the work in a manner such as to minimize damage to lawns, shrubs, trees and other plantings, driveways, sidewalks, fences, out-buildings, and any other miscellaneous improvements, using proper size and type of equipment.
    - c. The Engineer has the authority to prohibit the use of any equipment which in his judgment is too large or otherwise unsuitable for the conditions of the work on private property.
  2. Remove and replace fences, outbuildings and other miscellaneous improvements in the way of construction to the satisfaction of the property owner.

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3. When working in cultivated fields or gardens, remove original topsoil to a depth of 12 inches prior to excavation, and replace the topsoil to its original depth and grade upon completion of trench backfill.
4. Restore the private property to its original condition or better, free of debris, stones and excess materials.

### 3.3 TRENCHING

- A. Do not advance trench excavation more than 50 feet ahead of completed pipe installation except as approved by the Engineer.
- B. Provide and maintain sheeting, shoring, and bracing necessary for protection of the Work, adjacent property, and for the safety of personnel.
  1. Remove temporary sheeting and bracing after backfilling to an elevation which will prohibit caving of exposed sidebanks.
  2. Fill voids left by the withdrawal of sheeting with compacted sand.
  3. The Engineer may direct that supports in trenches be cut off at any specific elevation to protect adjacent facilities or property. Compensation for support left in place will be negotiated.
  4. No extra payment will be made for the supports left in place without the direction of the Engineer.
  5. Do not leave supports within 4 feet of the ground or pavement surface in place without the permission of the Engineer.
- C. Provide pumping, bailing, wellpointing, and construct ditches and dikes required to dewater and drain ground water, sewage, or storm water to keep the excavation and site dry for the completion of the Work.
- D. Excavation:
  1. Excavate by open cut unless otherwise indicated on the Drawings.
  2. Excavate trenches to the depths and grades necessary for the pipelines with allowances for bedding material.
    - a. Comply with the following minimum depth of cover unless otherwise noted on the Drawings:  
 Water pipelines: 6 feet.  
 Sewage and sludge pressure piping: 5 feet.  
 Air and gas piping: 3 feet.  
 Electrical or wiring conduits and cables: 30 inches.
  3. Overexcavate organic, soft, spongy, or otherwise unsuitable soils found at or below the bottom of the trench to meet firm subsoil or as directed by the Engineer.
  4. Comply with the following maximum trench widths at the top of pipelines:

<u>Nominal Pipe Sizes (Inches)</u>	<u>Trench Widths (Inches)</u>
12 or smaller	30
14-18	36
20-24	42
27-30	48
33 and larger	1-1/3 times pipe O.D.

5. Where the trench width exceeds the maximum limitations, provide higher strength pipe, or embed or cradle the pipe in concrete to achieve the necessary load factor as determined by the Engineer at no additional cost to the Owner.

### 3.4 EXCAVATION FOR APPURTENANCES

- A. Excavate for manholes and similar structures to the depths as shown on the Drawings and to a distance sufficient to leave at least 12 inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
- B. Overdepth excavation beyond depths indicated on the Drawings that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the Owner.

### 3.5 BEDDING AND COVERING OF PIPE

- A. General:
  1. Bedding is defined as the shaped and tamped material which supports the pipes. Covering is defined as the compacted material which protects and covers the pipes.
  2. Provide continuous bedding and covering for underground pipelines, except where concrete encasement, concrete cradles, boring or jacking are indicated.
- B. Pipe bedding:
  1. Provide compacted granular pipe bedding and covering material with a minimum thickness of 4 inches under pipe barrels and 2 inches under bells.
  2. Wherever the trench is overexcavated due to the removal of unsuitable material, refill the excavated area to the bottom of the pipe bedding with No. 2 crushed stone or granular material conforming to the Granular Backfill Materials gradation.
    - a. Removal and replacement of material, or unsuitable material, to a depth of one foot below the bottom of the pipe barrel is considered incidental to installation of the pipe.
  3. Wherever the trench is overexcavated to remove unsuitable material, install geotechnical fabric between native soil and granular material:
    - a. Install fabric to cover bottom and sides of trench to heights as follows:
      - (1) Sanitary sewer, force main, and water main: to envelope entire bedding and covering material and overlap 1 foot at the top.
      - (2) Storm sewer: to cover bedding material and from sides of trench to edge of pipe.
      - (3) Where undercut is of a depth that requires more than one piece of fabric to provide envelope, provide sewn seams between sections of fabric.

4. Wherever two or more pipes or conduits are placed in the same trench or excavated area, backfill the trench with granular pipe bedding and covering material to support the uppermost pipe or conduit.
5. Provide sand bedding with a minimum thickness of 3 inches under electrical and wiring conduits and cables.

C. Pipe covering:

1. Following placement of pipe and inspection of joints, provide compacted granular pipe bedding and covering material for the full width of the trench to the following levels unless otherwise shown on the Drawings:
  - a. For pipes sizes 24-inch and smaller, except flexible thermoplastic pipe: To 4 inches above the top of the pipe.
  - b. For pipes sizes 27-inch and larger, except flexible thermoplastic pipe: To the horizontal centerline of the pipe.
  - c. For flexible thermoplastic pipes: To 12 inches above the top of the pipe.
  - d. If compacted excavated materials are used for backfilling under the pavement as indicated on the Drawings: To 12 inches above the top of the pipe for all pipe sizes.
2. Place granular pipe bedding and covering material in uniform loose layers not exceeding 8 inches thick.
  - a. Compact each layer firmly by ramming or tamping with tools approved by the Engineer in such a manner as not to disturb or injure the pipe to yield a minimum density of 95 percent of maximum dry density as determined according to ASTM D1557 or AASHTO-T180.
3. Where trench is widened by installation of structures or jacking pits, extend bedding and covering materials to total width of excavation.

### 3.6 TRENCH BACKFILLING AND COMPACTING

A. General:

1. Backfill trench from the top of pipe cover to topsoil, paving subgrade, or foundation level.
2. If trenches settle during the period of construction and within the guarantee period of the work, fill trench back to the surrounding grade, and restore the surfaces.

B. For trench in lawns, parkways, and other improved areas not subject to vehicular traffic:

1. Backfill with excavated materials in uniform loose layer not exceeding 12 inches thick.
2. Compact each layer of trench backfill materials to yield a minimum of 85 percent of maximum dry density as determined according to ASTM D1557 or AASHTO-T180.

C. For trench in unimproved areas and cultivated fields:

1. Backfill with excavated materials.
2. Provide crowned surface to compensate for settlement.

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- D. For trench in streets, parking areas, driveways, sidewalks, curb and gutter, or within 2 feet of any proposed curb and gutter, sidewalk, and other paved areas:
  - 1. Backfilling with granular backfill materials:
    - a. Place in uniform loose layer not exceeding 12 inches thick and compact with vibrating roller or equivalent.
    - b. Fill the top of trenches with temporary aggregate pavement material to the depth(s) required to provide aggregate base and pavement base, binder and surface courses of the depth(s) shown in the Details in the Drawings.
  - 2. Compacting requirements:
    - a. Compact each layer of trench backfill materials to yield a minimum density of 90 percent of maximum dry density as determined according to ASTM D1557 or AASHTO T-180.
    - b. Determine the density of compacted backfill at intervals of not more than 500 feet at locations selected by the Engineer.
    - c. The Owner will provide the services of an independent testing laboratory for the density tests complying with the pertinent provisions of Section 01 45 29.
  - 3. Maintain temporary aggregate pavement level with adjoining pavement surfaces until the permanent pavement is placed.

### 3.7 BACKFILL AND BEDDING FOR APPURTENANCES

- A. Provide 3 inches of sand or granular bedding material unless otherwise shown on the Drawings.
- B. Do not backfill until new concrete has properly cured, and any required tests have been accepted.
- C. Backfill in lawns and landscaped areas with excavated materials.
- D. Backfill in pavement around manholes, catch basins, inlets, valve vaults, and other structures as directed by the Engineer with granular backfill materials.

### 3.8 FINISH GRADING

- A. General:
  - 1. Provide finish grading and filling to achieve the lines and grades.
  - 2. Slope grades to drain away from structures.
- B. Finish grading:
  - 1. Except where mounding over trenches is specified, grade smooth areas of the Work including previously grassed areas that have been disturbed, and adjacent transition areas.
  - 2. Fill and compact depressions from settlement and round tops of embankments and breaks in grade.
  - 3. Protect newly graded areas from traffic and erosion. Repair settlement or washing away that may occur prior to surface restoration and re-establish grades to the required elevations at no additional cost to the Owner.

- C. Disposal of waste excavated material:
  - 1. Remove unsuitable and surplus excavated materials not used for backfilling from the project site.
  - 2. Do not deposit on public or private property without written permission from property owner or authorized representative of appropriate public agency.

### 3.9 SUITABLE PIPE BEDDING AND COVERING MATERIALS ON SITE

- A. Preliminary information indicates that the materials generally encountered at the proposed invert elevation of the pipeline will be suitable for preparation as bedding and covering for the pipe, and that no other pipe bedding and covering materials will have to be provided.
- B. In the event that the materials encountered at the required pipe elevation are determined by the Engineer to be unsuitable for bedding and covering of the pipe, provide the granular pipe bedding and covering materials as specified under Paragraph 2.1 in this Section of these Specifications.
  - 1. Payment will be made on the basis of the Unit Price for GRANULAR PIPE BEDDING AND COVERING MATERIALS set forth in the Bid.

### 3.10 SUITABLE GRANULAR BACKFILL MATERIAL ON SITE

- A. Preliminary information indicates that the materials generally encountered in the excavation of the pipe trench will be suitable for use as granular backfill materials, and that no other granular backfill materials will have to be hauled in.
  - 1. Sort, segregate, and stockpile the suitable materials during trench excavation.
- B. In the event that the materials encountered during excavation are determined by the Engineer to be unsuitable for use as granular backfill material, provide the granular backfill materials as specified under Paragraph 2.4 in this Section of these Specifications.
  - 1. Payment will be made on the basis of the Unit Price for BACKFILLING WITH GRANULAR BACKFILL MATERIALS set forth in the Bid.

### 3.11 WATER MAIN REPAIR

- A. Whenever existing water mains and water service pipes are damaged during construction, stop the pipe installation work and immediately repair the damaged portion of the existing piping.
- B. Contact the Engineer and Owner immediately to report the location and extent of the damage.
- C. Repair the water main with methods of complying with "Standards for Water and Sewer Main Construction in Wisconsin", and any additional requirements required by the Owner.



- D. Utilize only materials of repair as noted in the products section of this specification or as dictated by the Owner.
- E. Where water services have been stripped or pulled from the water main, replace the corporation stop as instructed by the Engineer and Owner, and replace the water service pipe to a point as directed by the Owner.
- F. Comply with disinfection requirements as dictated by the Owner.
- G. Do not cover the repair until work is inspected and approved by the Owner.

END OF SECTION

## SECTION 31 25 00

### SOIL EROSION AND SEDIMENT CONTROLS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide soil erosion and sediment controls as shown on the Drawings, as specified herein, as required by the governmental authority, and as needed for a complete and proper installation.
- B. Related documents:
  - 1. "Wisconsin Department of Natural Resources Storm Water Management Technical Standards" and "Conservation Practice Standards".
  - 2. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction", latest edition and "Erosion Control Product Acceptability List".

##### 1.2 QUALITY ASSURANCE

- A. Provide adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Inspect all soil erosion and sediment control devices on a weekly basis and after rainfall events of ½-inch or greater. Provide a weekly inspection report.

##### 1.3 DELIVERY, STORAGE, AND HANDLING

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

#### PART 2 - PRODUCTS

##### 2.1 GENERAL

- A. Provide soil erosion and sediment controls in accordance with the requirements of the Wisconsin Department of Natural Resources and the Wisconsin Department of Transportation (WDOT) "Standard Specifications".
- B. Provide manufacturer's certification that product meets the minimum specified standard, if requested by the Engineer.

### SOIL EROSION AND SEDIMENT CONTROLS

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## 2.2 TEMPORARY EROSION AND SEDIMENT CONTROL SYSTEMS

- A. Rolled Erosion Control Products:
  - 1. Material: Products consisting primarily of totally encased straw or excelsior that comply with WDOT Erosion Control Product Acceptability List for Temporary Ditch Checks.
  - 2. Stakes: As recommended by manufacturer.
- B. Silt fence:
  - 1. Material: Comply with WDOT Standard Specification 628.
  - 2. Support posts and other hardware: Comply with WDOT Standard Specification 628.
- C. Temporary cover:
  - 1. Comply with Section 32 92 00.13 of these Specifications for purity and germination.
  - 2. Seed: Annual rye, spring oats, or wheat.
- D. Temporary riprap:
  - 1. Comply with WDOT, Section 606.
- E. Inlet Protection:
  - 1. Provide WDOT Inlet Protection Type A, B, C or D devices where indicated on drawings. Use materials described in WDOT Section 628 and Erosion Control Product Acceptability List.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Install soil erosion and sediment controls prior to any other construction and maintain until site is stabilized.
- B. Prepare subgrade for the installation of the soil erosion and sediment control systems to the lines and grades shown on the Drawings.
- C. Repair eroded or washed out areas prior to the installation of soil erosion and sediment control systems.

### 3.2 ROLLED EROSION CONTROL PRODUCTS

- A. Install straw wattles where shown on the Drawings and as directed by the Engineer.
  - 1. Anchor each log by driving stakes through the ends and at 2-foot intervals.
  - 2. Inspect frequently and repair or replace as necessary.
  - 3. Remove upon completion of Work or as directed by Engineer.

### 3.3 SILT FENCE

- A. Install silt fence where shown on the Drawings, in accordance with WDOT Standard Specification 628, and as directed by the Engineer.
  - 1. Perform maintenance as needed.
  - 2. Remove material when it reaches 1/3 of the fence height, and as directed by Engineer.
  - 3. Replace fence where it is torn or otherwise damaged.
  - 4. Retrench or replace fence that is not properly entrenched or anchored.
  - 5. Remove fence upon completion of Work, or as directed by Engineer.

### 3.4 TEMPORARY COVER

- A. Install temporary cover where shown on the Drawings, in accordance with pertinent provisions of Section 32 92 00.13 of these Specifications, particularly Article 32 92 00.13 3.4, and as directed by the Engineer.

### 3.5 INLET PROTECTION

- A. General:
  - 1. Verify the number and dimensions of the drainage structure frames for installation of the inlet filter assemblies.
  - 2. Inspect and clean filters weekly and after every rainfall.
  - 3. Dispose of debris removed at an approved location.
  - 4. Remove filter assembly as directed by the Engineer.
  - 5. The drainage structure inlet filter assembly will remain the property of the Contractor.

END OF SECTION

## SECTION 32 10 00.13

### ROADS, DRIVEWAYS, AND WALKS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide roads, driveways, and walks as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Construct roads, driveways, and walks in accordance with the WDOT "Standard Specifications" and "Supplemental Specifications", except as herein modified.

##### 1.2 QUALITY ASSURANCE

- A. Source quality control:
  - 1. Comply with Section 106 of the WDOT "Standard Specifications".
  - 2. Submit certificates from source of aggregate materials that aggregate meets specified standards.
  - 3. Submit certificates from geotextile manufacturer that fabric meets specified standards.
  - 4. Obtain asphaltic mixtures from plants approved by the WDOT.
  - 5. Submit the name of the source of materials proposed for use on the Project to the Engineer at the Preconstruction Meeting.
  - 6. Submit WDOT mix designs for asphaltic surface plant mix, asphaltic concrete binder and surfaces courses proposed to be constructed.
- B. Hot mix asphalt pavement quality management program:
  - 1. Comply with Section 460.2.8 of the WDOT "Standard Specifications".
  - 2. Comply with the pertinent provisions of Section 01 45 29.

#### PART 2 - PRODUCTS

##### 2.1 SUBBASE

- A. Breaker run materials:
  - 1. Use crushed stone or crushed concrete complying with Section 311 of the WDOT "Standard Specifications" for Breaker Run.

##### 2.2 BASE COURSE

- A. Asphaltic base:
  - 1. Comply with Section 315 of the WDOT "Standard Specifications" for materials and material preparation.

### ROADS, DRIVEWAYS, AND WALKS

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- B. Concrete base:
  - 1. Comply with Section 320 of the WDOT "Standard Specifications" for materials and material preparation.

## 2.3 TACK COATS

- A. Asphaltic materials:
  - 1. Comply with types shown in Section 455.2.5 of the WDOT "Standard Specifications".

## 2.4 SURFACE COURSE

- A. Asphaltic surface:
  - 1. Comply with Section 465 of the WDOT "Standard Specifications" Type (E-0.3). Conform to the following nominal size of aggregate in the mixture:
    - a. Pavement thickness shall be 3-1/2" total asphaltic pavement with 1 1/2" surface course and 2" binder course.
    - b. Use 12.5 mm (1/2") for binder course.
    - c. Use 9.5 mm (3/8") for surface course.

## 2.5 SHOULDERS

- A. Backfill with earthen material and seed.

## 2.6 GEOTECHNICAL FABRIC

- A. Comply with applicable articles of Section 645.2.2, Type SAS (Subgrade Aggregate Separation), of the WDOT "Standard Specifications".

## 2.7 TEMPORARY AGGREGATE

- A. Use crushed stone or crushed gravel complying with Section 305 of the WDOT "Standard Specifications", 3/4-inch dense graded base.

# PART 3 - EXECUTION

## 3.1 GENERAL CONSTRUCTION REQUIREMENTS

- A. Comply with the following Sections of the WDOT "Standard Specifications" except as modified herein:
  - 1. Subbase: Section 311.
  - 2. Base courses:
    - a. Asphaltic: Section 315.
    - b. Concrete: Section 320.
  - 3. Surface Courses:
    - a. Aggregate: Section 305.

- b. Hot Mix Asphalt Pavement: Section 460.
    - c. Asphaltic Surface: Section 465
  - 4. Tack Coat: Section 455.
  - 5. Shoulders:
    - a. Aggregate: Section 305.
  - 6. Geotechnical fabric: Section 645.
- B. Comply with the thickness and width shown on the Drawings.
  - 1. Construct elevation and crown of the finished surfaces to meet the required profile and section shown on the Drawings.
- C. Compaction test for aggregate subbase, base, and surface courses:
  - 1. Proof-roll for compaction by driving a rubber-tired, single-unit truck with a minimum 45,000 -pound load slowly over the area to be inspected.
  - 2. Repair areas which show depressions or deflections greater than:
    - a. 3/4-inch deep for subbase.
    - b. 1/2-inch deep for base.
    - c. 1/4-inch deep for surface.
  - 3. Repeat proof-roll and/or repair until approved by the Engineer.

### 3.2 TACK COAT

- A. Asphaltic Materials:
  - 1. Apply tack coat on new binder course if traffic has been allowed on it and on all existing paved surfaces to be overlaid at a minimum rate of 0.025 gallons per square yard.
  - 2. Do not apply when ambient temperature is less than 36 degrees F. or when local conditions indicate that rain is imminent.

### 3.3 SURFACE COURSES

- A. Asphaltic surface:
  - 1. A leveling binder course will be used to correct crown or other irregularities between the existing surface and the proposed surface shape.
  - 2. Minimum and Maximum thickness: Comply with Section 460.3.2 of the WDOT "Standard Specifications".
  - 3. Repair settled trenches, spalled pavement, and other defective binder before placement of asphaltic surface course.
- B. Provide asphaltic materials of a consistency to allow adequate workability around structures and joints.
- C. Acceptable tolerances for the pavement surface:
  - 1. Longitudinal tolerance:
    - a. Sweep the surface clean and test for smoothness when finish surface is complete.
    - b. Use a 10-foot straightedge as specified in Section 415.3.11.8 or Section 450.3.2.9 of the WDOT "Standard Specifications".

- c. Remove and replace depressions or high points which cannot be corrected by grinding or further rolling.
- d. Grinding high points or repairing depressions shall be done at the Contractor's expense.

D. Asphaltic walks:

- 1. Install 6-inch aggregate base course complying with applicable articles of Section 305 of the WDOT "Standard Specifications".
- 2. Construct a minimum of 3½-inch thick asphaltic surface course.

### 3.4 DRIVEWAYS

A. Construction requirements:

- 1. Construct to the lines, grades, and details as shown on the Drawings.

B. Asphaltic driveways:

- 1. Install 8-inch aggregate base course complying with applicable articles of Section 305 of the WDOT "Standard Specifications".
- 2. Construct a minimum of 3½-inch thick asphaltic surface course.

### 3.5 TEMPORARY AGGREGATE

A. Place, compact, and maintain course aggregate as a temporary driving surface where shown on the Drawings, as directed by the Engineer, and as specified in pertinent provisions of the WDOT "Standard Specifications" except as modified herein:

- 1. Place and compact additional material as directed by the Engineer.
- 2. Provide dust control.
- 3. Provide and maintain temporary culverts or other drainage devices.
- 4. Shape the road bed to provide positive drainage.
- 5. Completely remove the temporary aggregate. It may be reused for any of the following, if the Contractor receives approval from the Engineer:
  - a. Trench backfill or bedding.
  - b. Temporary aggregate at another location.
  - c. Fill material for subgrade removal and replacement.
  - d. Subbase granular material or aggregate base course if the Engineer determines that there is not significant segregation or contamination of the material and if it is constructed as specified in these Specifications.

END OF SECTION



## SECTION 32 31 13

## WOODEN FENCES AND GATES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide wooden fences, gates, and brick pilasters as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Documents affecting work of this Section include City of Madison bidding requirements and General Conditions.

## 1.2 SUBMITTALS

- A. Submit shop drawings and product data, including general dimensions, manufacturer's specifications, recommended installation procedures, and concrete footing details.

## 1.3 QUALITY ASSURANCE

- A. Fence framework and related accessories to be a complete system as specified herein.

## PART 2 - PRODUCTS

## 2.1 GENERAL

- A. Provide fencing, gates, and brick pilasters with overall height of 96 inches above grade to overall dimensions and locations as shown on the drawings

## 2.2 WOOD

- A. Use western red cedar with anti-graffiti coating, with dimensions as shown on Drawings.

## 2.3 MASONRY UNITS AND BRICK

- A. Provide normal weight CMU's and brick equal to Desert Ironspot Dark Modular Velour by Endicott Clay Products or equal as shown on the drawings and to match existing brick pilasters on site. Owner to approve of color, size and locations prior to installation.

## WOODEN FENCES AND GATES

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## 2.4 FRAMEWORK

- A. Roll formed steel sections with 2.0 ounces of hot-dipped zinc coating conforming to ASTM A-123, or Type I steel pipe, or Type II steel pipe.
  - 1. Type I: Schedule 40 steel pipe with 2.0 ounces of hot-dipped zinc coating conforming to ASTM A-120.
  - 2. Type II: Pipe manufactured from steel conforming to ASTM A-569, cold-formed, high frequency welded, and having a minimum yield strength of 50,000 psi. External surface triple coated with 1.0 ounce  $\pm$  0.1 ounce of zinc per square foot, 30  $\pm$  15 micrograms of chromate per square inch and 0.5  $\pm$  0.2 mils of clear cross linked polyurethane. Internal surface coated, after welding, with a zinc-rich based organic coating having a 91 percent zinc powder loading capable of providing galvanic protection.
- B. Line posts:
  - 1. 1-5/8-inch x 1-7/8-inch roll formed steel C-section weighing 2.28 pounds per foot, or 2-1/2-inch O.D. Type I steel pipe weighing 3.65 pounds per foot, or 2-1/2-inch O.D. Type II steel pipe weighing 3.12 pounds per foot.
- C. Terminal posts and gate posts for single swing gates or one leaf of double gates up to 6 feet leaf width:
  - 1. 3-1/2-inch x 3-1/2-inch roll formed steel section weighing 4.85 pounds per foot, or 3-inch O.D. Type I steel pipe weighing 5.79 pounds per foot, or 3-inch O.D. Type II steel pipe weighing 4.64 pounds per foot.
- D. Gate posts for single swing gates or one leaf of double gates with leaf width over 6 feet to 13 feet:
  - 1. 4-inch O.D. Type I steel pipe weighing 9.11 pounds per foot, or 3-1/2-inch O.D. Type II steel pipe weighing 5.71 pounds per foot.
- E. Gate posts for single swing gates or one leaf of double gates with leaf width over 13 feet to 18 feet:
  - 1. 6-5/8-inch O.D. Type I steel pipe weighing 18.97 pounds per foot.
- F. Gate posts for single swing gates or one leaf of double gates with leaf width over 18 feet.
  - 1. 8-5/8-inch O.D. Type I steel pipe weighing 28.55 pounds per foot.

## 2.5 GATES

- A. Frame assembly of 2-inch O.D. Type I or Type II steel pipe with welded or steel fitted corners. Provide braces and trusses where necessary.
- B. Heavy duty hinges and positive type latching device suitable for padlocking.
- C. Heavy duty spring loaded gate wheel, suitable for outdoor use.
- D. Center plunger rod with double latch and catch, and semi-automatic outer catches for drive gates.

- E. Wood to match fence.

## 2.6 FITTINGS

- A. Pressed steel, cast iron or cast aluminum post caps to exclude moisture.
- B. Pressed steel, cast iron or cast aluminum rail and brace ends.
- C. 6-inch minimum length top rail couplings at maximum 20 feet on centers.
- D. Steel tension bars, tension bands, and brace bands.
- E. 3/8-inch steel truss rods with turnbuckles.
  - 1. End, corner, pull and gate posts braced and trussed to line posts.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Installation by experienced fence erectors.
- B. Conform to ASTM F-567.
- C. Space line posts at even intervals not exceeding 10 feet.
- D. Set all posts to a minimum depth of 48 inches in a concrete foundation.
  - 1. 12-inch diameter foundation for line posts.
  - 2. 24-inch diameter foundation for terminal posts.

END OF SECTION

## SECTION 32 92 00.13

## LAWNS AND GRASSES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide topsoil, seeding, sodding, and care of grass during establishment period for a complete surface restoration of lawns, parkways, and other areas disturbed as a result of the construction.
- B. Construct the work of this section in accordance with WDOT "Standard Specifications" except as herein modified.

## PART 2 - PRODUCTS

## 2.1 TOPSOIL

- A. Comply with the requirements of Section 625 of the WDOT "Standard Specifications" for materials and material preparation.

## 2.2 AGRICULTURAL LIMESTONE

- A. Comply with applicable Articles of Section 629 of the WDOT "Standard Specifications" for materials and material preparation.

## 2.3 FERTILIZER

- A. Comply with the requirements of Section 629 of the WDOT "Standard Specifications" for materials and material preparation.

## 2.4 MULCH

- A. Vegetative mulch:
  - 1. Provide vegetative mulch for seeded areas of a high-quality, air-dried straw of wheat, rye, oats, beans, or other approved straw, free from grass, broom sedge, noxious weeds, and weed seeds detrimental to growth of grass.
- B. Hydraulic mulch:
  - 1. Provide virgin wood cellulose fibers complying with the following properties (percent by weight):
  - 2. Moisture content 15
  - 3. Organic matter, minimum 95
  - 4. Water holding capacity 400

5. pH 4.3-8.5

## 2.5 SEED

- A. Provide new crop seed furnished in standard sealed containers bearing seed tags showing purity, germination, and weed seed content, free of wild onion, Canadian thistle, crab grass, and seeds of other noxious weeds, complying with the requirements of Section 630 of the WDOT "Standard Specifications".
  - 1. Use Seed Mixture No. 10 where average loam, heavy clay or moist soils predominate.
  - 2. Use Seed Mixture No. 20 where light, dry, well-drained, sandy or gravelly soils predominate.
  - 3. Use Seed Mixture No. 30 on medians and on slopes or ditches within 15 feet of the shoulder where salt tolerant turf is desired.
  - 4. Use Seed Mixture No. 40 where a lawn type turf is desired.

## 2.6 SOD

- A. Provide field or nursery grown sod that is native to the locality of the Project.
- B. Provide sod that will not break, crumble or tear during handling and placing, free of stones, crab grass, noxious weeds, and other objectionable plants or substances injurious to plant growth.
- C. Provide sod having at least 1-inch of soil adhering firmly to the roots and cut in rectangular pieces with the shortest side not less than 12 inches. At the time of cutting sod, mow the grass height not less than 2 inches nor more than 4 inches.
- D. Do not use sod cut for more than 48 hours.

## PART 3 - EXECUTION

### 3.1 TOPSOIL PLACEMENT

- A. Scarify the compacted subgrade to a depth of 3 inches to receive the topsoil.
- B. Spread at least 4 inches of prepared topsoil in areas of new grading raked smooth and level.
- C. Grade flush with walks, curbs, and paving.

### 3.2 PREPARATION FOR SODDING OR SEEDING

- A. Do not start preparation until all other site and utility work and finished grading within the areas to be seeded have been completed.

- B. Till topsoil to a depth of at least 3 inches and smooth out all surface irregularities resulting therefrom. Leave area free of rocks or hard soil clods which will not pass through the tines of a standard garden rake.
- C. At least 7 days before applying fertilizer, spread lime uniformly in sufficient quantity to produce in the soil a pH of 6.5. Work lime thoroughly into topsoil to a depth of 3 inches.
- D. Apply fertilizer in accordance with the WDOT "Standard Specifications".

### 3.3 SODDING

- A. Provide sod in developed areas that were grassed prior to construction and as indicated on the Drawings. Sodding shall also be used in ditches and drainage swales and on all embankment slopes steeper than 3 to 1 unless protection is provided against erosion of seeding. At the Contractor's option, sodding may be substituted for seeding, but at no additional cost.
- B. Place sod with the edges in close contact and alternate courses staggered. Lightly tamp or roll to eliminate air pockets. On slopes 2 to 1 or steeper, stake sod with not less than 4 stakes per square yard and with at least one stake for each piece of sod. Stakes shall be driven with the flat side parallel to the slope. Do not place sod when the ground surface is frozen or when air temperature may exceed 90 degrees F. Water the sod thoroughly within 8 hours after placement and as often as necessary to become well established.
- C. In ditches, the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the longer dimension parallel to the contours of the ground.
- D. All exposed edges of sod shall be buried flush with the adjacent turf.

### 3.4 SEEDING

- A. Seed all grassed areas disturbed by construction operations and not receiving sod, and as indicated on the Drawings.
- B. Sow seed between September 1 and November 1, or in spring from time ground can be worked until May 15.
- C. Apply seed during favorable climatic conditions. Do not seed in windy weather or when soil is very wet. Sow seed at the rate specified for each seed mixture.
- D. Broadcasting seeding method:
  - 1. Sow seed with mechanical seeder in two directions at right angles to each other to achieve an even distribution of seed.

2. After seeding, rake seed lightly into ground and roll with a roller weighing between 100 and 200 pounds per foot of roller width.

E. Hydraulic seeding method:

1. When seed is applied with a hydraulic seeder, apply at a rate of not less than 1,000 gallons of slurry per acre containing the proper quantity of seed specified above.
2. When using a hydraulic seeder, apply the fertilizer in a separate operation.

### 3.5 MULCHING SEEDED AREAS

- A. Immediately after rolling seeded areas, apply mulch at the rate of 2 tons per acre within 24 hours after seeding. Use vegetative mulch on all seeded areas unless hydraulic seeding method is used.
- B. Apply mulch in accordance with the WDOT "Standard Specifications".

### 3.6 WATERING

- A. Immediately after placing erosion control matting or mulch, water seeded areas thoroughly with a fine mist spray. Keep soil thoroughly moist until seeds have sprouted and achieved a growth of 1-inch. For sod, immediately begin watering and continually keep moist until the sod has firmly knit itself to the topsoil.

### 3.7 PROTECTION OF WORK

- A. Protect newly seeded and sodded areas from all traffic by erecting temporary fences and signs. Protect slopes from erosion. Properly and promptly repair all damaged work when required.

### 3.8 APPLICATION OF FERTILIZER

- A. Six weeks after completion of seeding or sodding apply granular fertilizer over all areas at the rate of 2 lbs. of nitrogen nutrients per 1,000 sq.ft. of area.

### 3.9 CLEAN-UP

- A. At the time of final inspection of work, but before final acceptance, remove from seeded and sodded areas all debris, rubbish, excess materials, tools, and equipment.

### 3.10 MAINTENANCE

- A. Provide watering, mowing, and replanting and continue as necessary until a close healthy stand of specified grasses is established.

- B. Replace lawns not showing a close uniform stand of healthy specified grasses at the end of the guaranty period and maintain until acceptance.

END OF SECTION



## SECTION 32 93 79

## TREES, PLANTS, AND GROUND COVER

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide trees, plants, and ground cover as indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Construct the work of this Section in accordance with WDOT "Standard Specifications" except as herein modified.

## 1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
  - 1. Complete materials list of items proposed to be provided under this Section.
  - 2. Complete data on source, size, and quality.
  - 3. Sufficient data to demonstrate compliance with the specified requirements.
- C. Upon completion of the work of this Section, and as a condition of its acceptance, deliver to the Engineer two copies of a Manual compiled in accordance with the provisions of Section 01 78 26 of these Specifications.
- D. Certificates:
  - 1. Require certificates required by law to accompany shipments.
  - 2. Upon completion of the installation, deliver certificates to the Engineer.

## 1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Standards:
  - 1. Plants and planting material: Meet or exceed the specifications of Federal, State, and County laws requiring inspection for plant disease and insect control.
  - 2. Quality and size: Comply with current edition of "Horticultural Standards" for number one nursery stock as adopted by American Association of Nurserymen.

## TREES, PLANTS, AND GROUND COVER

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3. All plants:
  - a. True to name, with one of each bundle or lot tagged with the name and size of the plants in accordance with standards of practice of American Association of Nurserymen.
  - b. In all cases, botanical names take precedence over common names.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Immediately remove from the site plants which are not true to name, and materials which do not comply with the specified requirements, and promptly replace with plants and materials meeting the specified requirements.

### PART 2 - PRODUCTS

#### 2.1 FERTILIZER

- A. Provide commercial balanced organic fertilizer for the intended use, OMRI listed, delivered to the site in bags labeled with the manufacturer's guaranteed analysis.

#### 2.2 SOIL AMENDMENT

- A. Provide Redwood sawdust fortified with organic nitrogen.
- B. Approved products:
  1. "Tillo".
  2. "Silver Spade."
  3. Or equal.

#### 2.3 MULCH

- A. Bark Mulch:
  1. Provide standard size ground bark chips 1/4-inch to 1-inch in size, mill-run chips of Douglas Fir or hardwood bark.
  2. Approved products:
    - a. "Silvabark", distributed by Weyerhaeuser Company.

#### 2.4 TREE STAKES

- A. Unless otherwise indicated on the Drawings, provide Redwood stakes, Construction grade, rough sawn, 2 inches by 2 inches by 8 feet long.

#### 2.5 PLANT MATERIALS

- A. Provide the plant materials shown on the schedule in the Drawings.

## 2.6 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

## PART 3 - EXECUTION

### 3.1 SURFACE CONDITIONS

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

### 3.2 PLANTING TREES AND SHRUBS

- A. General:
  - 1. Plant nursery stock immediately upon delivery to the site and approval by the Engineer except that, if this is not feasible, heel-in all bare root and balled materials with damp soil and protect from sun and wind.
  - 2. Regularly water nursery stock in containers, and place them in a cool area protected from sun and drying winds.
- B. Excavating:
  - 1. For shrubs in one gal containers, dig a hole 12 inches in diameter and 12 inches deep.
  - 2. For shrubs and trees in 5-gallon containers, dig a hole 20 inches in diameter and 18 inches deep.
  - 3. For trees in 15-gallon containers, dig a hole 30 inches in diameter and 30 inches deep.
  - 4. At holes more than 12 inches deep, probe by hand to determine if mechanical auger will hit any in-place utilities.
- C. Planting:
  - 1. Fill holes with backfill mixture consisting of three parts soil taken from the hole and one part specified soil amendment, by volume.
  - 2. Fill to proper height to receive the plant, and thoroughly tamp the mixture before setting the plant.
  - 3. Set plant in upright position in the center of the hole, and compact the backfill mixture around the ball or roots.
  - 4. Thoroughly water each plant when the hole is 2/3 full.
  - 5. After watering, tamp the soil in place until the surface of the backfill is level with the surrounding area and the crown of the plant is at the finished grade of the surrounding area.
  - 6. Build up a temporary watering basin around the base of each tree and shrub, except no basins around trees and shrubs in turf area or in raised planter beds.

- D. Apply the specified mulch to a depth of 2-inch, evenly spread over the entire area of each soil basin.

### 3.3 STAKING

- A. Stake trees, using one stake per tree with two tree ties per stake, and driving stakes into the ground at least 2 feet.

### 3.4 INSPECTION

- A. In addition to normal progress observations, schedule and conduct the following formal inspections, giving the Engineer at least 24 hours advance notice of readiness for inspection:
  1. Inspection of plants in containers prior to planting.
  2. Inspection of plant locations, to verify compliance with the Drawings.
  3. Final inspection after completion of planting:
    - a. Schedule this inspection sufficiently in advance, and in cooperation with the Engineer, so final inspection may be conducted within 24 hours after completion of planting.
  4. Final inspection at the end of the maintenance period, provided that previous deficiencies have been corrected.

### 3.5 MAINTENANCE

- A. Maintain planting, starting with the planting operations and continuing for 30 calendar days after planting is complete and approved by the Engineer. Replace trees and shrubs that do not survive or display more than 30% impaired growth by July 1<sup>st</sup> of the year following their first winter dormancy.
- B. Work included:
  1. Watering, weeding, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition and to keep the planted areas neat and attractive throughout the maintenance period.
  2. Provide equipment and means for proper application of water to those planted areas not equipped with an irrigation system.
  3. Protect planted areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards.
- C. Replacements:
  1. At the end of the maintenance period, verify that all plant material is in a healthy growing condition.
  2. During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace that plant with a new and healthy plant of the same type and size without additional cost to the Owner.
  3. Replacements required because of vandalism or other causes beyond control of the Contractor are not part of this section.

- D. Extension of maintenance period:
1. Continue the maintenance period at no additional cost to the Owner until previously noted deficiencies have been corrected, at which time the final inspection will be made.

END OF SECTION

## SECTION 40 91 23.36

## LEVEL PROCESS MEASUREMENT DEVICES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Provide level process measurement devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

## 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals: Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

## 1.3 QUALITY ASSURANCE – Reserved.

## 1.4 DELIVERY, STORAGE, AND HANDLING

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

## 1.5 SITE CONDITIONS – Reserved.

## 1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

## 2.1 SUBMERSIBLE HYDROSTATIC LEVEL TRANSMITTER

- A. The liquid level of the reservoir shall be sensed by a submersible level transducer. The transducer shall be a **Bulletin A1000, Model 157GSCI**, condensation-protective as manufactured by **Siemens/US Filter, or equal**. The transducer shall be of the head-pressure sensing type, suitable for continuous submergence and operation and shall be installed in accordance with manufacturer's instructions. The bottom

## LEVEL PROCESS MEASUREMENT DEVICES

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diaphragm face of the sensor shall be installed 6 inches above the floor. The sensor shall be mounted using a 316 stainless steel cable and weight system; location to be determined in the field.

- B. The transducer shall sense water level (pressure) variations and transform these variations directly into a standard process signal of 1 to 5 volts DC or 4-20 mA over the desired level range (span). The transducer shall be completely solid state, with no mechanical linkages or moving parts. Supply voltage shall be as required by Contractor.
- C. The transducer shall incorporate a variable-capacitance transducer element to convert the sensed pressure to a corresponding electrical value. The sensed media shall exert its pressure against a ceramic diaphragm that flexes minutely so as to vary its proximity to a ceramic substrate to vary the capacitance of an electrical field created between the two surfaces. A stable, hybrid, operational amplifier assembly shall be incorporated in the transducer to excite and demodulate the sensing mechanism. The transducer shall incorporate laser-trimmed, temperature compensation, and high quality components and construction to provide a precise, reliable, stable output signal directly proportional to the sensed pressure over a factory-calibrated range.
- D. The transducer shall include easily accessible offset and span adjustments. Span shall be adjustable from 100% down to 15% of the sensor range. Fine and coarse adjustments for both span and offset shall be provided using 25-turn potentiometers. Offset and span adjustments shall be non-interactive for ease of calibration. Operating pressure range of the transducer shall be between 0 to 15 psig.
- E. Submersible level transmitter shall be mounted on a stainless steel cable with PVC covered anchor as required, per manufacturer's instructions. All mounting hardware shall be stainless steel and provided with floats.

## 2.2 FLOAT SWITCHES

- A. Float switches when specified herein, shown on the drawings, or necessary to complete an operating system shall be as follows:
  - 1. The float switches shall be mercury free and consist of a 316 stainless steel housing 5½-inch diameter, stainless steel mounting clamp, a flexible two-conductor cable with a CPE jacket, and a potted SPST magnetic reed switch. Provide switch configuration (NO or NC) as required. The electrical load for the switch contacts shall be 100 VA at up to 250 volts. Float switches shall include a two-conductor cable 16 AWG with fine strands made for heavy flexing service and underwater use. Cable length shall be 50 feet minimum for a continuous run to the terminating control panel. A green grounding wire shall connect internally to the float housing. Floats shall be **Siemens Model 9G-EF, or equal.**
  - 2. Weight and buoyancy shall be such that contaminants will not result in the float switch changing operating level more than 1-inch.
  - 3. Operating temperature range shall be -31° to 194°F.

4. Provide four floats for insertion in reservoir with depth of up to 30 feet below top of hatch. Floats shall sense 4 independent depths and controls as follows:
  - a. Overflow High Water Level (Alarm and locks out well pump).
  - b. Normal High Water Level (Shuts off well pump).
  - c. Normal Low Water Level (Turns on well pump).
  - d. Emergency Low Water Level (Alarm and locks out booster pumps).
- B. Floats shall be mounted on a stainless steel cable with PVC covered anchor per manufacturer's instructions. All mounting hardware shall be stainless steel and provided with floats.
- C. Provide stainless steel kellum grips for each float cable.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Provide power and control to transducer and control through existing conduits as shown on Drawings.
- B. Install equipment in accordance with manufacturer's recommendations.

#### 3.2 CALIBRATION

- A. Calibrate and program equipment to meet system requirements.
- B. Integrate into control system to provide noted system control.

#### 3.3 START-UP AND TESTING

- A. Comply with the manufacturer's recommended testing procedures.

END OF SECTION



SECTION 40 95 88  
POWER SUPPLY SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide power supply systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
  - 1. Comply with the requirements of Division 26 for any electrical work related to work in Division 40.
- C. References:
  - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals: Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE – Reserved.

1.4 DELIVERY, STORAGE, AND HANDLING

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

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

## PART 2 - PRODUCTS

### 2.1 UNINTERRUPTIBLE POWER SUPPLY

- A. Design uninterruptible power supply (UPS) to supply the total power requirement of the system plus 25 percent for future expansion.
  - 1. Provide no-break transfer line to inverter and return.
- B. Provide UPS unit with the following requirements:
  - 1. Input: 120 VAC 60 Hertz, single phase.
  - 2. Output: voltage 120 VAC 60 Hertz, single phase, true sine wave.
  - 3. Battery time: 30 minutes minimum of running time at full load or 60 minutes minimum at half load.
  - 4. Battery: Sealed, lead acid 5-year-maintenance free.
  - 5. Input/output configuration:
    - a. Input: 6-foot line cord with 20A, 3-prong grounded plug (5-20P).
    - b. Output: minimum 2-duplex, 15A receptacles.
  - 6. Safety: UL listed.
  - 7. Acceptable manufacturers:
    - a. American Power Conversion (APC), Smart UPS.
    - b. Sola/Hevy-Duty S4K Series.
    - c. Allen Bradley 1609 Series.
    - d. Or equal.
- C. Provide control panel UPS with relay interface card with dry contact relay outputs to monitor the following UPS status:
  - 1. Battery On.
  - 2. Battery Low.
  - 3. Communication Loss.
  - 4. Overloaded.
  - 5. Fault.
  - 6. Replace Battery.
- D. Provide computer UPS with interface communications software for the UPS to automatically perform an orderly shutdown of the computer to prevent loss of data, to monitor operating status of the UPS hardware and power system, and graphically display power system/UPS status.

### 2.2 DC POWER SUPPLY

- A. Design DC power supply to convert alternating current to direct current and supply the total power requirement of the system plus 25 percent for future expansion.
- B. Provide DC power supply with the following requirements:
  - 1. Input: 120 VAC, 60 Hertz.
  - 2. Output: DC voltage as required.
  - 3. Housing: Enclosed housing, DIN mounted.
  - 4. NEC Class 2.

5. Suitable for use as redundant power supply when connected to redundancy module (for 24 VDC power supplies).
  6. Complies with DeviceNet requirements for DeviceNet power supplies.
  7. Output contact to indicate power supply fault.
  8. Acceptable manufacturers:
    - a. Sola/Hevi-Duty SDN "P" Series.
    - b. Allen Bradley Bulletin 1606-XL.
    - c. Or equal.
- C. Provide Redundant DC power supply module with the following requirements:
1. Nominal voltage: 24VDC.
  2. Housing: Enclosed housing, DIN mounted.
  3. Allows two 24VDC power supplies to be connected to module using isolated inputs.
  4. NEC Class 2.
  5. Output contact to indicate module fault.
  6. Acceptable manufacturers:
    - a. Sola/Hevi-Duty SDN RED Series.
    - b. Allen Bradley Bulletin 1606-XLRED.
    - c. Or equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install power supply systems in accordance with manufacturer's recommendations.

END OF SECTION

## SECTION 40 95 92

### RELAYS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Provide relays as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
  - 1. Reserved.

##### 1.2 SUBMITTALS

- A. Shop Drawing Submittals:
  - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees - None Required.
- D. Lubricants – None Required.
- E. Spare Parts:
  - 1. Provide one spare relay for each type of relay installed.

##### 1.3 QUALITY ASSURANCE – Reserved.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

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

##### 1.5 SITE CONDITIONS – Reserved.

##### 1.6 MAINTENANCE – Reserved.

#### PART 2 - PRODUCTS

##### 2.1 GENERAL PURPOSE RELAYS

- A. Design general purpose relays to operate as follows:
  - 1. On application of control power to relay coil, contacts reverse state.
  - 2. Contacts return to de-energized state on removal of control power.

- B. Provide general purpose relays with the following requirements:
1. Plug-in blade type.
  2. Contacts:
    - a. Material: Silver cadmium oxide.
    - b. Rating: Minimum of 10A at 120 VAC.
    - c. Two Form C, minimum. Provide number of contacts for each relay as required for application.
  3. Duty cycle: Continuous.
  4. Relay sockets with barrier-type screw terminal connections for external wiring:
    - a. Surface or DIN rail mount.
    - b. Relay hold-down clips.
  5. Lamp indication when relay is energized.
  6. Acceptable manufacturers:
    - a. IDEC, RH Series.
    - b. Or equal.

## 2.2 DELAY-ON-MAKE (ON-DELAY) TIME DELAY RELAYS

- A. Design delay-on-make time delay relays to operate as follows:
1. On application of voltage to the coil, the relay contacts remain in the "off state" and timing cycle begins. When the set time has elapsed the relay contacts transfer to the "on state". The contacts remain in the "on state" until the timer is reset. The timer is reset upon removing the coil voltage. Timer is then ready for the next operation.
- B. Provide delay-on-make time delay relays with the following requirements:
1. Plug-in blade type.
  2. Repeat timing accuracy: Plus or minus 1.5 percent.
  3. Minimum setting: 10 percent of full range.
  4. Duty cycle: Continuous.
  5. Timing range: 0.1 sec. - 10 min.
  6. Contacts:
    - a. Material: Silver cadmium oxide.
    - b. Rating: 10A at 120 VAC.
    - c. Two Form C.
  7. Relay sockets with barrier-type screw terminal connections for external wiring.
    - a. Surface or DIN rail mount.
    - b. Relay hold-down clips.
  8. Acceptable manufacturers:
    - a. IDEC, RTE Series.
    - b. Or equal.

## 2.3 DELAY-ON-BREAK (OFF-DELAY) TIME DELAY RELAYS

- A. Design delay-on-break time delay relays to operate as follows:
1. Voltage is applied to the coil at all times. When a momentary or maintained start signal is supplied the contacts immediately transfer to "on state". The

set time begins when the start signal is removed. When the set time has elapsed, the contacts transfer to the "off state". The contacts remain in the "off state" until the next start signal is supplied. The timer can be reset by application of a reset input or by removing coil voltage.

- B. Provide delay-on-energize time delay relays with the following requirements:
  - 1. Plug-in blade type.
  - 2. Repeat timing accuracy: Plus or minus 1.5 percent.
  - 3. Minimum setting: 10 percent of full range.
  - 4. Duty cycle: Continuous.
  - 5. Timing range: 0.1 sec.- 10 min.
  - 6. Contacts:
    - a. Material: Silver cadmium oxide.
    - b. Rating: 10A at 120 VAC.
    - c. Two Form C.
  - 7. Relay sockets with barrier-type screw terminal connections for external wiring.
    - a. Surface or DIN rail mount.
    - b. Relay hold-down clips.
  - 8. Acceptable manufacturers:
    - a. IDEC, RTE Series.
    - b. Or equal.

## 2.4 MOTORIZED RESET TIMERS (BACKSPIN TIMERS)

- A. Design motorized reset timers (backspin timers) with synchronous timing motor driven reset timer suitable for door panel-mounting and reverse clutch operation to operate as follows:
  - 1. Timing cycle begins when control power is removed from the clutch. Control power must remain applied to the timing motor for the timing cycle to begin.
  - 2. Four sets of contacts that operate as follows:
    - a. Two sets change state when the "clutch" is energized and return to normal state when the clutch is de-energized.
    - b. One set changes state when the timing cycle has been completed.
    - c. One set changes state at approximately 5 percent of the timing cycle and will stop the timing motor ending the timing cycle.
- B. Provide motorized reset timers with the following requirements:
  - 1. Control power: 120 VAC, 60 Hertz.
  - 2. Timing range to be 0 to 10 minutes.
  - 3. Calibrated scale and adjustable knob with red progress pointer.
  - 4. Reset time: One-half second at maximum setting.
  - 5. Contacts:
    - a. Rating: 10A at 120 VAC, 5 amps at 240 VAC.
    - b. Four Form C that function as described above.
  - 6. Power indication: Neon pilot light.
  - 7. Standards recognition: U.L., CSA, and F.M.
  - 8. Acceptable manufacturers:
    - a. Eagle Signal Control, Model HP5-4-A6-01-00.

- b. Or equal.

## 2.5 POWER CONTROL RELAYS

- A. Design power control relays to operate as follows:
  - 1. On application of control power to relay coil, contacts reverse state.
  - 2. Contacts return to de-energized state on removal of control power
- B. Provide power control relay for heavy-duty switching operation with the following requirements:
  - 1. Screw-mounted type with screw type terminals.
  - 2. Contacts:
    - a. Material: Silver cadmium oxide.
    - b. Rating: 25A at 277 VAC, 1 horsepower per movable arm at 120 VAC.
    - c. Two Form C, minimum.
  - 3. Duty cycle: Continuous.
  - 4. Coil operating voltage: 120 VAC.
  - 5. Acceptable manufacturers:
    - a. Potter and Brumfield.
    - b. Or equal.

## 2.6 MULTIFUNCTION TIMERS

- A. Design multifunction timers with synchronous timing motor drive suitable for flush panel mounting.
- B. Provide multifunction timers with the following requirements:
  - 1. Control power: 120VAC, 60 Hz.
  - 2. Running reserve: 100 Hr.
  - 3. Minimum switch time: 20 minutes.
  - 4. Interval: 10 minutes.
  - 5. Contacts:
    - a. Rating: 10A at 120 VAC, 5A at 240 VAC.
    - b. Form C.
  - 6. Acceptable manufacturers:
    - a. IDEC Model GT3D4AF20.
    - b. Or equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install relays in accordance with manufacturer's recommendations.

### 3.2 CALIBRATION

- A. Calibrate and program equipment to meet system requirements.

### 3.3 START-UP AND TESTING

- A. Comply with the manufacturer's recommended testing procedures.

END OF SECTION



## SECTION E: BIDDERS ACKNOWLEDGEMENT

### UNIT WELL 26 GENERATOR ADDITION CONTRACT NO. 7107

Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2013 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda to the Contract Nos. \_\_\_\_\_ through \_\_\_\_\_ issued thereto, at the prices for said work as contained in this proposal. (Electronic bids submittals shall acknowledge addendum under Section E and shall not acknowledge here)
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. I hereby certify that I have met the Bid Bond Requirements as specified in Section 102.5.  
*(IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).*
5. I hereby certify that all statements herein are made on behalf of \_\_\_\_\_ (name of corporation, partnership, or person submitting bid) a corporation organized and existing under the laws of the State of \_\_\_\_\_ a partnership consisting of \_\_\_\_\_; an individual trading as \_\_\_\_\_; of the City of \_\_\_\_\_ State of \_\_\_\_\_; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
TITLE, IF ANY

Sworn and subscribed to before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Notary Public or other officer authorized to administer oaths)

My Commission Expires \_\_\_\_\_

Bidders shall not add any conditions or qualifying statements to this Proposal.

## SECTION F: DISCLOSURE OF OWNERSHIP & BEST VALUE CONTRACTING

### UNIT WELL 26 GENERATOR ADDITION CONTRACT NO. 7107

State of Wisconsin  
Department of Workforce Development  
Equal Rights Division  
Labor Standards Bureau

### Disclosure of Ownership

**Notice required under Section 15.04(1)(m), Wisconsin Statutes.** The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(d) and 103.49(7)(d), Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personal information you provide may be used for secondary purposes.

- (1) On the date a contractor submits a bid to or completes negotiations with a state agency or local governmental unit, on a project subject to Section 66.0903 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency or local governmental unit the name of any "other construction business", which the contractor, or a shareholder, officer or partner of the contractor, owns or has owned within the preceding three (3) years.
- (2) The term "other construction business" means any business engaged in the erection, construction, remodeling, repairing, demolition, altering or painting and decorating of buildings, structures or facilities. It also means any business engaged in supplying mineral aggregate, or hauling excavated material or spoil as provided by Sections 66.0903(3), 103.49(2) and 103.50(2), Wisconsin Statutes.
- (3) This form must ONLY be filed, with the state agency or local governmental unit that will be awarding the contract, if **both (A) and (B) are met.**
- (A) The contractor, or a shareholder, officer or partner of the contractor:
- (1) Owns at least a 25% interest in the "other construction business", indicated below, on the date the contractor submits a bid or completes negotiations.
- (2) Or has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.
- (B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for hours worked in excess of the prevailing hours of labor, to any employee at any time within the preceding three (3) years.

#### Other Construction Business

**Not Applicable** ☐

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

**I hereby state under penalty of perjury that the information, contained in this document, is true and accurate according to my knowledge and belief.**

Print the Name of Authorized Officer

Signature of Authorized Officer

Date Signed

Name of Corporation, Partnership or Sole Proprietorship

Street Address or P O Box

City

State

Zip Code

**If you have any questions call (608) 266-0028**

ERD-7777-E (R. 09/2003)

**UNIT WELL 26 GENERATOR ADDITION  
CONTRACT NO. 7107**

**Best Value Contracting**

1. The Contractor shall indicate the non-apprenticeable trades used on this contract.

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2. Madison General Ordinance (M.G.O.), 33.07(7), does provide for some exemptions from the active apprentice requirement. Apprenticeable trades are those trades considered apprenticeable by the State of Wisconsin. Please check applicable box if you are seeking an exemption.

- ☐ Contractor has a total skilled workforce of four or less individuals in all apprenticeable trades combined.
- ☐ No available trade training program; The Contractor has been rejected by the only available trade training program, or there is no trade training program within 90 miles.
- ☐ Contractor is not using an apprentice due to having a journey worker on layoff status, provided the journey worker was employed by the contractor in the past six months.
- ☐ First-time Contractor on City of Madison Public Works contract requests a onetime exemption but intends to comply on all future contracts and is taking steps typical of a "good faith" effort.
- ☐ Contractor has been in business less than one year.
- ☐ Contractor doesn't have enough journeyman trade workers to qualify for a trade training program in that respective trade

3. The Contractor shall indicate on the following section which apprenticeable trades are to be used on this contract. Compliance with active apprenticeship, to the extent required by M.G.O. 33.07(7), shall be satisfied by documentation from an applicable trade training body; an apprenticeship contract with the Wisconsin Department of Workforce Development or a similar agency in another state; or the U.S Department of Labor. This documentation is required prior to the Contractor beginning work on the project site.

- ☐ The Contractor has reviewed the list and shall not use any apprenticeable trades on this project.

**LIST APPRENTICABLE TRADES** (check all that apply to your work to be performed on this contract)

- ☐ BRICKLAYER
- ☐ CARPENTER
- ☐ CEMENT MASON / CONCRETE FINISHER
- ☐ CEMENT MASON (HEAVY HIGHWAY)
- ☐ CONSTRUCTION CRAFT LABORER
- ☐ DATA COMMUNICATION INSTALLER
- ☐ ELECTRICIAN
- ☐ ENVIRONMENTAL SYSTEMS TECHNICIAN / HVAC SERVICE TECH/HVAC INSTALL / SERVICE
- ☐ GLAZIER
- ☐ HEAVY EQUIPMENT OPERATOR / OPERATING ENGINEER
- ☐ INSULATION WORKER (HEAT & FROST)
- ☐ IRON WORKER
- ☐ IRON WORKER (ASSEMBLER, METAL BLDGS)
- ☐ PAINTER & DECORATOR
- ☐ PLASTERER
- ☐ PLUMBER
- ☐ RESIDENTIAL ELECTRICIAN
- ☐ ROOFER & WATER PROOFER
- ☐ SHEET METAL WORKER
- ☐ SPRINKLER FITTER
- ☐ STEAMFITTER
- ☐ STEAMFITTER (REFRIGERATION)
- ☐ STEAMFITTER (SERVICE)
- ☐ TAPER & FINISHER
- ☐ TELECOMMUNICATIONS (VOICE, DATA & VIDEO) INSTALLER-TECHNICIAN
- ☐ TILE SETTER

## SECTION G: BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT \_\_\_\_\_ (a corporation of the State of \_\_\_\_\_) (individual), (partnership), hereinafter referred to as the "Principal") and \_\_\_\_\_, a corporation of the State of \_\_\_\_\_ (hereinafter referred to as the "Surety") and licensed to do business in the State of Wisconsin, are held and firmly bound unto the City of Madison, (hereinafter referred to as the "Obligee"), in the sum of five per cent (5%) of the amount of the total bid or bids of the Principal herein accepted by the Obligee, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that, whereas the Principal has submitted, to the City of Madison a certain bid, including the related alternate, and substitute bids attached hereto and hereby made a part hereof, to enter into a contract in writing for the construction of:

### UNIT WELL 26 GENERATOR ADDITION CONTRACT NO. 7107

1. If said bid is rejected by the Obligee, then this obligation shall be void.
2. If said bid is accepted by the Obligee and the Principal shall execute and deliver a contract in the form specified by the Obligee (properly completed in accordance with said bid) and shall furnish a bond for his/her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

If said bid is accepted by the Obligee and the Principal shall fail to execute and deliver the contract and the performance and payment bond noted in 2. above executed by this Surety, or other Surety approved by the City of Madison, all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to forfeit to the Obligee as liquidated damages the sum mentioned above, it being understood that the liability of the Surety for any and all claims hereunder shall in no event exceed the sum of this obligation as stated, and it is further understood that the Principal and Surety reserve the right to recover from the Obligee that portion of the forfeited sum which exceed the actual liquidated damages incurred by the Obligee.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

Seal

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Date

By:

\_\_\_\_\_

\_\_\_\_\_  
Name of Surety

By:

\_\_\_\_\_

\_\_\_\_\_  
Date

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. \_\_\_\_\_ for the year \_\_\_\_\_, and appointed as attorney in fact with authority to execute this bid bond and the payment and performance bond referred to above, which power of attorney has not been revoked.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Agent

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State and Zip Code

\_\_\_\_\_  
Telephone Number

#### NOTE TO SURETY & PRINCIPAL

The bid submitted which this bond guarantees may be rejected if the following instrument is not attached to this bond:

Power of Attorney showing that the agent of Surety is currently authorized to execute bonds on behalf of the Surety, and in the amounts referenced above.

## Certificate of Biennial Bid Bond

TIME PERIOD - VALID (FROM/TO)
NAME OF SURETY
NAME OF CONTRACTOR
CERTIFICATE HOLDER <div>City of Madison, Wisconsin</div>

This is to certify that a biennial bid bond issued by the above-named Surety is currently on file with the City of Madison.

This certificate is issued as a matter of information and conveys no rights upon the certificate holder and does not amend, extend or alter the coverage of the biennial bid bond.

Cancellation: Should the above policy be cancelled before the expiration date, the issuing Surety will give thirty (30) days written notice to the certificate holder indicated above.

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Signature of Authorized Contractor Representative

---

Date

## SECTION H: AGREEMENT

THIS AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ in the year Two Thousand and Thirteen between \_\_\_\_\_ hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted \_\_\_\_\_, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

### UNIT WELL 26 GENERATOR ADDITION CONTRACT NO. 7107

2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.
3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum of \_\_\_\_\_ (\$\_\_\_\_\_) Dollars being the amount bid by such Contractor and which was awarded to him/her as provided by law.

4. **Wage Rates for Employees of Public Works Contractors**

**General and Authorization.** The Contractor shall compensate its employees at the prevailing wage rate in accordance with section 66.0903, Wis. Stats., DWD 290 of the Wisconsin Administrative Code and as hereinafter provided unless otherwise noted in Section D: Special Provisions, Subsection 102.10 – Minimum Rate of Wage Scale.

“Public Works” shall include building or work involving the erection, construction, remodeling, repairing or demolition of buildings, parking lots, highways, streets, bridges, sidewalks, street lighting, traffic signals, sanitary sewers, water mains and appurtenances, storm sewers, and the grading and landscaping of public lands.

“Building or work” includes construction activity as distinguished from manufacturing, furnishing of materials, or servicing and maintenance work, except for the delivery of mineral aggregate such as sand, gravel, bituminous asphaltic concrete or stone which is incorporated into the work under contract with the City by depositing the material directly in final place from transporting vehicle.

“Erection, construction, remodeling, repairing” means all types of work done on a particular building or work at the site thereof in the construction or development of the project, including without limitation, erecting, construction, remodeling, repairing, altering, painting, and decorating, the transporting of materials and supplies to or from the building or work done by the employees of the Contractor, Subcontractor, or Agent thereof, and the manufacturing or furnishing of



materials, articles, supplies or equipment on the site of the building or work, by persons employed by the Contractor, Subcontractor, or Agent thereof.

"Employees working on the project" means laborers, workers, and mechanics employed directly upon the site of work.

"Laborers, Workers, and Mechanics" include pre-apprentices, helpers, trainees, learners and properly registered and indentured apprentices but exclude clerical, supervisory, and other personnel not performing manual labor.

**Establishment of Wage Rates.** The Department of Public Works shall periodically obtain a current schedule of prevailing wage rates from DWD. The schedule shall be used to establish the City of Madison Prevailing Wage Rate Schedule for Public Works Construction (prevailing wage rate). The Department of Public Works may include known increases to the prevailing wage rate which can be documented and are to occur on a future specific date. The prevailing wage rate shall be included in public works contracts subsequently negotiated or solicited by the City. Except for known increases contained within the schedule, the prevailing wage rate shall not change during the contract. The approved wage rate is attached hereto.

**Workforce Profile.** The Contractor shall, at the time of signature of the contract, notify the City Engineer in writing of the names and classifications of all the employees of the Contractor, Subcontractors, and Agents proposed for the work. In the alternative, the Contractor shall submit in writing the classifications of all the employees of the Contractor, Subcontractors and Agents and the total number of hours estimated in each classification for the work. This workforce profile(s) shall be reviewed by the City Engineer who may, within ten (10) days, object to the workforce profile(s) as not being reflective of that which would be required for the work. The Contractor may request that the workforce profile, or a portion of the workforce profile, be submitted after the signature of the contract but at least ten (10) days prior to the work commencing. Any costs or time loss resulting from modifications to the workforce profile as a result of the City Engineer's objections shall be the responsibility of the Contractor.

**Payrolls and Records.** The Contractor shall keep weekly payroll records setting forth the name, address, telephone number, classification, wage rate and fringe benefit package of all the employees who work on the contract, including the employees of the Contractor's subcontractors and agents. Such weekly payroll records must include the required information for all City contracts and all other contracts on which the employee worked during the week in which the employee worked on the contract. The Contractor shall also keep records of the individual time each employee worked on the project and for each day of the project. Such records shall also set forth the total number of hours of overtime credited to each such employee for each day and week and the amount of overtime pay received in that week. The records shall set forth the full weekly wages earned by each employee and the actual hourly wage paid to the employee.

The Contractor shall submit the weekly payroll records, including the records of the Contractor's subcontractors and agents, to the City Engineer for every week that work is being done on the contract. The submittal shall be within twenty-one (21) calendar days of the end of the Contractor's weekly pay period.

Employees shall receive the full amounts accrued at the time of the payment, computed at rates not less than those stated in the prevailing wage rate and each employee's rate shall be determined by the work that is done within the trade or occupation classification which should be properly assigned to the employee.

An employee's classification shall not be changed to a classification of a lesser rate during the contract. If, during the term of the contract, an employee works in a higher pay classification than the one which was previously properly assigned to the employee, then that employee shall be considered to be in the higher pay classification for the balance of the contract, receive the appropriate higher rate of pay, and she/he shall not receive a lesser rate during the balance of the

contract. For purposes of clarification, it is noted that there is a distinct difference between working in a different classification with higher pay and doing work within a classification that has varying rates of pay which are determined by the type of work that is done within the classification. For example, the classification "Operating Engineer" provides for different rates of pay for various classes of work and the Employer shall compensate an employee classified as an "Operating Engineer" based on the highest class of work that is done in one day. Therefore, an "Operating Engineer's" rate may vary on a day to day basis depending on the type of work that is done, but it will never be less than the base rate of an "Operating Engineer". Also, as a matter of clarification, it is recognized that an employee may work in a higher paying classification merely by chance and without prior intention, calculation or design. If such is the case and the performance of the work is truly incidental and the occurrence is infrequent, inconsequential and does not serve to undermine the single classification principle herein, then it may not be required that the employee be considered to be in the higher pay classification and receive the higher rate of pay for the duration of the contract. However, the Contractor is not precluded or prevented from paying the higher rate for the limited time that an employee performs work that is outside of the employee's proper classification.

Questions regarding an employee's classification, rate of pay or rate of pay within a classification, shall be resolved by reference to the established practice that predominates in the industry and on which the trade or occupation rate/classification is based. Rate of pay and classification disputes shall be resolved by relying upon practices established by collective bargaining agreements and guidelines used in such determination by appropriate recognized trade unions operating within the City of Madison.

The Contractor, its Subcontractors and Agents shall submit to interrogation regarding compliance with the provisions of this ordinance.

Mulcting of the employees by the Contractor, Subcontractor, and Agents on Public Works contracts, such as by kickbacks or other devices, is prohibited. The normal rate of wage of the employees of the Contractor, Subcontractor, and Agents shall not be reduced or otherwise diminished as a result of payment of the prevailing wage rate on a public works contract.

**Hourly contributions.** Hourly contributions shall be determined in accordance with the prevailing wage rate and with DWD. 290.01(10), Wis. Admin. Code.

**Apprentices and Subjourney persons.** Apprentices and sub journeypersons performing work on the project shall be compensated in accordance with the prevailing wage rate and with DWD 290.02, and 290.025, respectively, Wis. Admin. Code.

**Straight Time Wages.** The Contractor may pay straight time wages as determined by the prevailing wage rate and DWD 290.04, Wis. Admin. Code.

**Overtime Wages.** The Contractor shall pay overtime wages as required by the prevailing wage rate and DWD 290.05, Wis. Admin. Code.

**Posting of Wage Rates and Hours.** A clearly legible copy of the prevailing wage rate, together with the provisions of Sec. 66.0903(10)(a) and (11)(a), Wis. Stats., shall be kept posted in at least one conspicuous and easily accessible place at the project site by the Contractor and such notice shall remain posted during the full time any laborers, workers or mechanics are employed on the contract.

**Evidence of Compliance by Contractor.** Upon completion of the contract, the Contractor shall file with the Department of Public Works an affidavit stating:

- a. That the Contractor has complied fully with the provisions and requirements of Sec. 66.0903(3), Wis. Stats., and Chapter DWD 290, Wis. Admin. Code; the Contractor has received evidence of compliance from each of the agents and subcontractors; and the

names and addresses of all of the subcontractors and agents who worked on the contract.

- b. That full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefore; where these records will be kept and the name, address and telephone number of the person who will be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

**Evidence of Compliance by Agent and Subcontractor.** Each agent and subcontractor shall file with the Contractor, upon completion of their portion of the work on the contract an affidavit stating that all the provisions of Sec. 66.0903(3), Wis. Stats., have been fully complied with and that full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefore; where these records shall be kept and the name, address and telephone number of the person who shall be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

**Failure to Comply with the Prevailing Wage Rate.** If the Contractor fails to comply with the prevailing wage rate, she/he shall be in default on the contract.

5. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex or national origin.

The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City Affirmative Action Division certain workforce utilization statistics, using a form to be furnished by the City.

If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Affirmative Action Division no later than one year after the date on which the first form was required to be provided.

The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City Affirmative Action Division of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications and application procedures and deadlines. The Contractor agrees to interview and consider candidates referred by the Affirmative Action Division if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

Articles of Agreement  
Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex or national origin and that the employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex or national origin.

Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Director of Affirmative Action.

Article VI

The Contractor will maintain records as required by Section 39.02(9)(f) of the Madison General Ordinances and will provide the City Affirmative Action Division with access to such records and to persons who have relevant and necessary information, as provided in Section 39.02(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 39.03 and 39.02 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.
2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.

3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or five thousand dollars (\$5,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

#### Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

#### Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract.

**UNIT WELL 26 GENERATOR ADDITION  
CONTRACT NO. 7107**

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused these presents to be sealed with its corporate seal and to be subscribed by its Mayor and City Clerk the day and year first above written.

Countersigned:

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Witness Date

\_\_\_\_\_  
President Date

\_\_\_\_\_  
Witness Date

\_\_\_\_\_  
Secretary Date

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

Approved as to form:

\_\_\_\_\_  
Finance Director

\_\_\_\_\_  
City Attorney

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Mayor Date

\_\_\_\_\_  
Witness

\_\_\_\_\_  
City Clerk Date

## SECTION I: PAYMENT AND PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we \_\_\_\_\_  
as \_\_\_\_\_ principal, \_\_\_\_\_ and

Company of \_\_\_\_\_ as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of \_\_\_\_\_ (\$\_\_\_\_\_) Dollars, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

### UNIT WELL 26 GENERATOR ADDITION CONTRACT NO. 7107

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_

Countersigned:

\_\_\_\_\_  
Company Name (Principal)

\_\_\_\_\_  
Witness

\_\_\_\_\_  
President

\_\_\_\_\_  
Seal

\_\_\_\_\_  
Secretary

Approved as to form:

\_\_\_\_\_  
Surety Seal  
☐ Salary Employee ☐ Commission

\_\_\_\_\_  
City Attorney

By \_\_\_\_\_  
Attorney-in-Fact

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. \_\_\_\_\_ for the year 20\_\_\_\_\_, and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Agent Signature

## **SECTION J: PREVAILING WAGE RATES**



## PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin  
Department of Workforce Development  
Pursuant to s. 66.0903, Wis. Stats.  
Issued On: 01/10/2013  
Amended On: 02/18/2013

**DETERMINATION NUMBER:** 201300080

**EXPIRATION DATE:** Prime Contracts MUST Be Awarded or Negotiated On Or Before 12/31/2013. If NOT, You MUST Reapply.

**PROJECT NAME:** ALL PUBLIC WORKS PROJECTS UNDER SEC 66.0903, STATS - CITY OF MADISON

**PROJECT LOCATION:** MADISON CITY, DANE COUNTY, WI

**CONTRACTING AGENCY:** CITY OF MADISON-ENGINEERING

<b>CLASSIFICATION:</b>	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 & Work Descriptions on the DWD website at: <a href="http://dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm">dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm</a> .
<b>OVERTIME:</b>	<p>Time and one-half must be paid for all hours worked:</p> <ul style="list-style-type: none"><li>- over 10 hours per day on prevailing wage projects</li><li>- over 40 hours per calendar week</li><li>- Saturday and Sunday</li><li>- 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;</li><li>- The day before if January 1, July 4 or December 25 falls on a Saturday;</li><li>- The day following if January 1, July 4 or December 25 falls on a Sunday.</li></ul> <p>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.</p> <p>A DOT Premium (discussed below) may supersede this time and one-half requirement.</p>
<b>FUTURE INCREASE:</b>	When a specific trade or occupation requires a future increase, you MUST add the full hourly increase to the "TOTAL" on the effective date(s) indicated for the specific trade or occupation.
<b>PREMIUM PAY:</b>	If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.
<b>DOT PREMIUM:</b>	This premium only applies to highway and bridge projects owned by the Wisconsin Department of Transportation and to the project type heading "Airport Pavement or State Highway Construction." DO NOT apply the premium calculation under any other project type on this determination.
<b>APPRENTICES:</b>	Pay apprentices a percentage of the applicable journey person'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.
<b>SUBJOURNEY:</b>	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.

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 (1) (f) & s. 103.49 (1) (c) "PREVAILING HOURS OF LABOR"** for any trade or occupation in any area means 10 hours per day and 40 hours per week and may not include any hours worked on a Saturday or Sunday or on any of the following holidays:

1. January 1.
2. The last Monday in May.
3. July 4.
4. The first Monday in September.
5. The 4th Thursday in November.
6. December 25.
7. The day before if January 1, July 4 or December 25 falls on a Saturday.
8. The day following if January 1, July 4 or December 25 falls on a Sunday.

**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 within a period specified by the department 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.

**BUILDING OR HEAVY CONSTRUCTION**

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**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
101	Acoustic Ceiling Tile Installer	30.16	15.31	45.47
102	Boilermaker	31.09	24.52	55.61
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add \$ .80 on 6/1/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.01	17.35	49.36
104	Cabinet Installer	30.16	15.31	45.47
105	Carpenter	30.16	15.31	45.47
106	Carpet Layer or Soft Floor Coverer	30.16	15.31	45.47
107	Cement Finisher	31.48	13.19	44.67
108	Drywall Taper or Finisher	25.10	14.78	39.88
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
110	Elevator Constructor	44.94	23.84	68.78
111	Fence Erector	22.50	3.98	26.48
112	Fire Sprinkler Fitter	36.07	18.60	54.67
113	Glazier	37.13	12.32	49.45
114	Heat or Frost Insulator	33.93	23.26	57.19
115	Insulator (Batt or Blown)	27.47	19.16	46.63
116	Ironworker	30.90	19.11	50.01
117	Lather	30.16	15.31	45.47
118	Line Constructor (Electrical)	37.05	16.94	53.99

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
119	Marble Finisher	20.00	0.00	20.00
120	Marble Mason	32.01	16.85	48.86
121	Metal Building Erector	18.05	8.08	26.13
122	Millwright	31.76	15.36	47.12
123	Overhead Door Installer	13.50	0.00	13.50
124	Painter	24.80	14.78	39.58
125	Pavement Marking Operator	30.00	0.00	30.00
126	Piledriver	30.66	15.31	45.97
127	Pipeline Fuser or Welder (Gas or Utility)	30.18	19.29	49.47
129	Plasterer	30.03	16.36	46.39
130	Plumber	36.17	15.37	51.54
132	Refrigeration Mechanic	42.45	16.71	59.16
133	Roofer or Waterproofer	30.40	2.23	32.63
134	Sheet Metal Worker	34.23	20.19	54.42
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	21.89	11.85	33.74
138	Temperature Control Installer	41.20	16.21	57.41
139	Terrazzo Finisher Future Increase(s): Add \$ .80 on 6/1/2013	26.57	16.50	43.07
140	Terrazzo Mechanic	29.51	17.63	47.14
141	Tile Finisher Future Increase(s): Add \$ .80/hr on 6/1/2013.	23.77	16.50	40.27
142	Tile Setter Future Increase(s): Add \$ .80/hr on 6/1/2013.	29.71	16.50	46.21
143	Tuckpointer, Caulker or Cleaner Future Increase(s): Add \$ .80 on 6/1/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.01	17.35	49.36

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
144	Underwater Diver (Except on Great Lakes)	34.16	15.31	49.47
146	Well Driller or Pump Installer Future Increase(s): Add \$.20/hr on 06/01/2013.	25.32	15.45	40.77
147	Siding Installer	37.20	17.01	54.21
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	28.24	15.10	43.34
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.64	44.28
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	24.00	11.57	35.57

**TRUCK DRIVERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	31.89	17.98	49.87
203	Three or More Axle	18.00	11.45	29.45
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	18.00	11.45	29.45

**LABORERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
301	General Laborer Future Increase(s): Add \$.75/hr. on 06/03/2013 Premium Increase(s): Add \$1.00/hr for certified welder; Add \$.25/hr for mason tender	24.19	13.90	38.09
302	Asbestos Abatement Worker	18.00	0.00	18.00
303	Landscaper	15.00	3.90	18.90
310	Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	20.94	12.65	33.59

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased) Premium Increase(s): DOT PREMIUMS: Pay two times the hourly basic rate on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	18.31	12.67	30.98
314	Railroad Track Laborer	23.41	6.91	30.32
315	Final Construction Clean-Up Worker	24.69	12.90	37.59

**HEAVY EQUIPMENT OPERATORS  
SITE PREPARATION, UTILITY OR LANDSCAPING WORK ONLY**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
501	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfg'r's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfg'r's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & 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 & 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). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
502	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 & Under). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
503	Air Compressor (&/or 400 CFM or Over); Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&/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 6/2/2013.	30.32	18.46	48.78

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
504	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
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. Future Increase(s): Add \$2.19/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014. Premium Increase(s): Add \$.50/hr for Friction Crane, Lattice Boom or Crane Certification (CCO).	38.80	20.17	58.97
506	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. Future Increase(s): Add \$2.08/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014.	34.50	20.04	54.54
507	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. Future Increase(s): Add \$1.88/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014.	28.70	19.86	48.56

**HEAVY EQUIPMENT OPERATORS  
EXCLUDING SITE PREPARATION, UTILITY, PAVING LANDSCAPING WORK**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
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 6/2/2013. Premium Increase(s): Add \$.50/hr for >200 Ton / Add \$1/hr at 300 Ton / Add \$1.50 at 400 Ton / Add \$2/hr at 500 Ton & Over.	35.12	18.46	53.58

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
509	Backhoe (Track Type) Having a Mfgr'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 6/2/2013. Premium Increase(s): Add \$.25/hr for all >45 Ton lifting capacity cranes.	34.12	18.46	52.58
510	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & 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 & Gutter Machine; Concrete Spreader & Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type).	32.42	17.97	50.39
511	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantrys (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 6/2/2013.	32.39	18.46	50.85
512	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & 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 & 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 & Under); Winches & A-Frames. Future Increase(s): Add \$1/hr on 6/2/2013.	30.32	18.46	48.78



<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
513	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & 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); Forklift; Generator (&/or 150 KW or Over); Greaser; Heaters (Mechanical); Loading Machine (Conveyor); Oiler; Post Hole Digger or Driver; Prestress Machine; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1/hr on 6/2/2013.	29.69	18.46	48.15
514	Gas or Utility Pipeline, Except Sewer & Water (Primary Equipment). Future Increase(s): Add \$2/hr on 1/1/2013.	34.89	20.59	55.48
515	Gas or Utility Pipeline, Except Sewer & Water (Secondary Equipment). Future Increase(s): Add \$1.60/hr on 06/01/2013; Add \$1.60/hr on 06/01/2014; Add \$1.65/hr on 06/01/2015.	31.32	17.95	49.27
516	Fiber Optic Cable Equipment Future Increase(s): Add \$1.75/hr on 02/01/2013; Add \$1.75/hr on 02/01/2014	26.69	16.65	43.34

<b>SEWER, WATER OR TUNNEL CONSTRUCTION</b>
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**Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).**

<b>SKILLED TRADES</b>
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Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
		\$	\$	\$
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add \$1.45/hr on 6/01/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	35.80	16.87	52.67
105	Carpenter Future Increase(s): Add \$.75/hr on 6/3/2013. Add \$1.25/hr on 6/2/2014. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.93	19.81	52.74
107	Cement Finisher Future Increase(s): Add \$1.87 on 6/1/13; Add \$1.87 on 6/1/14; Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16. 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 \$1.40/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.	32.09	16.13	48.22
109	Electrician Future Increase(s): Add \$1.60/hr on 6/1/2013. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.20	21.71	53.91
111	Fence Erector	22.50	3.98	26.48
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	37.05	16.94	53.99
125	Pavement Marking Operator	28.10	15.00	43.10
126	Piledriver	30.66	15.31	45.97
130	Plumber	36.97	17.66	54.63

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
146	Well Driller or Pump Installer	21.00	2.23	23.23
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	28.24	15.10	43.34
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.64	44.28
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

**TRUCK DRIVERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	25.87	13.00	38.87
203	Three or More Axle	17.54	13.85	31.39
204	Articulated, Euclid, Dumptor, Off Road Material Hauler	31.89	17.98	49.87
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	17.00	0.00	17.00

**LABORERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
301	General Laborer Future Increase(s): Add \$.80/hr. on 06/03/2013 Premium Increase(s): Add \$.20 for blaster, bracer, manhole builder, caulker, bottomman and power tool; Add \$.55 for pipelayer; Add \$1.00 for tunnel work 0-15 lbs. compressed air; Add \$2.00 for over 15-30 lbs. compressed air; Add \$3.00 for over 30 lbs. compressed air.	25.53	13.89	39.42
303	Landscaper	26.92	12.51	39.43

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
304	Flagperson or Traffic Control Person	17.33	15.53	32.86
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32

**HEAVY EQUIPMENT OPERATORS  
SEWER, WATER OR TUNNEL WORK**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
521	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 &/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 \$1/hr on 6/2/2013. Premium Increase(s): Add \$.50/hr for >200 Ton / Add \$1/hr at 300 Ton / Add \$1.50 at 400 Ton / Add \$2/hr at 500 Ton & Over.	35.12	18.46	53.58
522	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & 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 & Distributor; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/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. & 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 6/2/2013.	32.92	18.46	51.38
523	Air Track, Rotary or Percussion Drilling Machine &/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 & Under), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & 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). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
524	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & 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 & 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 & Under); Winches & A-Frames.	31.89	18.11	50.00
525	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Generator (&/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. Future Increase(s): Add \$1/hr on 6/2/2013.	29.69	18.46	48.15
526	Boiler (Temporary Heat); Forklift; Greaser; Oiler.	30.44	19.10	49.54
527	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
528	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
529	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.	27.75	19.15	46.90
530	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.	27.75	19.15	46.90

<b>AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION</b>
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**Includes all airport projects (excluding buildings) and all projects awarded by the Wisconsin Department of Transportation (excluding buildings).**

<b>SKILLED TRADES</b>
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Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u> \$	<u>HOURLY FRINGE BENEFITS</u> \$	<u>TOTAL</u> \$
103	Bricklayer, Blocklayer or Stonemason	35.58	19.20	54.78
105	Carpenter	30.16	15.31	45.47
107	Cement Finisher Future Increase(s): Add \$1.87 on 6/1/13; Add \$1.87 on 6/1/14; Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16. 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 \$1.40/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.	32.09	16.13	48.22
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
111	Fence Erector	28.00	4.50	32.50
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	31.29	15.34	46.63
124	Painter	26.65	13.10	39.75
125	Pavement Marking Operator	29.22	16.71	45.93
126	Piledriver	30.66	15.31	45.97
133	Roofer or Waterproofor	30.40	2.23	32.63
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.64	17.00	46.64
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	35.50	15.09	50.59

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65
<b>TRUCK DRIVERS</b>				

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	33.22	18.90	52.12
203	Three or More Axle Future Increase(s): Add \$1.85/hr on 6/1/2013. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	23.31	17.13	40.44
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	27.77	19.90	47.67
205	Pavement Marking Vehicle	23.84	14.94	38.78
206	Shadow or Pilot Vehicle	33.22	18.90	52.12
207	Truck Mechanic	22.50	16.19	38.69

## LABORERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
301	General Laborer Future Increase(s): 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).	28.35	13.90	42.25
302	Asbestos Abatement Worker	18.00	0.00	18.00
303	Landscaper Future Increase(s): Add \$1.70/hr on 6/1/13; Add \$1.60/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).	28.35	13.90	42.25
304	Flagperson or Traffic Control Person Future Increase(s): Add \$1.70/hr on 6/1/2013; Add \$1.60/hr on 6/1/2014. 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 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.	24.70	13.90	38.60
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32



**HEAVY EQUIPMENT OPERATORS  
AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
531	Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/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; Traveling Crane (Bridge Type). Future Increase(s): 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	35.22	19.90	55.12
532	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 Boom, Leads &/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., & 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 6/1/13; 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	34.72	19.90	54.62

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
533	<p>Air Track, Rotary or Percussion Drilling Machine &amp;/or Hammers, Blaster; Asphalt Heater, Planer &amp; Scarifier; Asphalt Milling Machine; Asphalt Screed; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. &amp; Under); Bituminous (Asphalt) Plant &amp; Paver, Screed; Boatmen (NOT Performing Work on the Great Lakes); 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 (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; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; 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); Straddle Carrier or Travel Lift; 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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtml">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtml</a>.</p>	34.22	19.90	54.12
534	<p>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 (Asphalt Plant, Pile Driver &amp; Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawyer (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; Tining or Curing Machine.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s):</p>	33.96	19.90	53.86

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
	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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .			
535	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/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. Future Increase(s): 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	33.67	19.90	53.57
536	Fiber Optic Cable Equipment.	25.74	15.85	41.59
537	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
538	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
539	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.	27.75	19.15	46.90
540	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.	27.75	19.15	46.90

<b>LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION</b>
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**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).**

<b>SKILLED TRADES</b>
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Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
		<b>\$</b>	<b>\$</b>	<b>\$</b>
103	Bricklayer, Blocklayer or Stonemason	33.00	15.00	48.00
105	Carpenter	30.16	15.31	45.47
107	Cement Finisher	31.48	15.68	47.16
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
111	Fence Erector	22.50	3.98	26.48
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	37.05	16.94	53.99
124	Painter	24.80	14.78	39.58
125	Pavement Marking Operator	28.10	15.00	43.10
126	Piledriver	30.66	15.31	45.97
133	Roofer or Waterproofofer	30.40	2.23	32.63
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.55	44.19
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	30.60	14.64	45.24
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

**TRUCK DRIVERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	25.87	13.00	38.87
203	Three or More Axle	17.00	0.00	17.00
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
205	Pavement Marking Vehicle	20.85	11.02	31.87
206	Shadow or Pilot Vehicle	25.87	13.00	38.87
207	Truck Mechanic	17.00	0.00	17.00

**LABORERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
301	General Laborer	27.20	13.37	40.57
303	Landscaper	18.25	1.11	19.36
304	Flagperson or Traffic Control Person	17.33	15.53	32.86
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32

**HEAVY EQUIPMENT OPERATORS  
CONCRETE PAVEMENT OR BRIDGE WORK**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
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 6/1/13; 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	35.22	19.90	55.12
542	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. & 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 6/1/13; 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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a> .	34.72	19.90	54.62

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
543	<p>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 (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; 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 (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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a>.</p>	34.22	19.90	54.12
544	<p>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 Sawyer (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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>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 night work premium. See DOT's website for details about the applicability of this night work premium at: <a href="http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm">http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm</a>.</p>	33.96	19.90	53.86

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
545	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/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.	29.82	17.98	47.80
546	Fiber Optic Cable Equipment.	25.74	15.85	41.59
547	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
548	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
549	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.	27.75	19.15	46.90
550	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.	27.75	19.15	46.90

**HEAVY EQUIPMENT OPERATORS  
ASPHALT PAVEMENT OR OTHER WORK**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
551	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.	34.62	17.98	52.60
552	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 \$1/hr on 6/2/2013.	32.92	18.46	51.38



<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
553	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type) Having a Mfr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & 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 & 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 & A-Frames. Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
554	Backfiller; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawyer (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. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.	33.67	19.55	53.22
555	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Generator (&/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. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.	33.67	19.55	53.22
556	Fiber Optic Cable Equipment.	25.74	15.85	41.59

<b>RESIDENTIAL OR AGRICULTURAL CONSTRUCTION</b>
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Includes single family houses or apartment buildings of no more than four (4) stories in height and all buildings, structures or facilities that are primarily used for agricultural or farming purposes, excluding commercial buildings. For classification purposes, the exterior height of a residential building, in terms of stories, is the primary consideration. All incidental items such as site work, driveways, parking lots, private sidewalks, private septic systems or sewer and water laterals connected to a public system and swimming pools are included within this definition. Residential buildings of five (5) stories and above are NOT included within this definition.

<b>SKILLED TRADES</b>
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Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
101	Acoustic Ceiling Tile Installer	19.50	11.10	30.60
102	Boilermaker	31.09	24.52	55.61
103	Bricklayer, Blocklayer or Stonemason	23.00	0.00	23.00
104	Cabinet Installer	16.25	3.22	19.47
105	Carpenter	30.16	1.36	31.52
106	Carpet Layer or Soft Floor Coverer	23.95	6.48	30.43
107	Cement Finisher	22.46	2.71	25.17
108	Drywall Taper or Finisher	15.50	0.00	15.50
109	Electrician	17.00	13.64	30.64
110	Elevator Constructor	44.94	23.84	68.78
111	Fence Erector	18.52	5.93	24.45
112	Fire Sprinkler Fitter	36.07	18.60	54.67
113	Glazier	37.13	12.32	49.45
114	Heat or Frost Insulator	35.00	0.00	35.00
115	Insulator (Batt or Blown)	18.50	13.98	32.48
116	Ironworker	30.90	19.11	50.01
117	Lather	30.16	1.36	31.52
119	Marble Finisher	16.50	2.38	18.88
120	Marble Mason	23.00	0.00	23.00
121	Metal Building Erector	16.52	1.82	18.34
123	Overhead Door Installer	17.00	0.00	17.00
124	Painter	23.00	11.27	34.27
125	Pavement Marking Operator	28.10	15.00	43.10

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
129	Plasterer	20.00	0.00	20.00
130	Plumber	38.90	0.00	38.90
132	Refrigeration Mechanic	33.00	1.79	34.79
133	Roofer or Waterproofofer	17.50	3.73	21.23
134	Sheet Metal Worker	21.03	3.40	24.43
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer	19.23	1.46	20.69
138	Temperature Control Installer	21.00	0.00	21.00
139	Terrazzo Finisher	26.57	16.00	42.57
140	Terrazzo Mechanic	30.01	17.13	47.14
141	Tile Finisher	20.60	4.88	25.48
142	Tile Setter	19.00	0.00	19.00
143	Tuckpointer, Caulker or Cleaner	32.50	2.84	35.34
146	Well Driller or Pump Installer	19.00	7.30	26.30
147	Siding Installer	19.07	0.00	19.07

**TRUCK DRIVERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	28.05	4.18	32.23
203	Three or More Axle	20.00	4.37	24.37
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	19.00	1.85	20.85

**LABORERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
301	General Laborer	19.80	7.22	27.02
302	Asbestos Abatement Worker	18.00	6.24	24.24
303	Landscaper	13.15	6.51	19.66

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
315	Final Construction Clean-Up Worker	15.00	0.00	15.00

**HEAVY EQUIPMENT OPERATORS  
RESIDENTIAL OR AGRICULTURAL CONSTRUCTION**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
557	Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type); Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; 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 & Gutter Machine; Concrete Spreader & Distributor; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Crane, Shovel, Dragline, Clamshells; Forestry Equipment, Timberco, Tree Shear, Tub Grinder, Processor; 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; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); 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); Winches & A-Frames.	31.89	18.20	50.09
558	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Backfiller; Belting, Burlap, Texturing Machine; Boiler (Temporary Heat); Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Jeep Digger; Lift Slab Machine; Mulcher; Oiler; Post Hole Digger or Driver; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Roller (Rubber Tire, 5 Tons or Under); Screed (Milling Machine); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Stump Chipper; Telehandler; Vibratory Hammer or Extractor, Power Pack.	28.70	4.91	33.61

\*\*\*\*\* END OF RATES \*\*\*\*\*