

Contract Routing Form

ROUTING: Urge	nt Rush	printed o	on: 03/27/2013

Contract between: Scherrer Construction Co., Inc.

and Dept. or Division:

Engineering Division

Name/Phone Number:

Olbrich Gardens Restroom Addition Project:

Contract No.: 6902 File No.: 29269

Enactment No.: RES-13-00199

Enactment Date: 03/20/2013

Dollar Amount: 271,826.00

(Please DATE before routing)

Signatures Required	Date Received	Date Signed
City Clerk	3-28-2013	1 3-28-2013
Director of Civil Rights		1 3/28/13MDC.
Risk Manager	03-₹ <sup>7</sup> -₹013	1 3/20/13 KAB
Finance Director	3283	1 328-13 h
City Attorney	4451,3-28-13	13-28-13
Mayor	3-21-13	1 3-29-13

Please return signed Contracts to the City Clerk's Office po#81836902 Room 103, City-County Building for filing.

Original + 2

Copies

03/27/2013 11:58:07 enamb - Project Manager Jeanine Zwart, 267-8749

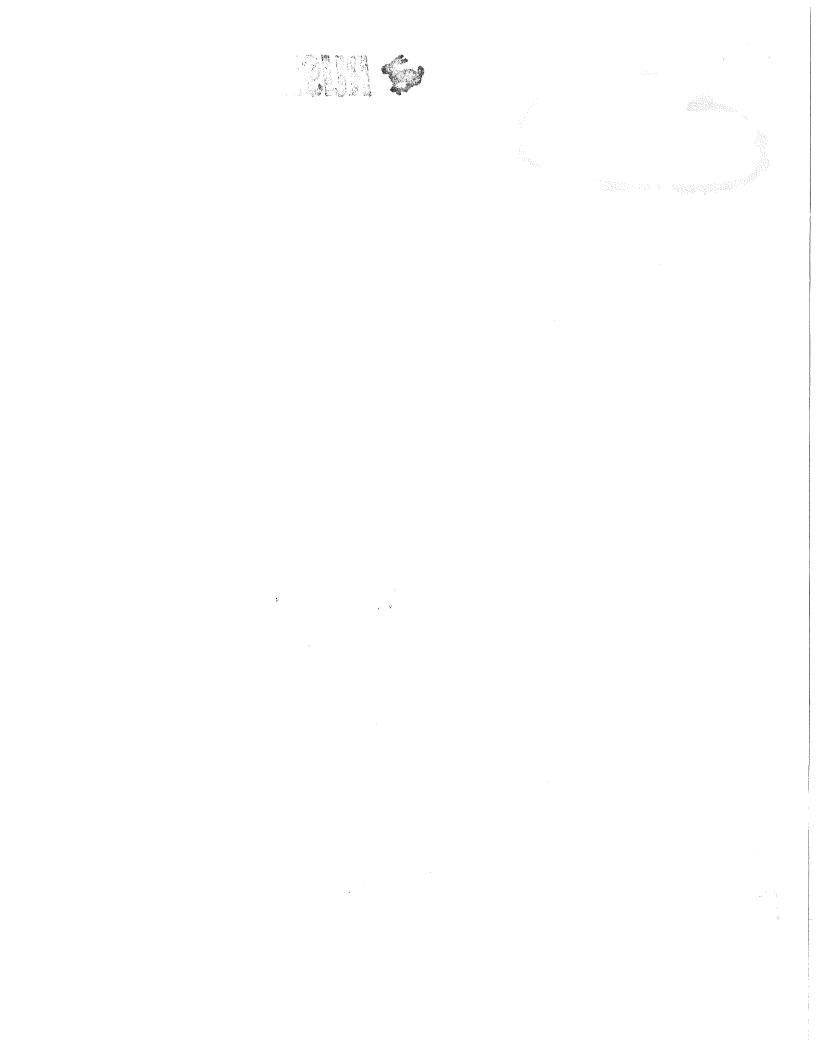
I will hard-deliver!! Please call me to help move contract thru routing!

Dis Rights: QK/(NA) PROBLEM-HOLD

Prev Wage: AA/Agency/ No Contract Value: See a Viole

AA Plan: A Pore Ver Amendment / Addendum #

Type: POS/ Dvlp/ Sbdv/ Gov't/ Grant/ PW/ Goal/ Loan/ Agrmt



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Reports

Awarding Public

Works Contract

File #:

29269 Version:1

Name:

No.6902, Olbrich

Gardens Restroom

Addition.

Type:

Resolution

Status:

Passed

File created:

2/26/2013

In control:

BOARD OF PUBLIC

<u>WORKS</u>

On agenda:

3/19/2013

Final action:

3/19/2013

Enactment date:

3/20/2013

Enactment #:

RES-13-00199

Title:

Awarding Public Works Contract No.6902, Olbrich Gardens Restroom Addition.

Sponsors:

**BOARD OF PUBLIC WORKS** 

Attachments:

Contract 6902.pdf

History (3)

Text

### **Fiscal Note**

Budget authority is available in the Acct. Nos. listed on the attached.

#### Title

Awarding Public Works Contract No.6902, Olbrich Gardens Restroom Addition.

### **Body**

BE IT RESOLVED, that the following low bids for miscellaneous improvements be accepted and that the Mayor and City Clerk be and are hereby authorized and directed to enter into a contract with the low bidders contained herein, subject to the Contractor's compliance with Section 39.02 of the Madison General Ordinances concerning compliance with the Affirmative Action provisions and subject to the Contractor's compliance with Section 33.07 of the Madison General Ordinances regarding Best Value Contracting:

BE IT FURTHER RESOLVED, that the funds be encumbered to cover the cost of the projects contained herein.

See attached document (Contract No. 6902) for itemization of bids.

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### CONTRACT NO. 6902 **OLBRICH GARDENS RESTROOM ADDITION**

### SCHERRER CONSTRUCTION CO., INC.

\$271,826.00

Acct. No. CB60-58401-810739-00-53W1447	\$80,000.00
Acct. No. CB53-58401-810714-00-53W1447	\$191,826.00
Contingency	<u>21,744.00</u>
Subtotal	\$213,570.00

**GRAND TOTAL** \$293,570.00

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# Wisconsin Office of the Commissioner of Insurance Licensed Producer Search\*

Wednesday, March 27, 2013

BARTON, DENNIS M NEW BERLIN WI Year of Birth: 1938

Status: Active

License Number: 125401

NPN\*\*: 283633

Effective Date: 01-01-1982 Expiration Date: 12-31-2014

License Type: Resident Intermediary Indv

CE Compliance: 12-31-2014

### **Lines of Authority**

Line of Authority	Residency	Effective Date	Status
Casualty	Resident	01-01-1982	Active
Fidelity	Resident	01-01-1982	Active
Property	Resident	01-01-1982	Active

### **Adjudicated Administrative Actions**

**Legal File:** 72-C7044 **Adjudicated Date:** 06-14-1972

Actions: Forfeiture: \$500

Allegations: payment as counselor and agent

Note: If this administrative action was settled with a stipulation, the Respondent denied

the allegations but both parties agreed to the action taken except as noted in the

stipulation. See the actual stipulation or order by viewing it at:

https://ociaccess.oci.wi.gov/OrderInfo/OrdInfo.oci

### **Appointments and Terminations**

	Qualification Type/Status	Effective Date	Termination Date	Termination Reason
ACUITY, A Mutual	CAS/Inactive	05-10-2005	10-14-2011	Canceled
Insurance Compan	y PROP/Inactive	05-10-2005	10-14-2011	Canceled
American Casualty Company of Readi		08-27-1993	11-17-2004	Vol. Surrender per Agent Rqst
Pennsylvania	PROP/Inactive	08-27-1993	11-17-2004	Vol. Surrender per Agent Rqst
American Insuranc	e CAS/Active	06-08-1987		•
Company, The	PROP/Active	06-08-1987		
Amwest Surety Insurance Compan	CAS/Inactive y	10-11-1994	10-25-1996	Inadequate Production
Automobile	CAS/Inactive	06-15-1993	12-05-2009	Canceled
Insurance Compan	y PROP/Inactive	06-15-1993	12-05-2009	Canceled

of Hartford, Connecticut, The				
Berkley Regional Insurance Company	CAS/Active PROP/Active	03-05-2008 03-05-2008		
Capitol Indemnity Corporation	CAS/Active PROP/Active	08-29-1994 08-29-1994		
Carolina Casualty Insurance Company	CAS/Active PROP/Active	11-13-1996 11-13-1996		
Charter Oak Fire Insurance Company, The	CAS/Active PROP/Active	01-13-2006 01-13-2006		
Continental Casualty Company	CAS/Active PROP/Active	08-27-1993 08-27-1993		
Economy Fire & Casualty Company	CAS/Inactive PROP/Inactive	12-09-1998 12-09-1998	11-03-2003 11-03-2003	Inadequate Production Inadequate Production
Farmington Casualty Company	CAS/Inactive	06-15-1993	11-20-2000	Vol. Surrender per Agent Rqst
	PROP/Inactive	06-15-1993	11-20-2000	Vol. Surrender per Agent Rqst
Fidelity and Deposit Company of Maryland	CAS/Active PROP/Active	09-01-2004 09-01-2004		
Fidelity and Guaranty Insurance Company	CAS/Inactive PROP/Inactive	03-02-1992 03-02-1992	12-05-2009 12-05-2009	Canceled Canceled
Guarantee Company of North America USA, The	CAS/Active	09-09-2010		
Gulf Insurance Company	CAS/Inactive PROP/Inactive	09-14-1993 09-14-1993	06-30-2005 06-30-2005	Inadequate Production Inadequate Production
Hanover Insurance Company, The	CAS/Active PROP/Active	10-12-2004 10-12-2004		
Liberty Mutual Fire Insurance Company	CAS/Active	05-20-2009		
Liberty Mutual Insurance Company	CAS/Active	05-20-2009		
LM Insurance Corporation	CAS/Active	05-20-2009		
Massachusetts Bay Insurance Company	CAS/Active PROP/Active	10-12-2004 10-12-2004		

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National Fire Insurance Company	CAS/Inactive	08-27-1993	11-17-2004	Vol. Surrender per Agent Rqst
of Hartford	PROP/Inactive	08-27-1993	11-17-2004	Vol. Surrender per Agent Rqst
Old Republic Insurance Company	CAS/Active PROP/Active	12-18-1990 12-18-1990		
	PROP/ACTIVE	12-10-1990		
Old Republic Surety Company	CAS/Active PROP/Active	12-18-1990 12-18-1990		
Phoenix Insurance Company, The	CAS/Active PROP/Active	01-13-2006 01-13-2006		
Seaboard Surety Company	CAS/Inactive PROP/Inactive	12-09-1998 12-09-1998	02-17-2009 02-17-2009	Canceled Canceled
St. Paul Fire and Marine Insurance Company	CAS/Active PROP/Active	12-09-1998 12-09-1998		
St. Paul Guardian Insurance Company	CAS/Inactive PROP/Inactive	12-09-1998 12-09-1998	12-05-2009 12-05-2009	Canceled Canceled
St. Paul Mercury Insurance Company	CAS/Inactive PROP/Inactive	12-09-1998 12-09-1998	12-05-2009 12-05-2009	Canceled Canceled
Standard Fire Insurance Company, The	CAS/Inactive PROP/Inactive	06-15-1993 06-15-1993	12-05-2009 12-05-2009	Canceled Canceled
Transcontinental Insurance Company	CAS/Inactive PROP/Inactive	08-27-1993 08-27-1993	12-11-2002 12-11-2002	Inadequate Production Inadequate Production
Transportation Insurance Company	CAS/Inactive PROP/Inactive	08-27-1993 08-27-1993	12-06-2002 12-06-2002	Inadequate Production Inadequate Production
Travelers Casualty and Surety Company	CAS/Active PROP/Active	06-15-1993 06-15-1993		
Travelers Casualty and Surety Company of America	CAS/Active PROP/Active	06-15-1993 06-15-1993		
Travelers Casualty Company of	CAS/Inactive	06-15-1993	11-20-2000	Vol. Surrender per Agent Rqst
Connecticut	PROP/Inactive	06-15-1993	11-20-2000	Vol. Surrender per Agent Rqst
Travelers Casualty Insurance Company	CAS/Inactive	06-15-1993	11-22-2000	Vol. Surrender per Agent Rqst
of America	PROP/Inactive	06-15-1993	11-22-2000	Vol. Surrender per Agent Rqst
Travelers	CAS/Inactive	06-15-1993	11-22-2000	Vol. Surrender per

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Commercial				Agent Rqst
Insurance Company	PROP/Inactive	06-15-1993	11-22-2000	Vol. Surrender per Agent Rqst
Travelers Home and	CAS/Active	12-11-2007		
Marine Insurance Company, The	PROP/Active	12-11-2007		
Travelers Indemnity	CAS/Active	01-13-2006		
Company of America, The	PROP/Active	01-13-2006		
Travelers Indemnity	CAS/Active	01-13-2006		
Company of Connecticut, The	PROP/Active	01-13-2006		
Travelers Indemnity	CAS/Active	01-13-2006		
Company, The	PROP/Active	01-13-2006		
Travelers Property	CAS/Active	01-13-2006		
Casualty Company of America	PROP/Active	01-13-2006		
United Fire &	CAS/Active	11-01-1996		
Casualty Company	PROP/Active	11-01-1996		
United States Fidelity	CAS/Inactive	03-17-1986	12-05-2009	Canceled
and Guaranty Company	PROP/Inactive	03-17-1986	12-05-2009	Canceled
USF&G Insurance	CAS/Inactive	05-24-1995	01-01-2001	Company Merger
Company of Wisconsin	PROP/Inactive	05-24-1995	01-01-2001	Company Merger
Valley Forge	CAS/Inactive	08-27-1993	07-11-2003	Inadequate Production
Insurance Company	PROP/Inactive	08-27-1993	07-11-2003	Inadequate Production
West Bend Mutual	CAS/Inactive	01-12-2001	12-27-2011	Canceled
Insurance Company	PROP/Inactive	01-12-2001	12-27-2011	Canceled
Western Surety	CAS/Active	10-28-2010		
Company	CAS/Inactive	03-19-2002	09-21-2010	Vol. Surrender per Agent Rqst
XL Specialty Insurance Company	CAS/Inactive	01-05-1993	11-03-2006	Vol. Surrender per Agent Rqst
	PROP/Inactive	01-05-1993	11-03-2006	Vol. Surrender per Agent Rqst

<sup>\*</sup> Photocopies of this report provided to an insurer should be confirmed on-line for accuracy.

<sup>\*\*</sup> NPN = National Producer Number assigned by the National Insurance Producer Registry to assist with nonresident licensing in the future.

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BID OF SCHERRER CONSTRUCTION CO., INC.

2013

PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS

FOR

**OLBRICH GARDENS RESTROOM ADDITION** 

**CONTRACT NO. 6902** 

IN

MADISON, DANE COUNTY, WISCONSIN

AWARDED BY THE COMMON COUNCIL MADISON, WISCONSIN ON MARCH 19, 2013

PLEASE RETURN PLANS AND SPECIFICATIONS TO:

CITY ENGINEERING DIVISION 1600 EMIL STREET MADISON, WISCONSIN 53713

www.cityofmadison.com/business/pw

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

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This Proposal, and Agreement have been prepared by:

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

Robert F. Phillips, P.E., City Engineer

### SECTION A: ADVERTISEMENT FOR BIDS

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

#### A BEST VALUE CONTRACTING MUNICIPALITY

CONTRACT NO.	PROJECT NAME:
6902	OLBRICH GARDENS RESTROOM ADDITION
SBE GOAL	11%

**Plans and Specifications** are available at 1600 Emil Street, Madison, WI 53713; 608-267-1197 or on our website at <a href="https://www.cityofmadison.com/business/pw/contracts/openforBid.cfm">www.cityofmadison.com/business/pw/contracts/openforBid.cfm</a>.

### **PREQUALIFICATIONS**

Bidders who have not been prequalified by the City Engineer and Affirmative Action Director for the period of February 1, 2013 to January 31, 2015 must submit their application on or before 1:00 p.m., FEBRUARY 22, 2013, Room 115, City-County Building, Madison, WI 53703. Postmark is not applicable. Contractors be prequalified by the City Engineer including an affirmative action plan approved by the Affirmative Action Director prior to the bid opening or the bid will be rejected. Forms are available at the same location or on our website at <a href="https://www.cityofmadison.com/business/pw/forms.cfm">www.cityofmadison.com/business/pw/forms.cfm</a>.

### PRE-BID MEETING

Representatives of the Affirmative Action Department will be present to discuss the Small Business Enterprise requirements on FEBRUARY 15, 2013 at 1:00 PM at 1600 Emil Street, Madison Wisconsin.

### OTHER REQUIREMENTS

Sealed bids 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.

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

Deadline for the Submittal of Bid is FEBRUARY 22, 2013 by 1:00 PM, at 1600 Emil Street, Madison, WI 53713.

Bid Opening will be on MARCH 1, 2013 at 1:30 PM at 1600 Emil Street, Madison, WI 53713.

### REQUEST FOR BIDS FOR PUBLIC WORKS CONSTRUCTION FOR THE CITY OF MADISON, WISCONSIN

### A BEST VALUE CONTRACTING MUNICIPALITY

Plans and Specifications for Public Works Projects that are open for bid are available on the City of Madison website at <a href="http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm">http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm</a> or by calling City Engineering at 608-266-4751.

Sealed bids 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.

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

Bidders must be prequalified with the City Engineer and the Affirmative Action Director. Deadline date for submittal of application is noticed on our website. Forms are available on the web at <a href="http://www.cityofmadison.com/business/pw/forms.cfm">http://www.cityofmadison.com/business/pw/forms.cfm</a> or by contacting City Engineering at 608-266-4620

Publ. WSJ 2/1/13, 2/8/13 & 2/15/13

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### SECTION B: INSTRUCTIONS TO BIDDERS

The City of Madison 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 at <a href="https://www.cityofmadison.com/Business/PW/specs.cfm">www.cityofmadison.com/Business/PW/specs.cfm</a> or by contacting City Engineering Division, Room 115, City-County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53703.

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 prequalified 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 Madison 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 Madison General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

### Section 102.4: Proposals

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 musts 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

01/29/13-6902specs.doc B-1

which such corporation was chartered. The required signatures shall in all cases appear in the space provided therefore 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. Proposals will be received at the place and until the hour on the date designated in the advertisement. When sent by mail, the sealed proposal marked as indicated above shall be enclosed in an additional envelope. Proposals sent by mail, submitted in person or otherwise delivered must be in the hands of the official conducting the letting by the hour on the date designated in the advertisement. Proposals received after the date designated will be returned to the bidder unopened.

The Bidder shall execute form ERD-7777 (R.9/03), a part of these proposal pages and submit same with the bidder's proposal, if applicable. REFER TO PROPOSAL SECTION.

### Section 102.5: Bid Deposit (Proposal Guaranty)

No proposal shall be considered unless either (i) it is accompanied by a bid deposit of the character and amount described in the Advertisement for Bids or (ii) a biennial bid bond in an amount and form acceptable to the City of Madison has been previously submitted.

Bid deposits of unsuccessful bidders shall be returned following the award of the contract by the Common Council. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

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

<u>Buil</u>	ding	<u> Demolition</u>			
101		Asbestos Removal	110		Building Demolition
120		House Mover			
Stre	et, l	Utility and Site Construction			
201		Asphalt Paving	265		Retaining Walls, Precast Modular Units
205		Blasting	270		Retaining Walls, Reinforced concrete
210		Boring/Pipe Jacking	275		Sanitary, Storm Sewer & Water Main Const.
215		Concrete Paving	280		Sewer Lateral Drain Cleaning/Internal TV Insp.
220		Con. Sidewalk/Curb & Gutter/Misc. Concrete Work	285		Sewer Lining
221		Concrete Bases and Other Concrete Work	290		Sewer Pipe Bursting
225		Dredging	295		Soil Borings
230		Fencing	300		Soil Nailing
235		Fiber Optic Cable/Conduit Installation	305		Storm & Sanitary Sewer Laterals & Water Svc.
241		Horizontal Saw Cutting of Sidewalk	310		Street Construction
240		Grading and Earthwork	315		Street Lighting
242		Infrared Seamless Patching	318		Tennis Court Resurfacing
245		Landscaping, Maintenance	330		Traffic Control During Construction
250		Landscaping, Site and Street	320		Traffic Signals
251		Parking Ramp Maintenance	325		Traffic Signing & Marking
255		Pavement Sealcoating and Crack Sealing	332		Tree Pruning/Removal
260		Petroleum Above/Below Ground Storage Tank	333		Tree, Pesticide Treatment of
	_	Removal/Installation	335		Trucking
			399		Other
Brid	ne (	<u>Construction</u>			
501		Bridge Construction and/or Repair			
D9	-1!	Operations			
		1 Construction	405	_	Manager
401		Floor Covering (including carpet, ceramic tile installation, rubber, VCT	435		Masonry
			437	Ц	Metals
402	ᆜ	Building Automation Systems	440	님	Painting and Wallcovering
403		Concrete	445		Plumbing
404		Doors and Windows	450		Pump Repair
405		Electrical - Power, Lighting & Communications	455	닏	Pump Systems
410		Elevator - Lifts	460	Ц	Roofing and Moisture Protection
412		Fire Suppression	461	Ц	Solar Photovoltaic/Hot Water Systems
413		Furnishings - Furniture and Window Treatments	465		Soil/Groundwater Remediation
415	$\boxtimes$	General Building Construction, Equal or Less than \$250,000	466	Ц	Warning Sirens
420		General Building Construction, \$250,000 to \$1,500,000	470	Ц	Water Supply Elevated Tanks
425		General Building Construction, Over \$1,500,000	475		Water Supply Wells
428		Glass and/or Glazing	480		Wood, Plastics & Composites-Structural & Architectural
429		Hazardous Material Removal		_	
430		Heating, Ventilating and Air Conditioning (HVAC)	499	Ш	Other
433		Insulation - Thermal			

<u>Sta</u>	<u>te of</u>	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: <a href="http://www.dhs.wisconsin.gov/Asbestos/Cert/Index.htm">http://www.dhs.wisconsin.gov/Asbestos/Cert/Index.htm</a> . 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

### **SECTION C: SBE**

# 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 commer—cially 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.

C-1

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 <u>ad hoc</u> 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 <u>ad hoc</u> 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.

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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 <a href="https://www.cityofmadison.com/dcr/aaTBDir.cfm">www.cityofmadison.com/dcr/aaTBDir.cfm</a>.

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 <a href="https://www.cityofmadison.com/dcr/aaTBDir.cfm">www.cityofmadison.com/dcr/aaTBDir.cfm</a>. 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 in a separate sealed envelope marked: "ENVELOPE 2 - SBE COMPLIANCE REPORT." 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 <u>meets or exceeds</u> 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-7; and
  - 2.4.2.1.2 Summary Sheet, C-8.
- 2.4.2.2 If the bidder <u>does not meet</u> 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-7;
  - 2.4.2.2.2 Summary Sheet, C-8; and
  - 2.4.2.2.3 **SBE Contact Report,** C-9 and C-10. (A <u>separate</u> Contact Report must be completed for <u>each applicable</u> SBE which is not utilized.)

### 2.5 Appeal Procedure

A bidder which does not achieve the established goal and is deemed <u>non-responsible</u> 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 <u>received</u> 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.

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

## **Small Business Enterprise Compliance Report**

## **Cover Sheet**

This information MUST be submitted in a separate sealed envelope marked "ENVELOPE NO. 2 - SBE COMPLIANCE REPORT."

Prime Bidder Information:	
Company:	
Address:	
Telephone Number:	Fax Number:
Contact Person/Title:	
Prime Bidder Certification:	
I,,	of Title
	certify that the information
Company	
contained in this SBE Compliance Report is true and corr	ect to the best of my knowledge and belief.
Witness' Signature	Bidder's Signature
Data	
Date	

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

## **Small Business Enterprise Compliance Report**

## **Summary Sheet**

This information MUST be submitted in a separate sealed envelope marked "ENVELOPE NO. 2 - SBE COMPLIANCE REPORT."

### SBE SUBCONTRACTORS WHO ARE NOT SUPPLIERS

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
,		
Subtotal SBE who are not suppliers:		%
SBE SUBCONTRACTORS WHO ARE S	SUPPLIERS	
Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
Subtotal Contractors who are suppliers:	% x 0.6 =	% (discounted to 60%)
Total Percentage of SBE Utilization:	%.	
Total I el centage of SDE Offication:	/0.	

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

## **Small Business Enterprise Compliance Report**

## **SBE Contact Report**

This information MUST be submitted in a separate sealed envelope marked "ENVELOPE NO. 2 - SBE COMPLIANCE REPORT."

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

SBE	Information:
Comp	pany:
Addre	ess:
Telep	hone Number:
Conta	act 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?
4.	Is the General Contractor pre-qualified to self-perform this category of work?
	☐ Yes ☐ No

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 sted 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.
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.
 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 no 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.
Other; please specify reason(s) other than listed above which made it impossible for you to utilize this SBE on this project.
ribe any other good faith efforts:

# **SECTION D: SPECIAL PROVISIONS**

# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

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: MINIMUM RATE OF WAGE SCALE

For this project, payment of prevailing wages (white sheet) is not required if either: a single trade accounts for 85% or more of the total labor costs of the project and the bid is less than \$48,000; or no single trade accounts for 85% or more of the total labor costs of the project and the bid is less than \$100,000. For bids not meeting either of these conditions, prevailing wages shall be required.

If 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:

$\boxtimes$	Building and Heavy Construction
	Sewer, Water, and Tunnel Construction
	Local Street and Miscellaneous Paving Operations
	Residential and Agricultural Construction

All bidders are notified that all labor employed on City contracts must be paid in accordance with the minimum rate of wage scale included in the Contract Documents.

For the information of the employees working on the project, a copy of the wage scale included in the contract documents and the provisions of Section 66.0903(8) of the Wisconsin Statutes shall be kept posted by the employer and in at least one conspicuous and easily accessible place at the site of the project.

The Contractor shall keep weekly payroll records setting forth the name, address, telephone number, classification, wage rate and fringe benefit package of each employee who worked on such City project and all other projects the employee worked in the same period, and the Contractor must 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. Such records shall, in addition, set forth the full weekly wages earned by each such employee and the actual hourly wage paid to that employee. The Contractor shall submit payroll records to the Engineer every week for those periods when work is being done on the project. Said submittal shall be within twenty-one (21) calendar days of the end of the Contractor's weekly pay period.

The Contractor shall ensure that employees shall be paid unconditionally and shall receive the full amounts accrued at the time of payment, computed at rates not less than those stated in the City of Madison "Minimum Rate of Wage Scale" and that 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 such employee. Questions regarding an employee's classification or rate of pay within that classification, shall

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be resolved by the practice that predominates in the industry and on which the trade or occupation rate/classification is based. Therefore, rate of pay, classification and work jurisdiction disputes shall be resolved by relying upon practices established by collective bargaining agreements and guidelines used in such determinations by appropriate recognized trade unions operating within the City of Madison.

The Contractor shall agree that the normal rate of wage paid to the Contractor's employees on other projects shall not be reduced or otherwise diminished as a result of the requirement to pay no less than the minimum rate of wage scale on a City project. Mulcting of employees on City projects by contractors, such as by kickbacks or other such devices, is prohibited.

These contract provisions shall apply to all work performed on the contract by the Contractor with its own organization and with assistance of laborers under its immediate superintendency and to all work performed by piecework or by subcontract. No laborer, worker, or mechanic shall be employed directly upon the site of the work except on a wage basis, but this shall not be construed to prohibit the rental of equipment from individuals.

In the event of a refusal by the Contractor to submit payroll records as required by the contract, the City of Madison shall have the option to cancel this contract and request the Surety to perform or to relet the balance of the work for bids, and in that event, to charge the Contractor for any loss which the City may incur thereby.

# 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.

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Olbrich Gardens Madison Wisconsin Destree Design Architects, Inc. Page 1 of 1 Project # 120410.00 7 January 2013 Section 00010 Table of Contents

#### PART 1 - GENERAL

## 1.1 SCOPE

- A. The work under this section includes general rules for the project. Included are the following topics:
  - . PART 1 GENERAL
    - a. Scope of Work
    - b. Pre-Bid Information
    - c. Commencement and Completion
    - d. Contacts
    - e. Qualifications of Bidder
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    - s. Drawings and Specifications
    - t. Operation and Maintenance Data
    - u. Safeguards Existing Equipment, Underground Utilities and Artifacts
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    - c. Delivery, Handling and Storage of Materials
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    - m. Identification
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    - o. Punch List
    - p. Tests and Final Acceptance
    - q. Training and Demonstration

Destree Design Architects, Inc.

- r. Fence
- s. Roadway
- t. Signs

#### 1.2 SCOPE OF WORK

A. Toilet room addition to the building of Olbrich Gardens at 3300 Atwood Avenue. in Madison, WI. This includes construction of foundation, slab, walls, ceiling, flooring and casework, along with related Mechanical, Electrical and Plumbing modifications.

#### 1.3 PRE-BID INFORMATION

A. There will be a pre-bid tour of the existing building on February 11, 2013 at 10:00am at 3300 Atwood Avenue, Madison, WI, to provide bidders the opportunity to acquaint themselves with the project. A representative from the designer's office will be present to take questions that will be answered by addendum.

## 1.4 COMMENCEMENT AND COMPLETION

- A. Please refer to Section 105.15, 109.7, and 110.5 of the Standard Specifications, which can be found here:
  - 1. http://www.cityofmadison.com/Business/PW/specs.cfm
- B. The successful Bidder must agree to commence the work on or before a date to be specified in a written "Start work Letter" and to fully complete all the work within 90 calendar days thereafter.

#### 1.5 CONTACTS

A. The City's designee for architectural and engineering is: Tyler Smith

Company: Destree Design Architects

Address: 222 w Washington Avenue, Suite 310

Phone: 608-268-1499

Email: Tyler@destreearchitects.com

B. The City's designee for project management: Jeanine Zwart

Company: City of Madison

Address: Room 115, 210 Martin Luther King Jr. Blvd.

Phone: 608-267-8749

Email: jzwart@cityofmadison.com

# 1.6 QUALIFICATIONS OF BIDDER

- A. Has completed one or more projects of at least 50% of the size or value of the division of work being bid and the type of work completed is similar to that being bid. If a greater magnitude of experience is deemed necessary, other than size or value of the work, such requirements will be described in the appropriate technical section of these specifications.
  - B. Has access to all necessary equipment and has organizational capacity and technical competence necessary to do the work properly and expeditiously.
  - C. Maintains a permanent place of business.

# 1.7 WORK BY THE CITY AND CITY FURNISHED EQUIPMENT

A. All asbestos removal.

# 1.8 SALVAGE MATERIALS

A. No materials removed from this project shall be reused except as specifically noted on plans. All materials removed shall become the property of and shall be disposed of by the Contractor.

#### 1.9 PROVISIONS FOR FUTURE WORK

A. Not applicable

## 1.10 SPECIAL SITE CONDITIONS

- A. Unless otherwise noted, construction operations shall be limited to the hours between 7:30 a.m. and 6:00 p.m., Mondays through Fridays, except for holidays. A request must be made to the City forty-eight hours in advance for approval of work days or hours other than those stated above. Compliance is required with the City of Madison Noise Ordinance.
- B. In addition the following restrictions apply:
  - 1. Sequence of Work within Project: Contractor to coordinate construction so as to keep facility in operation at all times.
- C. A temporary field office and temporary toilets are not required. The Contractor's labor force may use City facilities upon approval by the City. The Contractor shall maintain the toilets and other spaces provided by the City in clean and sanitary condition at all times.

#### 1.11 GENERAL

- A. The City of Madison Standard Publications for Public Works Construction current Edition, as supplemented from time to time, forms a part of these contract documents as if attached hereto.
- B. These Standard Specifications are available upon request from the City Engineer, City Engineering Division, Room 115, City County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53710. An electronic copy is available from the City Website <a href="http://www.cityofmadison.com/business/pw/specs.cfm">http://www.cityofmadison.com/business/pw/specs.cfm</a> The Contractor shall review these specifications prior to preparation of proposal for the work to be done under this contract. Failure to do so does not relive the Contractor from meeting all requirements.
- C. All articles in these General Requirements are applicable to all Divisions and Sections apply to each Division of these Specifications as fully as if repeated within that Division. The Conditions of the Contract, General and supplementary General Conditions, and these General Requirements shall apply to the Contractor and engaged in his work. Items listed under Scope of Work for each Division of the Specifications are not necessarily all inclusive.
- D. Portions of these specifications are of the abbreviated, simplified type and may include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "in conformity with", "shall be", "as noted on the drawings", "in accordance with details", are intentional. Omitted words or phrases shall be supplied by inference in the same manner, as they are when a note occurs on the drawings. Such terms as approved, reviewed, equal, as directed, as required, as permitted, acceptable, satisfactory mean by or to the City Engineer or designee.

- These specifications and drawings are intended to include everything necessary to perform the entire E. work properly. Every item necessarily required might not be specifically mentioned or shown. Unless expressly stated, all systems and equipment shall be complete and operable. The words "furnish", "install", and "provide" shall mean the same in a sense that the Contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the equipment and systems installation herein specified, except such parts as are specifically exempted herein. If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract. If a conflict exists within the Specifications or exists within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, largest quantity or most closely fits the City's intent. Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the City's or designee's inspections, tests and approval from the commencement until the acceptance of the completed work. Whenever a particular manufacturer's product is named, it is intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply. It must be understood that the details and drawings are diagrammatic. The Contractor shall verify all dimensions at the site and be responsible for their accuracy. If items are too large to fit into existing space Contractor shall provide smaller model of same type upon approval by The City at no cost to the City. All sizes as given are minimum except as noted. Prior to bidding bidder must visit site to become familiar and verify existing conditions. Failure to do so does not relieve the bidder from the responsibility to verify existing conditions, to point out errors in drawings or specifications or code violations.
- F. Bidders shall bring inadequacies, omissions or conflicts to the City's attention at least ten (10) days before the date set for bid opening. Prompt clarification will be supplied to all bidders of record by addendum. Failure to request clarification or interpretation of the drawings and specifications will not relieve the successful Bidder of responsibility. Signing of the contract will be considered as implicitly denoting that the Contractor has thorough understanding of the scope of work and comprehension of the contract documents. The City is not responsible for verbal instructions.
- G. Information pertaining to existing conditions that are described in the specifications or appear on the drawings is based on available records. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing. This information is provided to inform the Contractor of known, existing conditions so that due diligence is taken by the Contractor to avoid damage. Where site observation or documents indicate existing underground utilities/services in close proximity (within four feet horizontally and/or four feet vertically) to necessary new construction work, the Contractor shall be responsible to test, probe or otherwise determine exact locations so as to prevent damage to such utilities/services.
- H. It is expected that Contractors have access to their own cell phone for their own use. No additional telephone service will be provided.
- I. The City will not furnish Watchpersons. The Contractor shall provide such precautionary measures, to include the furnishing of watch persons if deemed necessary, to protect persons and property from damage or loss where the Contractor's work is involved.
- J. Contractors shall cooperate with all the testing consultants and verify system completion to the testing consultants. Demonstrate the starting, interlocking and control features of each system so the testing Contractor can perform its work. Testing and balancing (TAB) Contractor shall be direct subcontractor to the Contractor and shall not be the mechanical Contractor or subcontractor to mechanical Contractor.
- K. The Contractor resumes responsibility for all work specified in this contract except for work explicitly noted as be done by the City or a Contractor separately hired by the City. The Contractor shall immediately inform the City of the name of the person(s) designated as Superintendent representing the Contractor at the site. The Contractor shall take complete charge of the work under this contract and coordinate the work of all trades on the project. All Contractors shall work in cooperation with the Contractor and with each other, and fit their work into the structure as job conditions may demand. The City shall make all final decisions as to the right-of-way and run of pipe, ducts, etc., at prearranged

meetings with responsible representatives of the Contractors involved. Contractor(s) shall coordinate the work with adjacent work with other Contractors prior to installation and shall cooperate with all other trades to facilitate the general progress of the work. The Contractor shall coordinate and schedule the work of all its subcontractors, and shall furnish all information required by them for proper scheduling and execution of the work. In the same manner, the Contractor shall coordinate the work with that of the City, and any other Contractor operating in the area, including reasonable adjustments of schedule in order to allow other Contractors or the City to do their work. Coordinate all work with other Contractors prior to installation. Any installed work that is not coordinated and that interferes with other Contractor's work shall be removed or relocated at the installing Contractor's expense.

- L. Each trade shall afford all other trades every reasonable opportunity for the installation of their work and for the storage of their material. In no case will the Contractor(s) be permitted to exclude from the premises or work, any other Contractor or employees thereof, or interfere with any other Contractor in the executing or installation of their work. In case it is indicated which trade is responsible for which work, this is meant as a suggestion and it is the Contractor's responsibility in its contracts with subcontractors to clarify who ultimately will do the work. If conflicts arise between the Contractor and subcontractor about who is responsible for which work to be done it is the Contractor's responsibility to make sure the work gets done in time even if the dispute between Contractor and subcontractor gets settled later.
- M. The City Engineer shall have the right to make final and binding decisions on disputes between the Contractor and any other subcontractor operating in the area regarding: (a) access to the site with work force, equipment, and/or materials to their work area or (b) their adjacent work areas.
- N. The Contractor shall cooperate with other trades and City personnel in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical or piping or ducting work to better fit the general installation, such work shall be done at no extra cost to the City, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.
- O. The Contractor shall provide and maintain in working order during the entire construction period, a minimum of three (3) fire extinguishers on each floor level, and one (1) in temporary office. Extinguishers shall be nonfreezing type such as A-B-C rated dry chemical, of not less than 10-pound capacity each. In addition, any subcontractor who maintains an enclosed shed on the site shall provide and maintain, in an accessible location, one or more similar nonfreezing type fire extinguisher in each enclosed shed.
- Ρ. The area to be set aside for the work under this contract is shown on the drawings, and the Contractor shall confine the construction to the immediate area within the construction limits. The Contractor shall immediately upon entering the site for purpose of beginning work, locate general reference points and take such action as is necessary to prevent their destruction. The Contractor shall layout its work and be responsible for all lines, elevations and measurements of the building and other work executed under its Contract. The Contractor must exercise proper precaution to verify dimensions on the drawings before laying out work and will be held responsible for any error resulting from failure to exercise such precaution. The Contractor shall verify grades, lines, levels, locations, and dimensions as shown on drawings and report any errors or inconsistencies to the City before commencing work. Starting of work by the Contractor shall imply acceptance of existing conditions. Confine all operations, equipment, apparatus and storage of materials, to the immediate area of work to the greatest possible extent. Contractor shall ascertain, observe and comply with all rules and regulations in effect on the project site, including but not limited to parking and traffic regulations, use of walks, security restrictions and hours of allowable ingress and egress. Any special traffic control during construction involving lane closures shall be in accordance with the federal standard, Manual of Uniform Traffic Control Devices.
- Q. Using datum, the lot lines and present levels have been established as shown on the drawings. Other grades, lines, levels and benchmarks, shall be established and maintained by the Contractor, who shall be responsible for them. As work progresses, the Contractor shall layout on forms and floor, the locations of all partitions, walls and fix column centerlines as a guide to all trades. The Contractor shall make

provision to preserve property line stakes, benchmarks, or datum point. If any are lost, displaced or disturbed through neglect of any Contractor, Contractor's agents or employees, the Contractor responsible shall pay the cost of restoration.

R. The City's payment and guarantee provisions and when and how the City will accept the work are listed in the Standard Specifications under Sections 105.15 and 110.5.

## 1.12 GUARANTEES

- A. All work, material and equipment is guaranteed by the Contractor to be free of faults for at least one year or longer if specified elsewhere. This year begins from the date of final acceptance from the City, which is stated in the Standard Specifications under Section 105.16. The Contractor agrees to return to the project and commence work as directed upon notification by the City and will furnish at his own expense all necessary labor and material to make proper repairs or corrections made necessary by defective material or inferior workmanship furnished or performed under this contract. If a subcontractor is not complying, the Contractor is held responsible.
- B. All corrections and repairs are to be made no more than 30 days after notification of the Contractor for equipment and material that is not critical to the operation of the building. Critical equipment and material, including but not limited to HVAC, roofing, electrical, elevator, shall be repaired or brought into temporary and safe working condition in less than 7 days and temporary alternatives have to be provided by the Contractor. If Contractor fails to do so the City reserves the right to perform the work himself or subcontract a different Contractor and charge the Contractor the full cost of the repair and correction and cost of any material, rental fee, labor and equipment to provide temporary relief and protection to enable safe operation of the building.

# 1.13 DEFINITIONS AND STATUS OF INDIVIDUALS

- A. Owner: synonym for The City of Madison. Other synonyms are "City", "City of Madison" and "Department"
- B. Contractor: Shall mean the person or firm responsible for the execution of this contract, or any portion thereof. This shall include the General or Prime Subcontractor, all Sub Subcontractors and any suppliers. Subcontractor usually refers to the particular contractor concerned with the Section in which the term is found, but this in no way relieves the General contractor of its sole responsibility for completing the entire work of this contract. The contractor shall complete the work in accordance with the contract documents, approved submittals that comply with the contract documents, and any clarifications or instructions issued by the Project Manager. The contractor shall not be relieved of any responsibility to comply with such requirements by the activities of the Architect-Engineer or the Project Manager. The terms contractor and subcontractor may be interchangeable.
- C. Architect-Engineer or A/E: is the person or firm designated as the responsible design professional. The A/E shall interpret and clarify the intent of the construction Subcontract Documents, will work with the owner and project manager in determining the acceptability of workmanship, materials and the progress of the work and entitlement to payment. The A/E will review proposed changes, substitutions, shop drawings and schedules submitted by the Subcontractor for approval as required by the Subcontract Documents. The Architect-Engineer shall have access to the work at all times and the authority to recommend that the owner not accept any work or materials deemed not to conform to the requirements of the contract.
- D. Project Representative: During the Construction Phase, all submittals and communications with the A/E shall be through the Owner's "Project Representative." The Project Representative will administer the technical requirements of the contract and will coordinate the inspection of the work. The A/E and

City/Owner-A/E will determine all professional design responsibility matters. Other synonyms are "Project Manager" and Manager" and City Representative."

## 1.14 SUSTAINABLE CONSTRUCTION METHODS AND MATERIALS

- A. All construction methods and materials shall meet these requirements unless specified differently elsewhere. Contractor is to provide all documentations, certifications and other material necessary to prove compliance to the City and third party certifiers.
- B. Construction Activity Pollution Prevention:
  - 1. Follow Requirements in Storm Water Pollution Prevention Plan (SWPPP) and Erosion and Sedimentation
  - 2. Control (ESC) Plan.
  - 3. Stabilize any relocated and moved soil with fast growing grasses and place mulch (hay, woodchips, straw) on it to cover and hold soil.
  - 4. Divert surface runoff from distributed areas into sediment basin or sediment traps with a mound of stabilized soil Construct posts with filter fabric media to remove sediment from stormwater leaving the site.

# C. Site Development:

Follow requirements in site development plan and don't disturb areas beyond the marked areas

## D. Construction Waste Management:

- 1. Recycle all recyclable material. This includes any material for which there is a recycling facility in Wisconsin.
- 2. Separate all waste material in plastic, metal, paper, acoustical tile, brick, concrete, clean wood, glass, gypsum drywall, carpet and insulation and provide designated on-site collection areas.
- 3. Keep track of volume and weight of each material and track if it was recycled or disposed otherwise.
- 4. Keep track of volume and weight of donated material and site reused on site
- 5. Haul all recyclable material to recycling facility if one is available in the county at no cost to the
- 6. It is permissible to separate waste off-site by specialized recycling contractor. This contractor needs to provide proof of recycling and needs to be WASTECAP certified as "Accredited Professional in Construction and Demolition Debris Recycling".

# E. Indoor Air Quality:

- 1. During construction the recommended control measures of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ guidelines for occupied buildings under construction, (1995, chapter 3) must be met or exceeded.
- 2. Stored on-site or installed absorptive material must be protected from moisture damage.
- 3. In case permanently installed air handlers are used for ventilation, filtration media with a Minimum efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-1999. Contractor shall replace all filtration media immediately prior occupancy.
- 4. All to be installed ductwork, air handlers and other equipment later connected to the indoor air path are to be protected from dirt and debris.

## 1.15 SCHEDULE OF OPERATIONS

A. Within 5 calendar days after the effective date of Start Work Letter, the Contractor shall provide a critical path method (CPM) network diagram and a preliminary construction progress schedule covering Contractor operations for the first 60 calendar days. The diagram shall show the order in which the

Contractor proposes to accomplish the work. The CPM shall show interdependence and duration, along with installation man-hours by craft of each activity. Any work element longer than 15 days shall be broken down into component parts. The critical path and float for each activity shall also be shown. The diagram or bar chart shall be neatly lettered and legibly drawn to a time scale. The preliminary progress schedule shall be a bar graph or an arrow diagram showing the times the Contractor intends to commence and complete the various work stages, with operations and contract items planned to start during the first 60 calendar days. This initial network diagram and all consecutive versions shall include preliminary dates throughout the end of the project.

- B. Install work in phases to accommodate City's occupancy requirements. During the construction period coordinate electrical schedule and operations with the City.
- C. After the initial submittal, the Contractor shall update the schedule monthly by entering actual progress for the period and submit copies as part of the payment request.

# 1.16 DOCUMENTS

- A. All electronic files used or created for this project become property of the City. All files have to be submitted to the City upon request and once each phase (design, construction) is completed. Only Microsoft Office, PDF, and AutoCAD version 2008 and lower documents are acceptable. All documents that once existed in Microsoft or AutoCAD version must be submitted in such. AutoCAD files have to be submitted in original drawing form for further use in future projects. Sheet-set files alone will not be sufficient. All AutoCAD files must be submitted as PDF in addition. The Contractor can use CAD files and other files necessary for this project upon request.
- B. The City or designee will provide the Contractor with a suitable set of Contract Documents on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.
- C. The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted. During the first week of each month, the Contractor shall present, at the project site, the job copy showing variations and changes to date to the City for review.
- D. During first week of each month, the Contractor shall present at the project site all changes to architectural/engineering plans for review. At completion of the project, the Contractor shall submit the marked-up record drawings to the City prior to final payment.
- E. Contractor shall provide list with all equipment installed. This list shall contain, but not limited to, type, make and special product key and number. For grant purposes the contractor may have to provide detailed information about equipment installed and labor provided to third party institutions, such as Focus on Energy.

## 1.17 QUALITY ASSURANCE

- A. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the City.
- B. All products and materials used are to be new, undamaged, clean and in good condition. Existing products and materials are not to be reused unless specifically indicated.
- C. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the Contractor is responsible for all costs involved in integrating the equipment or accessories into the system and for obtaining the

- performance from the system into which these items are placed. This may include changes found necessary during the testing, adjusting, and balancing phase of the project.
- D. Welding procedures, welders, and welding operators for all building service piping to be in accordance with certified welding procedures of the National Certified Pipe Welding Bureau and Section 927.5 of ASME B31.9 Building Services Piping or AWS 10.9 Qualification of Welding Procedures and Welders for Piping and Tubing. Before any metallic welding is performed, Contractor to submit his Standard Welding Procedure Specification together with the Procedure Qualification Record as required by Section 927.6 of ASME B31.9 Building Services Piping. Before any metallic welding is performed, Contractor to submit his Standard Welding Procedure Specification together with the Procedure Qualification Record as required by Section IX of the ASME Boiler and Pressure Vessel Code and/or the National Certified Pipe Welding Bureau. Before any polyethylene fusion welding is performed, Contractor to submit certification that the welders to be used on this project have successfully demonstrated proper welding procedures in accordance with the Code of Federal Regulations, Title 49, Part 192, Section 192.285.
- E. Contractor shall assume the responsibility for the protection of all finished construction under the Contract and shall repair and restore any and all damage of finished work to its original state. Wheeling of any loads over any type of floor, either with or without plank protection, will be permitted only in rubber-tired wheelbarrows, buggies, trucks or dollies. Where structural concrete is also the finished surface, care must be taken to avoid marking or damaging those surfaces. All structures and equipment shall be constructed, installed and operated with guards, controls and other devices in place.
- F. Contractor shall obtain complete data at the site and inspect surfaces that are to receive the Work before proceeding with fabricating, assembling, fitting or erecting any work under this contract. Contractor shall notify the City in writing in case of discrepancies between existing work and drawings, and of any defects in such surfaces that are to receive the Contractor's work. The City will evaluate the notice and direct what remedial action will be taken.
- G. Starting of work implies acceptance of existing work or the work of others. Removal and replacement of work applied to defective surfaces, in order to correct defects, shall be done at the expense of the Contractor who applied work to defective surfaces.

## H. The Contractor shall:

- 1. Provide, erect and maintain all required planking, barricades, guard rails, temporary walkways, etc., of sufficient size and strength necessary for protection of stored material and equipment; paved surfaces, walks, curbs, gutters and drives; streets adjacent to or within project area; adjoining property and all project work to prevent accidents to the public and the workmen at the job site.
- 2. Notify adjacent property owners if their property interferes with the work so that arrangements for proper protection can be made.
- 3. Provide and maintain proper shoring and bracing to prevent earth from caving or washing into the building excavation. Provide temporary protection around openings through floors and roofs, including elevator openings, stairwells, and edge of slabs.
- 4. Provide and maintain proper shoring and bracing for existing underground utilities, sewers, etc., encountered during excavation work, to protect them from collapse or other type of damage until such time as they are to be removed, incorporated into the new work, or can be properly backfilled upon completion of new work.
- 5. Provide protection against rain, snow, wind, ice, storms, or heat to maintain all work, materials, apparatus, and fixtures, incorporated in the work or stored on the site, free from injury or damage. At the end of the day's work, cover all new work likely to be damaged. Remove snow and ice as necessary for safety and proper execution of the work.
- 6. Protect the building and foundations from damage at all times from rain, ground water and back up from drains or sewers. Provide all equipment and enclosures as necessary to provide this protection.
- 7. Damaged property shall be repaired or replaced in order to return it to its original condition. Damaged lawns shall be replaced with sod.

- 8. Protect materials, work and equipment, not normally covered by above protection, until construction proceeds to a point where the general building protection of the area where located, dispenses with the necessity therefore. Protect work outside of the building lines such as trenches and open excavations, as specified above.
- 9. Take all necessary precautions to protect the City's property as well as adjacent property, including trees, shrubs, buildings, sanitary and storm sewers, water piping, gas piping, electric conduit or cable, etc., from any and all damage which may result due to work on this project.
- 10. Repair work outside of property line in accordance with the requirements of the authority having jurisdiction.
- 11. Repair any work, damaged by failure to provide proper and adequate protection, to its original state to the satisfaction of the City or remove and replace with new work at the Contractor's expense.
- 12. Protect trees indicated on the drawings to remain and trees in locations that would not interfere with new construction, from all damage. Do not injure trunks, branches, or roots of trees that are to remain. Do cutting and trimming only as approved and as directed by the City.
- 13. The value of trees destroyed or damaged will be charged against the account of the Contractor responsible for the damage in an amount equal to the expense of replacing the trees with those of similar kind and size.
- I. The contractor shall be fully responsible for inspecting the work of its suppliers, and subcontractors to assure that the work complies with the standards for materials and workmanship required by the contract documents.
- J. The Contractor shall:
  - 1. Monitor quality control over subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of the quality specified in the contract documents.
  - 2. Comply fully with manufacturer's instructions, including each step in sequence.
  - 3. Request clarification from the City before proceeding with work when manufacturers' instructions or reference standards conflict with Subcontract Documents.
  - 4. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or manufactures instructions require more precise workmanship.
  - 5. Ensure that work is performed by persons specializing in the specific trade and class of work required, and qualified to produce workmanship of specified quality.
  - 6. Secure products in place with positive anchorage devices designed and sized to withstand seismic, static and dynamic loading, vibration, physical distortion or disfigurement.
- K. If reference standards or manufacturers' instructions contain provisions that would alter or are at variance with relationships between the parties to the contract set forth in the contract Documents, the provisions in the Contract Documents shall take precedence.
- L, When required by individual Specification sections, Contractor shall provide the following services from a manufacturer's representative:
  - 1. Review of Specifications and design and concurrence or suggestions for modification.
  - 2. Site observation of conditions of use and substrate.
  - 3. Observation of the installation work in progress and on completion.
  - 4. Start up, testing, and adjustment of equipment.
  - 5. Instruction to the City in operation and maintenance.
  - 6. Provide written signed report by manufacturer's representative documenting services provided and any comments or recommendations.
- M. The work will be inspected by City inspectors and/or independent inspection service personnel under coordination of the City. All work is subject to inspection and shall remain accessible and exposed until it has been inspected by the City. Any work covered up or made inaccessible before such inspection shall be uncovered and made accessible without additional expense to the City. The City can request inspection of delivered material to confirm meeting of standards and specifications. An installation under supervision of the City can be requested to check proper installation. Contractor is to grant access to all

material and finished and unfinished work at any time upon request. At least 3 business days notice has to be given to the City prior to arrival of material and equipment to be inspected. This includes concrete, which will be sampled and tested by the City.

- N. Inspection or testing performed by the City Engineer or his designee shall not relieve the Contractor from responsibility for performing his own quality control and for complying with the requirements of the contract Documents. The City will not be responsible for the Contractor's failure to carry out work in accordance with the contract Documents.
- O. Cooperate and arrange meetings with City or designee (Cx). Fill out and submit all documents required by Cx. Commissioning checklists need to be filled out truthfully at the time indicated. This includes but is not limited to delivery checklist (at time of delivery), installation checklist (at time of installation) and start up checklist (at time of startup).
- P. Commissioning involves among other things:
  - 1. Inspection of material arriving at site regarding right type, number and undamaged package and proper storage.
  - 2. Inspection of installation
  - 3. Test of proper function
  - 4. Review of Training and submitted O&M material
  - 5. Test of proper function before end of warranty period

# 1.18 CODES AND PERMITS

- A. Applicable provisions of Public Law, the Constitution and Laws and Statutes of the State of Wisconsin and the codes and regulations of the Department of Energy are hereby referred to and made a part of this contract and all work performed shall be in accordance with such laws, regulations and the latest edition or supplement or amendment thereto in effect at the time of submittal of bid shall be considered to be the issue in effect (unless shown otherwise) of all applicable codes including, but not limited to:
  - 1. Wisconsin Building Code
  - Wisconsin Electrical Code
  - 3. Wisconsin Mechanical Code
  - 4. Wisconsin Plumbing Code
  - 5. Wisconsin Energy Code
  - 6. Wisconsin Fire Code
  - 7. NFPA 70 National Electrical Code
  - 8. General Services Administration 41 CFR Part 101-19
  - 9. Americans with Disabilities Act (ADA)
  - 10. Energy Conservation Performance Standards,
  - 11. Local Codes
- B. Contractor is expected to know or to ascertain, in general and in detail, the requirements of all codes and ordinances, and all rulings and interpretations of code requirements being made by all authorities having jurisdiction over the work performed by them, applicable to the construction and operation of systems covered by this contract. Where codes or standard specifications other than those listed in this paragraph are referred to in the different Divisions of these specifications, it is understood that they apply as fully as if cited here. Where differences exist between codes affecting this work, the code affording the greatest protection to the City shall govern. Maintenance clearances shall be maintained around equipment as required by the Codes and Standards, and as recommended by the equipment manufacturers. The maintenance envelope and equipment access shall be kept clear of any obstruction. It is Contractor's responsibility to enforce these requirements with all the Contractors. The Contractor shall be responsible for correcting any infringement on this requirement at no cost to the City. All cost for items and procedures necessary to satisfy requirements of all applicable codes, ordinances and authorities, whether or not these are specifically covered by drawings or specifications. All cases of serious conflict or omission between the drawings, specifications, and codes shall be brought to the City's attention as herein

before specified. The Contractor shall carry out work and complete construction as required by applicable codes and ordinances and in such a manner as to obtain approval of all authorities whose approval is required.

- C. Contractor is responsible for obtaining permits at its own cost including expenses for supporting documents. Deliver original permits to the City before work starts. Obtain and pay for all required installation inspections except those provided by the City. Deliver originals of these certificates to the City. Include copies of the certificates in the Operating and Maintenance Instructions. Contractor shall arrange all required inspections and correct all efficiencies at no cost to the City.
- D. The Contractor must maintain all licenses required for the work performed and required by authorities. In addition all licenses and certificates required elsewhere have to be maintained. If a Contractor loses a license for whatever reason he must inform the City immediately after learning about that himself. The Contractor must submit proof of holding the license or certificate upon request.

#### 1.19 SUBMITTALS

- A. Documents have to be submitted in electronic form (PDF) as described elsewhere in addition to hardcopies no later than 3 business days after start work letter is issued. The City or designee will review, and process shop drawings and other required submittals with reasonable promptness. No delay will be allowed in the progress of the job attributable to Contractor's failure to supply submittals in time.
- B. The Contractor shall submit three (3) prints of all shop drawings, submittal data consisting of brochures, catalogs, material lists, wiring diagrams, Material Safety Data Sheets (MSDS), samples, erection drawings, and equipment layouts for review by the City Engineer or his designee. General catalog sheets showing a series of the same device is not acceptable unless the specific model is clearly marked. Submittals shall be processed with such promptness as not to cause delay to the work or to that of any other Contractor. Each submittal shall be provided together with a transmittal letter or form. Each original transmittal shall be assigned a transmittal number. The number shall begin with the first initial of the name of the Contractor's firm followed by a serial number. The resubmittals shall indicate the same number with numerical suffix in sequence. Each transmittal shall itemize the enclosures and indicate the distribution of the transmittal and the enclosures. The following information shall be included on all submitted documents: Agency/Location/Address obtained, project number, building name, project name. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.
- C. Submit all original documents providing information regarding sustainability requirements including but not limited to recycled content, VOC, certified wood, disposal certificates and transportation distance. Contractor is required to prove that material and methods used meet all requirements specified elsewhere.
- D. The City or designee will return the marked and stamped drawings together with transmittal letter or form to Contractor. If re-submittal is required, the City Engineer or designee will so note and Contractor shall make another submission for review after correction resolving the review comments on the prior submittals. The above procedure shall be repeated until the City Engineer or designee favorably reviews the submittal. The submittals must be approved before material is ordered and fabrication is authorized.
- E. The City Engineer's or designee's favorable review of shop drawings and other submittals shall not relieve the Contractor of responsibility for deviations from drawings or specifications, unless the Contractor has in writing called the City Engineer's or designee's attention to such deviations at the time of submission, and the City Engineer or designee has acknowledged in writing such deviations; nor shall it relieve the Contractor from responsibility for errors of any sort in such drawings. If deviations, discrepancies, or conflicts between shop drawing submittals and the drawings and specifications are discovered either prior to or after the shop drawing submittals are reviewed by the City Engineer or

designee, the drawings and specifications shall control and shall be followed. The Contractor shall be responsible for and shall check the correctness of all documents including those subcontractors prior to submitting them to the City for review.

- F. The Contractor shall furnish prints of the favorably reviewed final shop drawings, erection drawings, equipment layouts and vendor data to subcontractors and suppliers for the proper coordination of their work. The Contractor shall keep one (1) complete set of the above documents at the job site for the use of the City.
- G. After the completion of the project. and prior to final payment. submit:
  - 1. One (1) copy of the Waste Manifest Records to the The City, if required in accordance with "Safety and
  - 2. Environment" Requirements Article "HAZARDOUS SUBSTANCES".
  - 3. The original and one (1) copy of all guarantee/warranty documents.

## 1.20 DRAWINGS AND SPECIFICATIONS

- A. Drawings indicate approximate locations of the various items. These items are shown approximately to scale and attempt to show how these items should be integrated with building construction. Locate all the various items on-the-job measurements in conformance with code and cooperation with other trades.
- B. Before locating items, confer with the City as to desired location in the various areas. In no case items shall be located by scaling drawings. Contractor must relocate items and bear cost of redoing work or other trades' work necessitated by failure to comply with this requirement.
- C. If electrical items are to be relocated within 10 feet of location shown on drawings and Contractor is informed before work is begun on this portion of the job, the relocation shall be at Contractor's expense. Drawings are schematic in nature and are not intended to show exact locations of conduit but rather to indicate distribution, circuitry, and control.
- D. Standard Specifications: Standard Specifications such as ANSI, AASHO, AWWA, AISC, Commercial Standards, Federal Specifications, NEMA, UL, and the like incorporated in the requirements by reference shall be those of the latest edition at time of receiving bids, unless otherwise specified. The manufacturers, producers and their agents of required materials shall have such specifications available for reference and are fully familiar with their requirements as pertains to their product or material.
- E. Contract Drawings and Specifications on the Job: contract drawings shall be kept on the job by the Contractor shall include at least one copy of Drawings and Specifications, all approved shop and erection drawings and schedules, lists of materials and equipment, as-built drawings, addenda and bulletins, documents relevant to the work. The list of Subcontract drawings is attached to these Specifications.
- F. Maintain a complete, precise, accurate dimensioned record of actual locations of the work, including concealed and embedded work, size and type of equipment, and every change or deviation from original contract drawings at the site. Keep this record legible and correct weekly as the job progresses on black or blue-line prints. Keep Record Drawings available for inspection at all times. Drawings will be inspected before approval of requests for payment.
- G. It shall be the responsibility of the Contractor to submit to the City within ten (10) days after final inspection, one complete marked-up set of contract drawings fully illustrating all revisions made by all the crafts in the course of the work. This shall include all field changes, adjustments, variances, substitutions and deletions, whether covered by Change Order or not. Underground utility installations must be located precisely as constructed on the marked-up drawings.

- H. The Contractor shall not take advantage of any apparent error or omission in the plans or specifications, and the City shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications.
- I. In addition to verifying at the site all measurements shown on the Drawings, Contractor shall consult the Drawings and Specifications of related work or existing construction that may in any manner affect the work of this contract. Contractor shall promptly report to the City, in writing, any errors, omissions, violations, or inconsistencies that may be discovered as a result of such verifications; otherwise, it shall be understood that Contractor accepts all such related data and conditions without reservations.
- J. Layout of existing piping, conduits, and locations of equipment are shown as exactly as could be determined during design of the facilities; but their accuracy, particularly when such layouts and drawings are schematic, cannot be guaranteed. Contractor shall check all Specifications including the Drawings for possible interference with electrical, mechanical, and structural details, as well as interference with existing building or equipment, and shall notify the City of the interference for resolution of the interference before commencing work. Any completed work that interferes shall be corrected by Contractor at Contractor expense so that the original design can be followed.

# 1.21 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, Use three D side rings if necessary and binders with durable plastic covers. Submit all documents in electronic form as well as in hardcopy. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- B. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 20-pound white paper, in three parts as follows:
  - Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment (including assigned equipment numbers).
    - c. A description of recommended replacement parts and materials, which the City should
    - d. Parts list for each component.
    - e. A summary of equipment vendors, or location where replacement parts can be purchased.
    - f. List indicating types and grades of oil and/or grease, packing materials, normal and abnormal tolerances for devices, and method of equipment adjustment.
    - g. Copies of all approved submittals.
    - h. Operating instructions.
    - i. Maintenance instructions for equipment and systems, Preventive maintenance recommendations.
    - j. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
    - k. Manufacturer's wiring diagrams for electrically powered equipment.
    - 1. A complete set of record control drawings.
    - m, Additional information as indicated in the technical specification sections
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Product data.
    - b. Air and water balance reports.
    - . Certificates.

- d. Photocopies of warranties.
- e. Name, address, and telephone number of the person or office to contact for service during the warranty period.
- f. Name, address, and telephone number of the person or service organization to be contacted for service after the warranty period.
- C. Submit 1 draft copy of completed volumes 15 [fifteen] days after approval of applicable submittal or receipt of the product. Revise content of all document sets as required prior to final submission. Submit 2 [two] sets of revised final volumes, within 10 [ten] days after final inspection.

# 1.22 SAFEGUARDS - EXISTING EQUIPMENT, UNDERGROUND UTILITIES AND ARTIFACTS

- A. Existing utilities, including those listed as abandoned, shall not be moved or otherwise disturbed without written verification by the City that the utility is abandoned.
- B. When altering existing facilities, the Contractor shall take every precaution to preserve and protect existing facilities, both those to be altered and those to remain unaltered that are within the limits of the work.
- C. The Contractor shall notify the City of structural members, piping, conduit, or equipment not indicated for removal that may cause interference with the work. Work shall not proceed in the affected area until instructions have been issued. Do not drill or penetrate existing structures without prior permission. The removal of existing work shall be by methods that will not jeopardize the integrity of structures or systems that are to remain.
- D. Existing utilities, including but not limited to roof drainage systems, underground cables, ducts, roadways, manholes, building fire alarm, public address or telecommunications wiring shall not be moved or otherwise disturbed, nor electrical circuits or switches operated or taken in or out of service, without prior consent of the City. Contractor shall compensate loss to the City resulting from damage to utilities.
- E. If bones or artifacts are encountered during digging, the City requires that the Contractor stop work within a 50-foot radius of the find and immediately notify the City. Work may continue only with approval from the City.

# 1,23 ACCESS PANELS AND DOORS

A. All serviceable and replaceable devices, including but not limited to valves, boxes, and dampers shall receive an access at a location and in a size that enables proper servicing and repair of the device without removal of other material. The sizes described below are minimum sizes and might be increased if the type and size of device requires it. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the City or designee making sure that access is available for all equipment and specialties. Relocate access panel or door if equipment is not properly accessible to perform all maintenance and repair at no cost to the City.

#### 1.24 LAY-IN CEILINGS:

A. Removable lay-in ceiling tiles in 2 X 2 foot or 2 X 4 foot configuration are sufficient; no additional access provisions are required unless specifically indicated.

# 1.25 PLASTER WALLS AND CEILINGS:

A. 16 gauge frame with not less than a 20 gauge hinged door panel, prime coated steel for general applications, stainless steel for use in toilets, showers, and similar wet areas, concealed hinges, screwdriver operated cam latch for general applications, key lock for use in public or secured areas, UL listed for use in fire rated partitions if required by the application. Use the largest size access opening possible, consistent with the space and the item needing service; minimum size is 12" by 12".

#### 1.26 SLEEVES AND OPENINGS

- A. The Contractor requiring sleeved openings shall furnish and install all sleeves required for their penetrations. Contractors furnishing sleeves to others for installation shall do this in a timely manner so as not to impede the project schedule.
- B. Openings that are required and are not shown on the structural and/or architectural drawings shall be the responsibility of the Contractor requiring the openings. The Contractor shall install sleeves for these openings or cut openings as needed (including floor openings within chases).
- C. The Contractor shall be responsible for coordinating locations of their sleeves with work of other trades. The Contractor who requires sleeves and/or openings shall submit through the Contractor, to the City for review and approval, layout drawings of all such required sleeves and/or openings. Sleeve and opening layout drawings shall be received by the City a minimum of two weeks prior to installation of the sleeves and openings. Sleeve and opening sizes and locations shall be dimensioned from column lines and floor elevations or from a point of reference approved by the City.
- D. Provide galvanized sheet metal sleeves for pipe and conduit penetrations through interior and exterior walls to provide a backing for sealant or firestopping. Patch wall around sleeve to match adjacent wall construction and finish. Grout area around sleeve in masonry construction. In finished spaces where pipe penetration through wall is exposed to view, sheet metal sleeve shall be installed flush with face of wall. Pipe sleeves in new poured concrete construction shall be schedule 40 steel pipe (sized to allow insulated pipe to run through sleeve), cast in place.
- E. In all piping floor penetrations, fire rated and non-fire rated, top of sleeve shall extend 2 inches above the adjacent finished floor. In existing floor penetrations, core drill sleeve opening large enough to insert schedule 40 sleeve and grout area around sleeve with hydraulic setting, non-shrink grout. If the pipe penetrating the sleeve is supported by a pipe clamp resting on the sleeve, weld a collar or struts to the sleeve that will transfer weight to existing floor structure.
- F. For floor penetrations through existing floors in mechanical, food service areas, parking ramps, sanitary pumping stations, swimming pool equipment rooms, chemical storage and hazardous waste storage rooms and other wet locations or locations that can get wet by accident or failure of a component, core drill opening and provide a sleeve fastened to floor surrounding the penetration or group of penetrations to prevent water from entering the penetration. Top of sleeve shall be 4 inches above the adjacent floor. Provide urethane caulk between angles and floor and fasten angles to floor a minimum of 8" on center. Seal corners water tight with urethane caulk. Or, core drill sleeve openings large enough to insert schedule 40 sleeve and grout area around sleeve with hydraulic setting non-shrink grout/cement. Size sleeve to allow insulated pipe to pass through sleeve and paint the sleeve.
- G. Pipe sleeves for conduits 6" in diameter and smaller, in new poured concrete construction, shall be schedule 40 steel pipe, plastic removable sleeve or sheet metal sleeve, all cast in place.

#### 1.27 LOOSE AND DETACHABLE PARTS

- A. Contractor shall retain all loose and small detachable parts of apparatus and equipment furnished under this Contract, until completion of the work and shall turn them over to the City to receive them.
- B. Furnish one can of touch-up paint for each different color factory finish furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts".

# 1.28 STAIRS, SCAFFOLDS, HOISTS, ELEVATORS OR CRANES

- A. The Contractor shall furnish and maintain equipment such as temporary stairs, fixed ladders, ramps, chutes, runways and the like as required for proper execution of work by all trades, and shall remove them on completion of the work. The Contractor shall erect permanent stair framing as soon as possible. Provide stairs with temporary treads, handrails, and shaft protection. Contractors requiring scaffolds shall make arrangements with the Contractor, or shall provide their own and remove them on completion of the work. The Contractor shall underlay its interior scaffolds with planking to prevent uprights from resting directly on the floor construction.
- B. Contractor shall provide and pay for its own hoist/crane or other apparatus necessary for unloading/setting or moving their equipment and materials. Installation and removal of equipment for this activity must be accounted for in the Project Schedule. Equipment and operations for this activity shall comply with applicable Department of Commerce and OSHA requirements. No material hoist may be used to transport personnel unless it meets Department of Commerce and OSHA requirements for that purpose.
- C. Existing elevators may be used on a limited basis with the City's permission and agreement. The Contractor will pay costs of warranty extensions and additional service work required. Appropriate protection must be provided by the using Contractor and that Contractor shall be responsible for any structural, mechanical or finish damage to the elevator and its parts and to adjoining building finishes and components.

# **PART 2 - PRODUCTS**

# 2.1 SPECIFIED ITEMS – SUBSTITUTES

- A. Wherever catalog numbers and specific or trade names are used in conjunction with a designated material, product, thing, or service mentioned in these Specifications, they are used to establish the standards of quality, utility, and appearance required. Substitutions, which are equal in quality, utility, and appearance to those specified, will be approved, subject to the following provisions:
- B. All Substitutions must be accepted by the City Engineer or designee in writing. The City Engineer or designee will accept, in writing, such proposed Substitutions as are in his or her opinion, equal in quality, utility, and appearance to the items or materials specified. Such acceptance shall not relieve the Contractor from complying with the requirements of the drawings and specifications, and the Contractor shall be responsible at Contractor's own expense for any changes resulting from Contractor proposed substitutions which affect the other parts of Contractor's own work or the work of others.
- C. The manufacturer shall be a company specializing in the manufacture of the specified equipment and accessories with minimum five years documented experience.

D. Failure of the Contractor to submit proposed substitutions for approval in the manner described above and within the time prescribed shall be sufficient cause for disapproval by the City Engineer or designee of any substitutions otherwise proposed.

# 2.2 APPROVED TESTING LABORATORIES

- A. The following laboratories are approved for providing electrical product safety testing and listing services as required in these specifications:
  - 1. Underwriters Laboratories Inc.
  - 2. Electrical Testing Laboratories, Inc.

# **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions and all code requirements. Provide the City or designee with copy of manufacturer's instructions prior to installation. Coordinate equipment location with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. Locate equipment to provide access space for servicing all components. Install in accordance with recognized industry practices. The manufacturer's latest recommendations at the time of bidding shall be used.
- B. Startup and test equipment and adjust operating and safety controls for proper operation.
- C. Contractor shall coordinate work with existing equipment so that all systems, equipment and other components will fit the available space, and will allow proper service and repair. Each location needs to be approved by the City or designee. This also applies to existing equipment if newly installed equipment interferes with its accessibility. Location of equipment has to fit into existing panels, decoration or finish. The City can request minor position changes of equipment before the work has begun.
- D. The Contractor shall cooperate in reducing objectionable noise or vibration. If noise or vibration is a result of improper material or installation, these conditions shall be corrected at no cost to the City. Abnormal buzzing in equipment is not acceptable.
- E. Carpentry, Cutting, Patching, and Core Drilling:
  - 1. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment specified in the scope of work. Do not cut, core, or drill structural members without consent of the City.
- F. Waterproof Construction:
  - 1. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashings at exterior roof penetrations. Caulk penetrations of foundation walls and floors watertight. Provide membrane clamps at penetrations of waterproof membranes. Provide waterproof NEMA 3R enclosures for all equipment or devices mounted outside or otherwise exposed to the weather.
- G. Workmanship:
  - 1. Install using procedures defined in NECA Standard of Installation and shall be conform with all codes and regulations. Materials and equipment of the types for which there are National Board of Fire Underwriters' Laboratories (UL) listing and label service shall be so labeled and shall be used by Contractor.

- H. Modifications to existing construction and Alterations:
  - 1. Alter, extend and reconnect existing conduit as necessary. Reconnect existing conduits, which were reused, cut or exposed because of construction as quickly as possible. Where wiring is involved, new wires shall be "pulled in" between the nearest available accessible reused outlets to the extent allowed by the governing code. Furnish and install new conduits for wires if they cannot be "pulled in" to existing conduits. All new conduits, wiring, and electrical items shall be connected to the existing systems so as to function as a complete unit. Where existing electrical equipment, devices, fixtures, electrically operated items, etc., interfere with any remodeling work, they shall be removed and reinstalled in another location to avoid such interferences. All existing and relocated equipment shall be left in good operating condition. Include in bid removal from service of existing electrical material and equipment as specified hereinafter, as noted on the drawings, or as needed by field conditions.

# I. Painting of Equipment and Hardware:

- 1. Provide moisture resistant paint for all exterior painting. Colors shall be as shown on the drawings unless specified.
- Refer to individual Sections and construction drawings for painting requirements. All exposed
  conduits, raceways and gutters inside and outside the building shall be painted to match the wall
  color.

# 3.2 DELIVERY, STORAGE AND HANDLING OF MATERIALS

- A. Contractor or the Contractor's authorized representative must be present to accept delivery of all equipment and material shipments. The City will not knowingly accept, unload or store anything delivered to the site for the Contractor's use. Inadvertent acceptance of delivered items by any or employee of the City shall not constitute acceptance or responsibility for any of the materials or equipment. It is the Contractor's responsibility to assume liability for equipment or material delivered to the job site.
- B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays. Materials and equipment shall be delivered to the site in adequate time to ensure uninterrupted progress of the work and inspection of material by the City. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Care shall be taken to prevent damage to materials and equipment during loading, transporting and unloading. Packaged materials and equipment shall be delivered to the site in original, undamaged containers bearing manufacturer's name, with seals unbroken. Packaged units shall be delivered in their original crates. Store in a clean and dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic. Promptly inspect shipments to insure that the material is undamaged and complies with specifications. Materials or equipment, which do not conform to the Specifications or are damaged shall not be incorporated in the work and shall be immediately removed from the site.
- C. Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this Contractor, restore any opening to its original condition after the apparatus has been brought into the building.
- D. Contractor shall confine equipment, apparatus, storage of materials and operations to limits indicated on the drawings or by specific direction of the City. The storage of materials on the grounds and within the building shall be in strict accordance with the instructions of the City. Storage of materials within the building shall at no time exceed the design carrying capacity of the structural system. The City assumes no responsibility for materials stored in building or on the site. The Contractor assumes full responsibility for damage due to the storage of materials. Repairing of areas used for placing of sheds, offices, and for storage of materials shall be done by the Contractor.

- E. Material shall be stored according to manufacturer's recommendations as a minimum. Provide and maintain watertight storage sheds on the premises where directed, for storage of materials that might be damaged by weather. Sheds shall have wood floors raised at least 6" above the ground. Materials, construction sheds, and earth stockpiles shall be located so as not to interfere with the installation of the utilities nor cause damage to existing lines. Should it be necessary at any time to move material sheds or storage platforms, the Contractor shall move it at the Contractor's expense, when directed by the City. All materials affected by moisture shall be stored on platforms and protected from the weather. In addition, material must be stored in a location protected from vandalism and weather. If material is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If necessary, material will be stored off site at the Contractor's expense. Offsite storage agreements will not relieve the Contractor from using proper storage techniques. Storage and protection methods must allow inspection to verify products.
- F. All materials shall be stored in a manner that prevents release of hazardous material to the environment. All hazardous materials, including motor fuels, shall be properly handled and contained to prevent spills or other releases. The Contractor shall develop and maintain a contingency plan to provide emergency response, containment, and cleanup of spills of hazardous materials resulting from contract activities. All spills and releases shall be reported to the City as soon as possible. Please note that the Standard Specifications Section 107 A(f) must be followed and overrides any provision in these specifications.
- G. Cover pipes and ducts to prevent corrosion or deterioration while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, duct, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.
- H. Store windows and doors in upright position, off ground, under cover and protected from sunlight, weather and construction activities.

# 3.3 DEMOLITION

- A. Perform all demolition as indicated on the drawings to accomplish new work. Demolition Drawings are based on casual field observation and/or existing record documents. Verify field measurements and circuiting arrangements as shown on Drawings, verify that abandoned wiring, piping, ducting and equipment serve only abandoned facilities. Report discrepancies to the City before disturbing existing installation. Beginning of demolition means installer accepts existing conditions.
- B. Before demolition of any load bearing concrete, a ground-penetrating radar or concrete X-ray scan needs to be performed to detect any rebar. This work shall be performed at least a week before demolition starts to give A/E the opportunity to resolve any issues by rebar or other obstacles in unexpected locations. Drawings with existing subsurface obstacles may not be correct and shall not be relied on.
- C. Where demolition work is to be performed adjacent to existing work that remains in an occupied area, construct temporary dust partition to minimize the amount of contamination of the occupied space. Where pipe or duct is removed and not reconnected with new work, cap ends of existing services as if they were new work. Coordinate work with the City to minimize disruption to the existing building occupants.
- D. All pipe, wiring and associated conduit, insulation, ductwork, and similar items demolished, abandoned, or deactivated are to be removed from the site by the Contractor. Maintain the condition of material and/or equipment that is indicated to be reused equal to that existing before work began. All piping and ductwork specialties are to be removed from the site by the Contractor unless they are dismantled and removed or stored by the City. Verify whether or not PCB ballasts exist in light fixtures, which will be disposed of. If PCB light fixture ballasts exist, then follow requirements in other sections related to electrical work.

- E. Patch holes and openings caused by removal of material and equipment, or formerly covered by such, with like material and texture of surrounding surface. Painting is not necessary unless noted otherwise.
- F. Approval of all legal institutions shall be obtained prior to disposal of any equipment and materials. All disposal has to be in compliance with all local, county, state and nationwide regulations. All disconnected wiring shall be removed from all raceway systems, panels, enclosures pull boxes, junction boxes etc. irrespective of whether the removal is specified in the construction documents or not. The empty raceway systems shall be tagged spare on both ends of each termination.
- G. Don't demolition equipment and material that is to stay in place. Replace and repair any equipment and installations that get damaged during demolition.

## 3.4 CUTTING, PATCHING AND PAINTING

- A. Cutting and patching required to access work in existing walls, in chases, above inaccessible ceilings, below floors, etc., shall be by the Contractor who requires the access, unless shown on the bid documents otherwise or noted otherwise.
- B. The Contractor shall do all cutting, or fitting of the work as required to make its several parts fit together, or to receive the work of others, as shown or reasonably implied by the drawings or specifications, or as may be directed by the City. Holes cut in exterior walls and/or roofs shall be waterproofed.
- C. The Contractor who cuts shall also be responsible for patching. Where cutting and patching is required, the Contractor shall hire individuals skilled in such work to do cutting and patching. The Contractor who removes or relocates building components which leaves a remaining opening shall be responsible for patching the opening.
- D. Patching includes repairing openings to match adjacent construction and painting the surface to match existing surface including texture.
- E. Painting means covering the entire wall where patching is to be done to nearest break point or corner unless indicated to be done by other trades. All paining will require patching. This includes all painting included in other sections.
- F. Contractor shall not endanger any work by cutting, digging or otherwise and shall not cut or alter the work of others without their consent.
- G. Do not pierce beams or columns without permission of the City and then only as directed in writing. If any ductwork, piping, conduit, etc. is required through walls or floors where no sleeve has been provided, use a core drill or saw cut to prevent damage and structural weakening.
- H. Wherever any material, finish, or equipment, is damaged, the skilled trade shall accomplish the repair or replacement, in that particular work and the cost shall be charged to the party responsible for the damage. The City reserves the right to disallow any means *and/or* methods that, in the opinion of the City, are harmful to and/or not in the best interest of preserving the improvements receiving the work.

#### 3.5 CONCRETE WORK

A. Provide all layout drawings, anchor bolts, metal shapes, and/or templates required to be cast into concrete or used to form concrete for support or installation of electrical, mechanical, plumbing piping, fixtures, specialties and equipment. This includes but is not limited to piping thrust restraints, pipe supports, hydrant supports, manholes, catch basins, grease traps, septic tanks, distribution boxes, valve pits, meter

pits, cleanout cover pads, yard hydrant pads, etc. Coordinate locations of equipment, pipe penetrations in wet areas, etc. with other trades.

Unless noted otherwise provide cast in place concrete for equipment pads, manhole bases and thrust B. blocks. Concrete to be 3,000 psi at 28 days, 3/4 inch aggregate, five bags cement, three inch slump, air entraining admixture. The ACI 614 Recommended Practice for Measuring, Mixing and Placing of Concrete shall constitute the execution requirements.

#### 3.6 EXCAVATION, BACKFILL, AND SURFACE RESTORATION

- The Contractor shall take all measures necessary to become acquainted with the location of underground A. service, utilities, structures, etc., which may be encountered or be affected by the Contractor's work, and shall be responsible for damage caused by neglect to provide proper precautions or protection. As a minimum to become acquainted with such underground appurtenances, the Contractor shall: 1) Observe existing conditions visible at the site immediately prior to commencement of work; 2) Review available site plans incorporated in the contract documents and/or provided by the City; 3) Final check with the City for additions to or changes from conditions indicated on site plans for the facility.
- Before excavation in areas with utilities nearby, a ground-penetrating radar or ground radar scan needs to В. be performed to detect any subsurface obstacles. This work shall be performed at least a week before demolition starts to give A/E the opportunity to resolve any issues by utilities or other obstacles in unexpected locations. Drawings with existing utilities may not be correct and shall not be relied on.
- C. Verify the locations of any water, drainage, gas, sewer, electric, telephone or steam lines which may be encountered in the excavation. Underpin and support all lines. Cut off service connections encountered which are to be removed at the limits of the excavation and cap. Existing pipes, electrical work, and all other utilities encountered, which may interfere with new work, shall be re-routed, capped, cut off, or replaced by the Contractor.
- D. Perform all excavation and backfill work necessary to accomplish indicated systems installation. Excavate to below bottom of pipe and structure bedding (4" in stable soils, 6" in rock or wet trenches and 8" in unstable soil). Finish bottoms of excavations to true, level surface. Install lines passing under foundations with minimum of 1-1/2 inch clearance to concrete and insure there is no disturbance of bearing soil. Excavate whatever materials are encountered as required to place at the elevations shown, all pipe, manholes, and other work. Remove debris and rubbish from excavations before placing bedding and backfill material.
- Ε. Remove rock encountered in the excavation to a minimum dimension of six (6) inches outside the pipe. Rock excavation includes all hard, solid rock in ledges, bedded deposits and unstratified masses, all natural conglomerate deposits so firmly cemented as to present all the characteristics of solid rock; which material is so hard or so firmly cemented that in the opinion of the City Engineer it is not practical to excavate and remove same with a power shovel except after thorough and continuous drilling and blasting. Rock excavation includes rock boulders of ½ cubic yard or more in volume. Rock excavation will be computed on the basis of the depth of rock removed and a trench width two (2) feet larger than the outside diameter of the pipe where one (1) pipe is laid in the trench and three (3) feet larger than the combined outside diameter where two (2) pipes are laid in the trench. Include 6" pipe and structure bedding in rock excavation. Include rock excavation shown on the plans in the Base Bid. Bed pipe up to a point 12" above the top of the pipe. Take care during bedding, compaction and backfill not to disturb or damage piping. Bedding up to a point 12" inches above the top of a pipe or conduit shall be thoroughly compacted sand or crushed stone chips meeting the following gradations:

Gradation for Bedding Sand

% Passing (by Wt) Sieve Size

1 inch

100

No. 16 45-80

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Gradation for Crushed Stone Chip Bedding

Sieve Size

% Passing (by Wt)

½ inch

100

No. 4

75-100

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- F. Provide shoring, sheet piling and bracing in conformance with the Wisconsin Administrative Code to prevent earth from caving or washing into the excavation. Shore and underpin to properly support adjacent or adjoining structures. Abandon in place shoring, sheet piling and underpinning below the top of the pipe, or, if approved in advance by the City Engineer, maintained in place until other permanent support approved by the City Engineer is provided.
- G. Tunnel or remove sidewalk and curb in areas of excavation to the nearest joint. Remove pavements, curbs and gutters to neat and straight lines to the limits of removal. Make sawcut lines parallel to existing joints, or parallel or perpendicular to pavement edges to form a neat patch. Carefully remove remaining pavement within the sawcut area. Leave existing base materials between the area disturbed by the work and the sawcut line undisturbed by the sawcutting, pavement removal, or pavement replacement processes.
- H. Strip topsoil from area to be excavated, free from subsoil and debris, and store separately for later respreading. No topsoil shall be removed from site and all topsoil is property of the City. Remove surplus excavated non-topsoil materials from site and dispose properly.
- I. At no time place excavated materials where they will impede surface drainage unless such drainage is being safely rerouted away from the excavation.
- J. Provide and maintain all fencing, barricades, signs, warning lights, and/or other equipment necessary to keep all excavation pits and trenches and the entire subgrade area safe under all circumstances and at all times. No excavation shall be left unattended without adequate protection.
- K. Elevations shown on the plans are subject to such revisions as may be necessary to fit field conditions. No adjustment in compensation will be made for adjustments up to two (2) feet above or below the grades indicated on the plans.
- L. Three days before backfilling, the City shall be notified so that the City Surveyor can obtain the three-dimensional coordinates of all buried utilities. Buried utilities including the pipeline and any other utilities exposed during construction shall not be covered with backfill without the prior approval of the City. Coordination of this survey requirement is the responsibility of the Contractor. Surveyors will be provided by the when scheduled. The cost for delay or dig-up related to the Contractor's failure to schedule the utility survey shall be paid by the Contractor. Alternately, the Contractor shall install reference points consisting of nail and hub/flagging at all changes in grade or alignment of the new pipeline and for all other utilities exposed by the excavation. The Contractor shall keep a separate written record referenced to each point with the following information:
  - 1. Offset and depth to top and centerline of utility, accurate to 0.1 feet
  - 2. Type of utility (i.e. gas, water, etc.)
  - 3. Size of utility (i.e. 2", 4", 16" wide duct, etc.)
  - 4. Type of material of utility (i.e. cast iron, PVC, etc.)
  - 5. Identification tape shall be installed 12': above the buried utility crown. The identification tape shall be continuous for the entire length of utility. Before backfilling for buried utilities over identification tape, the City construction inspector will verify that identification tape has been installed.
- M. Mechanically compact bedding and backfill to prevent settlement. The initial compacted lift to not exceed 24" compacted to 95% density per Modified Proctor Test (ASTM 0-1557). Subsequent lifts under pavements, curbs, walks and structures are not to exceed 12" and be compacted to 95% density per Modified Proctor Test. In all other areas where construction above the excavation is not anticipated within 2 years, mechanically compact backfill in lifts not exceeding 24" to 90% density per Modified Proctor Test. Route the equipment over each lift of the material so that the compaction equipment contacts all areas of the surface of the lift.

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- N. Backfill above the bedding in lawn areas shall be thoroughly compacted excavated material free of large stones, organic, perishable, and frozen materials.
- O. Backfill above the bedding under existing and future utilities, paving, sidewalks, curbs, roads and buildings shall be granular materials, pit run sand, gravel, or crushed stone, free from large stones, organic, perishable, and frozen materials.
- P. Completely restore the surface of all disturbed areas as described below to a like condition of the surface prior to the work. Level off all waste disposal areas and clean up all areas used for the storage of materials or the temporary deposit of excavated earth. Remove all surplus material, tools and equipment. Topsoil shall be spread upon order from the City, typically right before any planting to avoid disturbance of topsoil by construction activities.
- Q. Lawns: Topsoil with 4" of clean, friable, fertile topsoil conforming to D.O.T. Section 625, free from debris, lumps, rocks, roots, plants and seeds. Grade surfaces to match adjacent elevations. Rake smooth, free of lumps and debris. Sod with good quality nursery sod conforming to D.O.T. Section 631, be uniform, dense, free from weeds and consist of approximately 60% Kentucky blue grass and the balance perennial rye, fescue and white clover. Place sod with joints staggered and abutting. Maintain lawn areas for one month after installation. Department will be responsible for necessary watering and mowing. Contractor needs to inform Department about watering needs. Do necessary weeding, repair, reseeding or resodding until uniform catch is obtained.
- R. Curb and Gutter: Concrete curb and gutter conforming to the City requirements and D.O.T. Section 601, Type 0 or L.
- S. Sidewalk and Walkways: Non-reinforced concrete conforming to D.O.T. Section 602, thickness to match existing, cross slope of one-fourth inch per foot, scored into squares approximately equal to width.
- T. Bituminous Concrete Pavements: 4" thick crushed stone base course conforming to D.O.T. Section 304 (excluding 304.2.4) and two pass bituminous concrete pavement conforming to D.O.T. Section 407, first course 1-1/2" binder, second course 1-1/2" surface.

# 3.7 DEWATERING

- A. Provide, operate and maintain all pumps and other equipment necessary to drain and keep all excavation pits, trenches and the entire subgrade area free from water under all circumstances. Obtain general permit from the Wisconsin Department of Natural Resources district office for discharge of construction dewatering effluent. Obtain well permit from the Wisconsin Department of Natural Resources district office for dewatering wells discharging more than 70 GPM. Comply with permit requirements.
- B. Temporary pumps required for pumping water from building excavation or from building proper shall be provided by the Contractor, including temporary connections. Permanent sump pumps shall not be installed until building is substantially complete and when approved by the City. The Contractor shall remove temporary pumps and connections when approved by the City.

# 3.8 SEALING AND FIRESTOPPING

A. The Contractor penetrating a waliffloor/ceiling is responsible for sealing this opening to the same rating as the wall/floor/ceiling is rated. All walls, floors and ceilings are considered to have a 1 hour rating at minimum unless a higher rating is determined. This also applies to walls, floor and ceilings that are not rated.

B. Sealing and firestopping of sleeves/openings between conduits, cable trays, wire ways, troughs, cable-bus, bus-duct, pipes, ducts etc. and the structural or partition opening shall be the responsibility of the Contractor whose work penetrates the opening. The Contractor responsible shall hire individuals skilled in such work to do the sealing and firestopping. These individuals hired shall normally and routinely be employed in the sealing and fireproofing occupation.

# 3.9 FIRE AND/OR SMOKE RATED PENETRATIONS:

- A. Install approved product in accordance with the manufacturer's instructions where an installation penetrates a fire/smoke rated surface. When pipe is insulated, use a product, which maintains the integrity of the insulation and vapor barrier.
- B. Where firestop mortar is used to infill large fire-rated floor openings that could be required to support weight, provide permanent structural forming. Firestop mortar alone is not adequate to support substantial weight.
- C. Whenever possible, avoid penetrations of fire and smoke rated partitions. When they cannot be avoided, verify that sufficient space is available for the penetration to be effectively fire and smoke stopped. All firestopping systems shall be by the same manufacturer. Firestop systems shall be UL listed or tested by an independent testing laboratory approved by the Department of Commerce. The Contractor will be responsible for selecting the appropriate UL tested fire stop system for each application required on the project and will submit this to the City or designee for review. Each firestop manufacturer has specific details for different applications they have tested.
- D. Manufacturers: 3M, STIISpecSeal, Tremco, Hilti or approved equal.
- E. Submittals: Contractor shall submit product data for each firestop system. Submittals shall include product characteristics, performance and limitation criteria, test data, MSDS sheets, installation details and procedures for each method of installation applicable to this project. For non-standard conditions where no UL tested system exists, submit manufacturer's drawings for UL system with known performance for which an engineering judgment can be based upon. Use a product that has a rating not less than the rating of the wall or floor being penetrated. Reference architectural drawings for identification of fire and/or smoke rated walls and floors.
- F. Contractor shall use firestop putty, caulk sealant, intumescent wrapstrips, intumescent firestop collars, firestop mortar or a combination of these products to provide a UL listed system for each application required for this project. Provide mineral wool backing where specified in manufacturer's application detail.

# 3.10 NON-RATED PENETRATIONS:

- A. Conduit Penetrations Through Below Grade Walls:
  - 1. In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the uninsulated conduit and the cored opening or a water-stop type wall sleeve.
- B. Conduit and Cable Tray Penetrations:
  - 1. At conduit and cable tray penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between conduit and sleeve, or the core-drilled opening.
- C. In exterior wall openings below grade, assemble rubber links of mechanical seal to the proper size for the pipe and tighten in place, in accordance with manufacturer's instructions.

D. At all interior partitions and exterior walls, pipe penetrations are required to be sealed. Apply sealant to both sides of the penetration in such a manner that the annular space between the pipe sleeve or cored opening and the pipe or insulation is completely blocked.

## 3.11 CLEANING

- A. The Contractor shall clean up and remove from the premises, on a daily basis accumulation of surplus materials, rubbish, debris and scrap and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site.
- B. All installed items shall be cleaned at time of installation, and all lens exteriors shall be cleaned just prior to final inspection. Equipment shall be thoroughly cleaned of all stains, paint, spots, dirt and dust. All temporary labels not used for instruction or operation shall be removed. Dust, dirt and other foreign matter shall be removed completely from all internal surfaces of all mechanical and electrical units, cabinets, ducts, pipes, etc. Dirt, soil, fingerprints, stains and the like, shall be completely removed from all exposed finished surfaces.
- C. Contractor shall wash all glass immediately prior to the occupancy of this project. Work shall include the removal of labels, paint splattering, glazing compound and sealant. Surfaces shall include mirrors and both sides of all glass in windows, borrowed lights, partitions, doors and sidelights. In addition to the above, the Contractor shall be responsible for the general "broom" cleaning of the premises and for expediting all of the cleaning, washing, waxing and polishing required within the technical sections of the specifications governing work under this Contract.
- D. The Contractor shall also perform "final" cleaning of all exposed surfaces to remove all foreign matter, spots, soil, construction dust, etc., so as to put the project in a complete and finished condition ready for acceptance and use intended.
- E. If rubbish and debris is not removed, or if surfaces are not cleaned as specified above, the City reserves the right to have said work done by others and the related cost(s) will be deducted from monies due the Contractor.

# 3.12 CONTINUITY OF SERVICE AND SHUTDOWN

- A. Contractor shall provide and maintain continuous service (power, controls, alarms, communication, elevators, HVAC, roads etc.) during the entire construction period. No outages shall be permitted on existing systems except at the time and during the interval specified by the City. Any outage must be scheduled when the interruption causes the least interference with normal institutional schedules and business routines and might be scheduled during after-hours if regular business hours are not acceptable to the City. No extra costs will be paid to the Contractor for such outages, which must occur outside of regular weekly working hours. Cost to the utility is paid by Contractor. The Contractor shall provide temporary utility services and bypasses for any disruptions not completed within this period. The Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible.
- B. If the building is occupied and continues operation during construction, retrofit or demolition, Contractor must maintain ventilation and air conditioning for as large parts of the building as technically feasible. Spreading of dirt, dust and other construction related material must be kept to a minimum. Occupied and work areas must be separated by seals. All work affecting air conditioning and ventilation must be coordinated with the daily work in the building and approved by the supervisor or department head at the building. If air conditioning, heating and ventilation has to be taken out of service for longer periods of time in parts of the building and work would be affected negatively, the Contractor shall provide

temporary sufficient air conditioning, heating and ventilation in coordination with the department. All such taking out of service has to be coordinated and approved by the supervisor or department head at the building.

- C. If the shutdown involves the interface with, or modification of, existing building energy system(s), the Contractor shall be required to show the reviewed submittal and shop drawings of the proposed modifications. Shutdown schedules shall have been reviewed and approved by the City at least 72 hours prior to date of shutdown. Postponement by the City of scheduled shutdowns shall not constitute a basis for additional charges to the City.
- D. Prior to the shutdown of any building energy system(s) the Contractor shall provide the following:
  - 1. Proof of receipt of all materials required for the shutdown or a written commitment from the responsible suppliers that the required materials will be available at the time of the shutdown.
  - 2. A list of the qualified Contractor personnel assigned to perform the work.
  - 3. Analysis of any affect on the utility or building energy system(s) and the estimated duration of the shutdown.
  - 4. Work plan for the shutdown
  - 5. A twenty-four-hour emergency callback phone number to be used by the City in the event of any problems or concerns with the modifications made to the building system(s) after the Contractor has left the site.
- E. The startup of electrical and mechanical utility systems constructed by Contractor shall be performed by Contractor in coordination with the City.

#### 3.13 PROJECT MEETINGS

- A. Project meetings will be held at the time designated by the City. If the principal of the firm does not attend meetings, a responsible representative of the Contractor who can bind the Contractor to a decision at the meetings shall attend.
- B. During construction, weekly project meetings may be held at the discretion of the City. The minutes of these meetings will be prepared by the Contractor and one copy issued as expeditiously as possible to the each party involved in the project. The Contractor will submit, in writing, questions and/or answers (previously obtained verbally) to be confirmed at each meeting.

## 3.14 TEMPORARY CONSTRUCTION

- A. Temporary construction shall conform to all requirements and laws of state and local authorities, which pertain to operation, safety, and fire hazards. Contractor shall furnish and install all items necessary for conformance with such requirements, whether called for under separate sections of these Specifications or not. Contractor shall provide, maintain, and remove upon completion of his work:
  - 1. Temporary crossovers and bypass to utilities, electrical connections, traffic and footbridges, and walkways used to maintain services or communications, which cannot be interrupted or curtailed.
  - 2. Temporary rigging, scaffolding, shoring, hoisting equipment, and all other temporary work as required for this project.
  - 3. Temporary barricades around openings and excavations for this project.
- B. Temporary lighting, if necessary during the period of construction, shall be supplied and maintained by the Contractor at Contractor expense so that construction work can be safely performed. The temporary lighting system shall be sufficient to enable all trades to safely complete their work and to enable the City to check all work as it is being done. Illumination shall be 5 foot-candles minimum in all areas and, in addition, shall meet or exceed the requirements of 29 CFR 1926.56 Illumination (OSHA regulations). In accordance with the latest issue of the National Electrical Code, all temporary electrical circuits for

construction purposes shall be equipped with combination ground fault interrupter and circuit breakers meeting the requirements of UL for Class A, Group 1 devices. The ground fault interrupter portion shall be solid-state type, insulated and isolated from the breaker mechanism. A test button shall be provided for checking the device. The breaker mechanism shall provide overload and short circuit protection and shall be operated by a toggle switch with over center switching mechanism so that contact cannot be held closed.

# 3.15 TEMPORARY HEAT

- A. All heating required after enclosure of the building shall be classified as TEMPORARY HEAT and be provided by the Contractor. It shall be the responsibility of the Contractor to see that every precaution is used to prevent unnecessary escape of heat. The Contractor shall provide and pay for temporary heat. A minimum temperature of 45 degrees and a maximum temperature of 65 degrees for the building shall be maintained, except for a period of at least ten days prior to the placing of interior woodwork and throughout the placing of this and other finish, varnishing, painting, tiling etc., and until substantial completion to provide sufficient heat to insure a temperature in the spaces involved of not less than 70 degrees nor more than 80 degrees. Temperatures must be checked during nighttime and on weekends. Restitution shall be made by Contractor responsible for damage to building and contents caused by overheating, freezing, fumes, soot or residue given off by temporary heating or lack of thereof.
- B. Permanent heating system may be used for temporary heating. Warranty period may not be affected by use of permanent heating. If permanent system is used, the Heating Trade shall install in their permanent location heating coils or connectors as approved by the City, with controls to maintain temperatures required. Temporary filters shall be used in the permanent system. Provide bases, shields, etc., around heating elements to prevent too rapid drying of adjacent concrete, masonry or plaster. Relocation of some of the permanent heating system equipment may be required during construction to prevent interference with new construction. Temporary units may be installed in such areas during the time permanent equipment is not operating due to relocation. The temporary heating system shall be removed after the permanent heating system has been installed and is operating. Surfaces and structure shall be patched as required. Temporary heating equipment shall be relocated by the Heating Trade as required during construction to prevent interference with new construction.
- C. The use of temporary units whose product of combustion will damage fresh concrete, mortar or other building materials, will not be allowed. Use of coke or oil salamanders is prohibited. All portable temporary heating units shall be properly ventilated to prevent combustion gases from remaining in the heating area. If electrical power is required for oil or gas portable heating units, it may be taken from the available temporary power source and paid for by the Contractor. Heating units and the area surrounding the units shall be kept in a clean and safe condition.

## 3.16 TEMPORARY ELECTRICAL SERVICE

- A. The Contractor shall make all arrangements with the local utility company for metered electrical service, pay for the installation of all temporary service to utility point of termination shown on drawings, and upon completion of project, pay for removal of temporary service. The Contractor shall patch surfaces and structure after services have been removed. The Contractor shall pay for all electrical energy consumed for construction purposes for all trades including temporary offices, for operation of ventilating equipment, for heating of building, and for testing and operating of all equipment. The Contractor shall continue to pay for energy used until substantial completion even though equipment has been connected to the permanent wiring.
- B. Contractor shall provide and maintain 200 ampere electrical services in single phase or multi phase as required by equipment to be used. Provide at multiple services to ensure service to run at less than 75% of its capacity at all times and to enable short cable runs of less than 300 ft to equipment to be used.

- C. The Contractor shall provide meter base and wiring to point of utility termination, provide main fused service switch, and fused or breaker distribution panel(s). The Contractor shall also provide, at no cost to others, all lamps, wiring, switches, sockets and similar equipment required for temporary system until substantial completion. Upon completion of the project, the Contractor shall remove the temporary system.
- D. After Substantial Completion of the permanent electrical system and building wiring, permanent receptacles may be used during finishing work. Permanent wiring for lighting fixtures, switches and receptacles shall be installed only after all masonry and plastering has been completed, but this wiring shall not be used for motors larger than fractional HP or for welding equipment. Circuits for larger motors and welding equipment may be provided with special circuits to mains of electrical panels at the expense of those trades requiring them, provided that special permission is obtained from the City and the installation is made by skilled electricians.
- E. All temporary wiring and electrical installations shall be in accordance with applicable codes. Any power outage occasioned by tying into the existing electrical system for temporary or permanent use shall be coordinated with the City. The City does not guarantee the quantities or quality of power or water available for Contractor's use, nor will it be responsible in any manner for interruptions in service or for the effects of interruptions.
- F. All Trades shall furnish their extension cords and lamps other than those furnished for general lighting. All Trades and other separate Contractors shall be allowed to use the service provided for general lighting and fractional horsepower hand tools at no cost.
- G. If a Contractor contemplates the use of equipment that requires a different voltage or greater capacity than that specified, then that Contractor must arrange with Utility for this additional service and pay for installation of the service and the necessary additional switches and wiring required. The meter shall be taken out in the Contractor's name.

#### 3.17 TEMPORARY WATER, SEWER AND PUMPS

- A. The Contractor shall supply all water required for construction and other purposes until the permanent water supply system is accepted and in operation. As soon as possible Contractor shall install and pay for permanent water mains into new building, provide temporary gate valve and freezing protection, extend piping and provide a 'X" hose bib for use by all Contractors. Permanent lines maybe used.
- B. Waste of water shall be avoided and valves, connections, pumps pipes and hoses shall be provided by Contractor kept in perfect condition.
- C. Sewer work shall be started and finished as soon as possible. Including backfill.
- D. Water supply used by workmen shall be kept clean and sanitary at all times.

# 3.18 TOILETS

- A. The Contractor shall provide and maintain sanitary temporary toilets, located where directed by the City, in sufficient number required for the force employed. The toilets shall comply with International Building Code Chapter 29 on Plumbing Systems. Toilets shall be self-contained chemical type.
- B. As soon as conditions will allow, the Plumbing Trade shall provide temporary toilets within the building, where directed, and equip the room with at least two temporary water closets and one temporary lavatory, each with connections to cold water and sanitary sewer. The Contractor shall provide a temporary wood enclosure with doors; remove when directed. After directed by the City, the Plumber shall remove the

temporary fixtures and replace them with permanent fixtures. After temporary toilet accommodations are provided within the building, the Contractor shall remove the temporary outside toilets.

C. The Contractor shall maintain the temporary toilets in a sanitary condition at all times and shall supply toilet paper until completion of the job.

#### 3.19 FIELD OFFICES

A. The Contractor shall provide, maintain and remove upon completion a temporary watertight office where directed for use by the Contractor and Trades. The office shall be equipped with a plan rack, a suitable table for examination of plans and shall have adequate equipment for document files and space for job meetings. Exterior of offices shall be of neat appearance, and if deemed necessary by the City, shall be painted to achieve such appearance; heat offices during cold weather; provide each office with at least one glazed movable window and one door with a cylinder lock and latch set. Provide and maintain artificial light, minimum of 40 foot-candles, and two duplex outlets where directed. When directed, move the office into a suitable area in the building.

#### 3.20 IDENTIFICATION

- A. Identify all equipment by stenciling (not less than 1 inch high letters/numbers) with one coat of black enamel against a light background or white enamel against a dark background. Use a primer where necessary for proper paint adhesion. Where stenciling is not appropriate for equipment identification, engraved name plates may be used (White letters on a black background, 1/16 inch thick plastic laminate, beveled edges, screw mounting, Setonply Style 2060 by Seton Name Plate Company or Emedolite Style EIP by EMED Co., or equal by W. H. Brady)
- B. Identify interior piping not less than once every 30 feet, not less than once in each room, adjacent to each access door or panel, and on both side of the partition where accessible piping passes through walls or floors. Place flow directional arrows at each pipe identification location. Label all pipes with name of loop and arrows for flow direction with permanent label. Label all gauges. Use one coat of black enamel against a light background or white enamel against a dark background.
- C. Identify all exterior buried piping for entire length with underground warning tape except for sewer piping which is routed in straight lines between manholes or cleanouts. Place tape 6"-12" below finished grade along entire length of pipe. Extend tape to surface at building entrances, meters, hydrants and valves. Where existing underground warning tape is broken during excavation, replace with new tape identifying appropriate service and securely spliced to ends of existing tape.
- D. Identify valves with brass tags bearing a system identification and a valve sequence number. Identify medical gas and vacuum valves with brass tags and wall or cabinet mounted color coded engraved nameplate with the following "(Type of Gas) Shutoff Valve for (Location or Zone)". Valve tags are not required at a terminal device unless the valves are greater than ten feet from the device, located in another room or not visible from device. Provide a typewritten valve schedule and pipe identification schedule indicating the valve number and the equipment or areas supplied by each valve and the symbols used for pipe identification; locate schedules in mechanical room and in each Operating and Maintenance manual. Schedule in mechanical room to be framed under clear plastic.
- E. Provide all buried utilities, conduit and pipes with detectable underground warning tape, 5.0 mil overall thickness, 6" width, .0035" thick aluminum foil core with polyethylene jacket bonded to both sides. Color code tape and print caution along with name of buried service in bold letters on face of tape.
  - 1. Manufacturers: Thor Enterprises Magnatec or equal by Carlton, MSI Marking Services, Seton.

F. All underground non-metallic sewers/mains and water services/mains shall be provided with tracer wire installations. Tracer wire installations shall conform with Section 182.0715(2r) of Wisconsin Statutes and prevailing Department of Commerce Chapter 84 requirements. Tracer wire shall be continuous solid copper or steel plastic coated with split bolt or compression-type connectors.

## G. SNAP-AROUND PIPE MARKERS:

1. One-piece, preformed, vinyl construction, snap-around or strap-around pipe markers with applicable labeling and flow direction arrows, %" min. size for lettering. Provide nylon ties on each end of pipe markers. Equal to Seton Setmark.

#### H. VALVE TAGS:

1. Round brass tags with 1/2 inch numbers, 1/4 inch system identification abbreviation, 1-1/4 inch minimum diameter, with brass jack chains, brass "S" hooks or one piece nylon ties around the valve stem, available from EM ED Co., Seton Name Plate Company, or W. H. Brady.

## 3.21 LUBRICATION

A. Lubricate all bearings with lubricant as recommended by the manufacturer before the equipment is operated for any reason. Once the equipment has been run, maintain lubrication in accordance with the manufacturer's instructions until the work is accepted by the City. Maintain a log of all lubricants used and frequency of lubrication; include this information in the Operating and Maintenance Manuals at the completion of the project.

#### 3.22 PUNCH LIST

- A. Contractor's supervisor at site shall acknowledge receipt of punch list.
- B. Multiple punch lists can be submitted.
- C. If Contractor fails to perform required corrective work in less than 30 days upon receipt of punch list by Contractor, the City can perform corrections himself and charge the Contractor.
- D. Contractor shall advice the City or designee that the necessary work has been performed. If the City or designee verify if punch list items were not resolved and the work was not performed in less than 30 days upon receipt of punch list by Contractor, the Contractor shall be required to compensate the designee for additional site visits at a rate of \$100/hour plus mileage with the amount paid to the City or designee prior to processing the final payment.

## 3.23 CLOSEOUT PROCEDURES

## A. Substantial Completion:

- 1. Proceed as follows when Contractor considers the Work to be Substantially Complete:
  - a. Submit written notice to the A/E with list of items to be completed or corrected.
  - b. Within a reasonable time, the A/E and owner will inspect to determine status of completion.
  - c. Should A/E determine that Work is not substantially complete, he will promptly notify Contractor in writing, giving the reasons therefore.
  - d. Contractor shall remedy deficiencies, and send a second written notice of substantial completion, and A/E and Owner will reinspect the Work.
  - e. When A/E determines that Work is substantially complete, he will prepare a Certificate of Substantial Completion in accordance with the General Conditions.

## B. Final Completion:

- A/E will consider Closeout Submittals within 10 days after date of Substantial Completion of the whole Work.
- 2. When Contractor considers Work is complete, he shall submit written certification that:
- 3. Contract Documents have been reviewed.
- 4. Work has been inspected for compliance with Contract Documents.
- 5. Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificates of Substantial Completion have been corrected.
- 6. Equipment and systems have been tested in presence of Owner's representative and are operational.
- 7. Work is complete and ready for final inspection.

# C. Closeout Submittals:

- 1. Comply with the Proposal, Contract, Bond, and Specification documents, prepared by The City of Madison and the following Closeout procedures.
- 2. Evidence of compliance with requirements of governing authorities:
  - a. Certificates of Inspection.
  - b. Affidavit of Compliance With Prevailing Wage Rate Determination, if applicable (See Section 01235).
- 3. Project Record Documents: In accordance with 01782 Project Record Documents.
- 4. Operation and Maintenance Data, Instructions to Owner's Personnel: In accordance with 01784 Operating and Maintenance Data.
- 5. Warranties and Bonds: In accordance with 01786 Warranties and Bonds.
- Evidence of Payment of Debts and Claims and Release of Liens: Utilize AIA Documents G706 and G706A.
- 7. Consent of Surety to Final Payment: Utilize AIA Document G707.
- 8. Certificates of Insurance for Products and Completed Operations:
- 9. The Application for Final Payment:
  - a. In accordance with the Proposal, Contract, Bond, and Specification documents, prepared by The City of Madison.

## 3.24 PROJECT RECORD DOCUMENTS

- A. Maintain at the site for the Owner, one record copy of:
  - 1. Drawings, Project Manual, and Addenda.
  - 2. Required State approved Documents.
  - 3. Construction schedule.
  - 4. Change Orders and other modifications to the Contract.
  - 5. A/E field orders or written instructions.
  - 6. Approved Shop Drawings, product data and samples.
  - 7. Field test records.
- B. Maintain documents in a clean, dry, legible condition, and in good order. Do not use record documents for construction purposes.
- C. Label record documents "PROJECT RECORD" in neat, large printed letters.
- D. Record information concurrently with construction progress.
- E. Do not conceal any work until required information is recorded.
- F. Drawings; Legibly mark to record actual construction:
  - 1. Field changes of dimension and detail.
  - 2. Changes made by Field Order or Change Order.

- 3. Details not on original Contract Drawings.
- G. Specifications and Addenda; Legibly mark each Section to record:
  - Manufacturer, trade name, catalog number, and Supplier of each Product and item of equipment actually installed.
  - 2. Changes made by Field Order or by Change Order.
- H. At Contract Closeout, deliver Record Documents to A/E for the Owner.

## 3.25 TESTS AND FINAL ACCEPTANCE

- A. The complete installation consisting of the several parts and systems and all equipment installed according to the requirements of the Contract Documents, shall be ready in all respects for use by the City and shall be subjected to a test at full operating conditions and pressures for normal conditions of use.
- B. Proper notice has to be given to enable the City or designee to attend all tests. Failure to give proper notice can result in repeated tests to be paid for by the Contractor. Tests are acceptable on properly working equipment only and have to be repeated as often as required by the City at no cost to the City. If tests have to be repeated by an City-hired Contractor due to equipment not installed or working properly, the Contractor shall reimburse the City for additional testing expenses.
- C. Contractor shall make all necessary adjustments and replacements affecting the work, which is necessary to fulfill the City's requirements and to comply with the directions and recommendations of the manufacturer of the several pieces of equipment, and to comply with all codes and regulations, which may apply to the entire installation. Contractor shall also make all required adjustments to comply with all provisions of the drawings and specifications.
- D. Prior to acceptance, all elements of operating equipment, including those of mechanical nature and those that slide, swing, turn, or are intended to move in any way and those of an electrical nature, shall be given an operating test to assure to the satisfaction of the City that such equipment operates as required. Contractor shall make all adjustments, replacements, and such other modifications as needed. If it is necessary to run equipment in order to complete the work, for periods that exceed the manufacturer's recommended maintenance interval, the Contractor will provide such required maintenance at no additional cost to the City.
- E. Notice that the work is ready for final inspection and acceptance shall consist of a written notice issued to the City by the Contractor stating that the Contractor has carefully inspected all portions of the work, has reviewed in detail the drawings and specifications, and that to the best of the Contractor's knowledge all conditions of the contract documents have been fulfilled. Upon receipt of this notice, the City and the Contractor shall make a joint inspection of the work. After deficiencies, if any, have been corrected or accounted for, and after all work is satisfactorily complete, the City will accept the work; and Notice of Completion will be filed by the City.
- F. Prior to final acceptance, filing of the Notice of Completion or processing of final payment, the following shall be done and submitted reviewed and accepted by the City:
  - 1. Certificates of compliance and guarantees required under various Sections
  - 2. Operating and maintenance manuals
  - 3. Instruction to City personnel, as required
  - 4. Test reports (TAB, fire alarm, elevator etc.)
  - 5. Certifications and registrations (boiler etc.)
  - 6. All kevs
  - 7. Replacement material as required in specifications
  - 8. All required operations tests
  - 9. All documents required by commissioning and other project related documents

- 10. Satisfy all commissioning requirements
- 11. As -built documents
- 12. All punch list items resolved
- 13. All training provided (except deferred seasonal training)
- 14. All warranty issues brought to Contractor's attention so far resolved
- 15. Warranty documents signed by representative of manufacturer, guarantee documents, roofing agreement and other warranty related documents
- G. No official closeout and final payment will be made before all requirements are met.

## 3.26 TRAINING AND DEMONSTRATION

- A. The City's facility staff (and occupants and service Contractors as needed), shall receive orientation and training on features, systems and equipment in this facility requisite with the complexity and criticality of the system and the City's needs.
- B. Additional training requirements may be found in specific equipment sections. The City may videotape all training sessions.
- C. Only training on equipment that works as designed is acceptable.
- D. The Contractor shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed on all equipment per the Specifications. Unless otherwise required or approved, the training shall be given during regular business hours during a regular work week.
- E. The City or designee will be responsible for coordinating and approving the content and adequacy of the training of the City personnel for commissioned equipment. The City or designee will develop an overall training plan after meeting with the City and appropriate facility staff to determine needs and areas of emphasis for this project. The City or designee will develop criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The City or designee recommends approval of the training to the City.
- F. Training shall consist of, as needed and at the discretion of the City or designee, the installing technician, installing Contractor and the appropriate trade or manufacturer's representative on each major piece of equipment. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment as installed in this project is required. More than one party will be required to execute the training on primary equipment. The Contractor shall attend and present at sessions in addition to the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.
- G. Follow the outline in the table of contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference. Training Shall Include the Following:
  - 1. Use of the printed installation, operation and maintenance instruction material included in the O&M manuals.
  - 2. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, and special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shutdown, seasonal changeover, as applicable, and any emergency procedures.
  - 3. Discussion of relevant health and safety issues and concerns.
  - 4. Discussion of warranties and guarantees.
  - 5. Common troubleshooting and maintenance issues, problems and solutions.
  - 6. Explanatory information included in the O&M manuals and the location of all related plans and manuals in the facility.
  - 7. Discussion of any peculiarities of equipment installation or operation.

- 8. The format and training agenda in The HVAC Commissioning Process, ASHRAE Guideline 1 is recommended, as applicable.
- 9. Hands-on training shall include start-up, operation in all modes possible, including manual, shutdown and any emergency procedures and preventative maintenance for all pieces of equipment.
- 10. Training shall occur after functional testing and piping and equipment labeling are complete unless approved otherwise by the City.
- H. Testing Adjusting and Balancing: The Contractor shall have the following special training responsibilities relative to the testing, adjusting and balancing (TAB) work:
  - 1. The TAB technician shall meet with facility staff after completion of TAB and instruct them on the following:
    - a. Go over the final TAB report, explaining the layout and meanings of each data type.
    - b. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
    - c. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
    - Discuss any temporary settings and steps to finalize them for any City-furnished, Cityinstalled equipment.
    - e. Other salient information that may be useful for facility operations, relative to TAB.

#### 3.27 ROADWAY

A. The Contractor may build a temporary roadway for delivery of materials at the Contractor's own expense and maintain it until completion of construction or until service drives are installed. Where possible, build temporary roadway within the confines of the new roadway and allow others to use it at no cost. Any gravel topping used for temporary roadway shall be at least 6" below finished elevation of permanent drives. If temporary roadway is not intended to be converted to a permanent road, all road materials shall be removed upon termination of access need, and the confines of the temporary roadway shall be repaired to match adjacent area.

#### 3.28 FENCE

A. The Contractor shall provide a neat appearing protective fence where indicated on the drawing, constructed of standard studded T-Posts of sufficient length for line posts and spaced not to exceed 8'-0" apart. Corner posts and gate posts are to be galvanized steel pipe of not less than 2 1/2" o.d. and shall be properly braced. A 4-foot high wooden snow fence shall be securely fastened to the supports. Plastic fencing is not acceptable. The snow fence shall project 4" above the fence posts. Provide gates, properly constructed and braced, complete with hinges, hasps, and padlocks in number and location required for proper control, delivery and distribution of material and equipment. Gateposts shall be adequately back tied and anchored to insure a rigid installation. All protective fencing shall be maintained in an upright, orderly fashion throughout the construction schedule. In areas where existing trees are to be protected, the area inside the protective fencing shall not be used for any purpose related to construction activities, such as material storage, vehicle parking, portable toilets, or other disruptive activities that would result in damage of any kind to the site inside the fence.

## 3.29 SIGNS

- A. Contractor shall furnish and install signs, located as directed by the City. The signs shall be readily legible to the general public, subcontractors, material men, and truck drivers approaching the site and shall include the following information:
  - 1. Project.

- 2. Subcontract No.
- 3. Subcontractor Name.
- 4. Access to Buildings: Contractor shall keep access to existing buildings clear at all times.
- B. The Contractor shall order, paint and erect the sign. The sign shall be placed on the property where directed and shall be maintained for the duration of the construction period.
- C. No individual advertising signs, plaques or credits, temporary or permanent, will be permitted on the building or premises, except the name of the Contractor on Contractor's office or material shed.

End of Section 010002

#### SECTION 01 00 03 - SAFETY AND ENVIRONMENT

#### PART 1 - GENERAL

#### 1.1 SCOPE

- A. The work under this section includes general rules for the project. Included are the following topics:
  - 1. PART 1- GENERAL
    - a. Scope
    - b. General Requirements
    - c. Activity Hazard Analysis and Hazard Abetment Plan
    - d. Work Site Safety Orientation
    - e. Fire Protection and Prevention
    - f. Special Permits
    - g. Hazardous Substances
  - 2. PART 2 PRODUCTS
    - a. Procurement of Hazardous Materials
  - 3. PART 3 EXECUTION
    - a. Accidents
    - b. Spills
    - c. Waste Management
    - d. Erosion Control and Storm Water Management

## 1.2 GENERAL REQUIREMENTS

- A. Contractor shall provide in the performance of the work under this subcontract all labor, materials, equipment, services and supervision required to maintain work sites that meet the environment, safety and health (ES&H) requirements of all applicable federal, state, and local regulations and protect the environment and the safety and health of its employees, the employees of its lower tier subcontractors, CITY employees and the general public.
- B. Contractors shall comply with the requirements of the following:
  - 1. Occupational Safety and Health Act (OSHA)
  - 2. Occupational Safety and Health Standards, Department of Labor
  - 3. Safety and Health Regulations for Construction, Department of Labor
  - 4. Wisconsin Fire Code
  - 5. National Electrical Safety Code, ANSI C2
  - 6. Environmental Protection Agency
  - 7. Clean Air Act
  - 8. Clean Water Act
  - 9. Resource Conservation and Recovery Act
  - 10. Toxic substances Control Act
  - 11. Wisconsin Department of Health and Family Services
  - 12. State and Regional Water Quality Control Boards
- C. In case of conflict or overlap of the above references, the most stringent provision shall apply.
- D. The contractor shall provide a qualified onsite Health and Safety Representative with the authority to enforce all of the safety requirements of this subcontract and implement the contractor's Injury and Illness Prevention Program and Hazard Abatement Plan. This may be a contractor supervisor, foreperson or project manager. The contractor shall remove and replace its Health and Safety Representative at the

request of the Project Representative, if the Safety Representative is unsuccessful in enforcing the safety requirements of this subcontract and maintaining hazard free worksites. The contractor's onsite health and safety representative shall conduct safety inspections of the project operations, materials, and equipment frequently throughout the day to ensure that all safety deficiencies are identified and corrected. The city reserves the right to enforce measures if it feels the contractor's onsite health and safety representative does not enforce all requirements. Inspection findings and corrective actions taken shall be documented, and the record shall be kept on the construction work site and be made available to the Project Manager upon request.

- E. The contractor shall prepare a written comprehensive injury and illness prevention program for its employees and all lower tier Subcontractor employees as required by this contract's specified EH&S standards, and regulations and submit it to the Project Representative for review. Field activities shall not start on this project until the project representative has favorably reviewed the program. Subsequent revisions shall be submitted to the Project Representative for review prior to commencement of affected work.
- F. The required comprehensive program shall include but not be limited to:
  - 1. Confined Space Entry
  - 2. Site specific Emergency Response, First Aid, & Medical Services. Identify employees with CPR/First Aid certification available at the work site.
  - 3. Fire Protection and Prevention
  - 4. Hazard Communications
  - 5. Hazardous Waste Operations
  - 6. Hazardous Work Permits
  - 7. Toxic and Hazardous substances
  - 8. Inspection, Maintenance, and Certification of Heavy Equipment, Cranes, and Motor Vehicles
  - 9. Lock Out/Tag Out (LOTO) Subcontractors are required to include LOTO
  - 10. Personal Protective and Life Saving Equipment
  - 11. Radiation Protection
  - 12. Construction Safety Training
  - 13. Control of silica dust released during demolition or drilling of concrete or released from work with other materials that contain silica.
  - 14. Energized electrical work within panels and equipment is not allowed.
  - 15. Workers shall be qualified to perform electrical tasks in accordance with OSHA 29 CFR 1910 and 1926 requirements.
  - 16. Work practices must be compliant with NFPA 70E, 2004 Standard for Electrical Safety in the Workplace.
- G. Rubbish, debris and scrap shall not be thrown through any window or other opening, or dropped from any great height; it shall be conducted to the ground, to waiting truck(s) or removable container(s) by means of approved chutes or other means of controlled conveyance.
- H. Form and scrap lumber shall have all nails withdrawn or bent over; shall be neatly stacked, placed in trash bins, or removed from the premises.
- I. Spillages of oil, grease or other liquids, which could cause a slippery or otherwise hazardous situation or stain a finished surface, shall be cleaned up immediately.
- J. The City Engineer and/or assigned delegates will periodically monitor the contractor's compliance with the EH&S requirements of this subcontract. If safety deficiencies are found, the Project Representative will issue a Safety Deficiency Notice to the contractor.
- K. Upon receipt of a written Safety Deficiency Notice from the OWNER, the contractor shall take appropriate action to correct the deficiency and discontinue the hazardous activity until the hazard is abated. Failure to correct or eliminate violation(s) within the period specified might result in the CITY stop all or any part of the work.

- L. The contractor shall submit to the Project Representative a written response to the Safety Deficiency Notice describing what corrective action it has taken, the date such corrective action was completed and actions that it will take to prevent future recurrence of the same incident.
- M. All material classified by authorities to be a material that needs special treatment must be recycled, reused or disposed of by a special contractor that holds a valid license to work with such material.

## 1.3 ACTIVITY HAZARD ANALYSIS AND HAZARD ABATEMENT PLAN

- A. In addition to the Injury and Illness Prevention Program the Subcontractor shall prepare and submit for review by the Project Representative a written Activity Hazard Analysis for each phase of construction in this contract.
- B. The Activity hazard Analysis shall provide the following information:
  - 1. Description of work phase or activity
  - 2. Identification of potential hazards associated with the activity
  - 3. A list of the contractor's planned controls to mitigate the identified hazards
  - 4. Name of the contractor's employee responsible for inspecting the activity and ensuring that all proposed safety measures are followed
  - 5. Construction activities for which an Activity Hazard Analysis and Hazard Abatement Plan may be required include, but are not limited to:
    - a. Roofing
    - b. Hoisting and handling of materials
    - c. Excavations
    - d. Trenching and drilling
    - e. Concrete placement and false work
    - f. Welding
    - g. Steel erection
    - h. Work performed six feet or higher above ground
    - i. Electrical work
    - i. Demolition
    - k. Work in confined spaces
    - 1. Work that causes the release of silica such as demolition or drilling of concrete or work with materials that contain silica.
    - m. Work with epoxy coatings
    - n. Work with or around hazardous materials
    - o. Work on hilly terrain
    - p. Use and handling of flammable materials
    - q. Control of Crystalline Silica Dust: The subcontractor shall provide all necessary control measures at the work site to keep worker exposure to crystalline silica dust within the OSHA Established Permissible Exposure Limits (PEL's). Dust control measures may require spraying of water or engineering controls at the dust generating points. It also may include the use of respirators, industrial grade HEPA vacuums, and HEPA filtered locally exhausted tools.
    - r. Construction operations known to cause the release of silica dusts include, but are not limited to:
      - 1) Chipping, sawing, grinding, hammering, and drilling of concrete, rock, or brick.
      - 2) Work with cementitiou5 materials such as grout, mortar, stucco, gunnite, etc.
      - Dry sweeping of dust originating from concrete or rock
  - 6. The City Project Representative must favorably review the Activity Hazard analysis and Hazard Abatement Plan before work can start on that activity.
- C. Each employee scheduled to work in the activities identified above shall receive safety training in those activities prior to working on them. The Subcontractor shall maintain proof of employee training at the work site and make it available to the Project Representative upon request. The favorably reviewed

project Hazard Abatement Plan shall be maintained on the work site and shall be made available, upon request, to work site employees and the Project Representative.

# 1.4 WORK SITE SAFETY ORIENTATION

- A. Each employee shall receive initial EH&S orientation prior to performing any work on the project. The contractor shall maintain on the work site a detailed outline of the orientation and a signed and dated roster of all employees who have completed the project EHS indoctrination. Make documentation available to Project Representative on request.
- B. The orientation shall, at a minimum, cover the following points:
  - 1. Employee rights and responsibilities.
  - 2. Construction contractor responsibilities.
  - 3. Alcohol and drug abuse policy
  - 4. Contractor's disciplinary procedures.
  - 5. First aid and medical facilities.
  - 6. Site and project specific hazards.
  - 7. Hazard recognition and procedures for reporting or correcting unsafe conditions or practices.
  - 8. Procedures for reporting accidents and incidents.
  - 9. Fire fighting and other emergency procedures to include local warning and evacuation systems.
  - 10. Hazard Communication Program.
  - 11. Access to employee exposure monitoring data and medical records.
  - 12. Protection of the environment, including air, water, and storm drains from construction pollutants.
  - 13. Location of and access to reviewed project Illness and Injury Prevention Program, Hazard Analysis and Hazard Abatement Plan
  - 14. Location and contents of required postings

## 1.5 FIRE PROTECTION AND PREVENTION

- A. The contractor shall develop and maintain an effective fire protection and prevention program at the job site through all phases of demolition, alteration, repair, and construction work. Contractor shall ensure the accessibility and availability of fire protection and suppression equipment.
- B. Smoking shall be prohibited at or in the vicinity of operations, which constitute a fire hazard. Such areas shall be conspicuously posted with "NO SMOKING OR OPEN FLAME" signs.
- C. Smoking is not permitted in any CITY buildings. No burning of rubbish or debris will be allowed at the site. Combustible waste shall be removed immediately or stored in fire resistive containers until disposed of in an approved manner.

## 1.6 SPECIAL PERMITS

- A. Permit to Penetrate Ground or Existing Surfaces of City Property:
  - 1. Prior to any penetration of the ground or existing concrete surfaces (including the use of stakes or poles) in excess of 1.5", the Subcontractor shall obtain from the Project Representative a Permit to penetrate or Excavate Existing Surface of city Property and shall adhere to the conditions of the permit during such work. The Permit and all conditions in it shall be considered part of these specifications and shall be included in the contractor's bid amount.
  - 2. In areas where a Permit to penetrate or excavate existing surfaces of city property is not required, contractors shall verify by safe means, prior to drilling, that no utilities or services are enclosed within the area to be drilled.

# B. Fire Safety Permit:

- 1. All operations with open flames or that cause sparks or is near gas lines or near combustible storage containers require a daily Fire Safety Permit issued by the Project Representative. Contractor shall not commence such work until the permit is issued. Activities requiring a Permit include, but are not limited to, electric arc and gas welding and flame cutting, other open flame operations, tar kettles, powder activated tools and excavations. Fire watch personnel shall be provided the contractor in sufficient number to continuously monitor all locations where work is conducting requiring a fire permit. The fire watch personnel shall remain on the job at least thirty minutes after such operations are completed. Fire safety personnel may be installers or welders.
- C. Noncombustible shields or covers shall be provided by the contractor on tables, floors, walls, around the workstation, and over equipment to protect building structures, equipment and personnel from sparks and fragments of hot metal. Contractor shall also take these precautions to protect against sparks and hot metallic oxides generated by grinding, drilling or sawing operations.
- D. Permit to Conduct Electrical Work:
  - 1. Energized electrical work is not allowed, except for verification and testing.
- E. Air Emissions Permits and Notifications:
  - 1. For all projects that involve demolition of a structure, the contractor shall complete the asbestos demolition forms and notify all related authorities at least 10 working days in advance of the activity, regardless of the presence of asbestos.
- F. For all projects that involve removal of regulated asbestos containing materials, the contractor shall complete the required asbestos removal forms and notify the authorities at least 10 working days in advance of the activity.
- G. For any operations required to obtain an Authority to Construct or Permit to Operate from the authorities, the contractor shall provide in advance to the Project Manager the information needed for the application. Authorities may take more than 40 working days to process the application and issue the Authority to Construct or Permit to Operate; the contractor shall include this time in his Schedule of Operations; OWNER will grant no extra cost under this contract for this wait period.

## 1.7 HAZARDOUS SUBSTANCES

- A. The contractor assumes responsibility for proper removal, collection and storage of hazardous substances on site and disposal of those if hazardous substances were known to be present and pointed out in these specifications or on the plans. If hazardous substances are not known to be present and are found, the city assumes responsibility for additional cost due to removal, collection and storage on site. All hazardous substances are to be disposed in accordance with all federal, state and local laws, codes and regulations. It is the contractor's responsibility to recognize typical hazardous substances not known to be present. This includes all substances that were used in buildings of that type in the period since original construction.
- B. Contractor will assume that all electronic components, machinery, refrigeration devices and other common devices contain hazardous substances and include disposal of such in bid price, even if those substances are not mentioned separately. If special tests are necessary the city assumes responsibility for such.

## C. ASBESTOS

1. Contractor's attention is directed to WAC NR 447, WAC HSS 159 and the Occupational Safety and Health Act (OSHA) in general, part 1926.1101--ASBESTOS in particular. Contractor is responsible for compliance with all applicable regulations when the work includes fastening to or coring through Asbestos Containing Materials (ACM) and disturbance of asbestos containing caulking and mastics. Unless otherwise indicated, all caulking, sealants, glazing compounds,

gaskets, asphalt roofing materials and miscellaneous adhesives are assumed to contain asbestos and are considered to be Category I non-friable ACM as defined in NR 447. Waste material containing Category I non-friable ACM, is regulated as Construction and Demolition (C&D) waste and may be disposed of at a Department of Natural Resources (DNR) approved C&D waste landfill. If Contractor's work methods cause non-friable ACM to become friable, the Contractor is responsible for the disposal of the friable asbestos waste at a landfill specifically approved by DNR to accept friable asbestos. A copy of the signed waste manifest for the disposal of all friable asbestos waste shall be provided to CITY prior to request for final payment.

- 2. The regulations referenced above require removal of friable ACM and Category" non-friable ACM prior to demolition of a building. Category I non-friable ACM does not need to be removed from a building prior to demolition if the waste generated from the demolition is taken to a DNR approved C & D waste landfill. If the contractor chooses to recycle building materials from a building to be demolished, the contractor is responsible for removal and disposal of all Category I non-friable ACM in accordance with applicable regulations prior to demolition. If the contractor's demolition methods will cause non-friable ACM to become friable, the contractor is responsible for removal and disposal of all Category I non-friable ACM in accordance with applicable regulations prior to demolition.
- 3. The asbestos abatement contractor will require sole occupancy of the workspace during asbestos abatement work. Contractor shall communicate with the asbestos abatement contractor and make adequate allowance for the asbestos abatement work in the work schedule

#### D. Lead Based Paint

1. Conform with OSHA and EPA recommended worker safety requirements when removing lead based paint or material bearing lead based paint or material contaminated with lead by the demolition process. Contractor's attention is directed to the Occupational Safety and Health Act (OSHA) in general and particularly to 29 CFR 1910 (LEAD STANDARD) and to CFR 1926 (LEAD EXPOSURE IN THE CONSTRUCTION INDUSTRY). For OSHA compliance and regulation interpretations, contractors may contact the area OSHA office for this project. [Milwaukee, telephone (414) 297-3315; Appleton, telephone (414) 734-4521; Eau Claire, telephone (715) 832-9019]. Dispose of refuse containing lead based paint or contaminated with lead by the demolition process in conformance with State of Wisconsin Hazardous Waste Regulations set forth by the Department of Natural Resources and in conformance with OSHA and EPA recommended worker safety requirements.

### E. PCB's

1. Contractor's attention is directed to Wisconsin Administrative Code, Chapter NR 157 relative to PCB's. Refer to Division 26, Electrical within these specifications for work involving PCB's. Used lighting ballasts are accumulated separately as either PCB-containing or non-PCB containing and disposed of by the contractor.

## F. Mercury-Containing Devices

1. Mercury containing devices are accumulated in our facilities for eventual recycling through a contracted vendor. These devices include certain building controls and switches, thermometers, and lamps. Lamps are stored in accordance with Environmental Protection Agency universal waste regulation 40 CFR part 273 including storing them in containers with labels describing the contents and the start date of accumulation.

# G. Paint and related products

1. The oil-based paints are disposed of as hazardous waste

## H. Used Appliances and Building Equipment

1. Used appliances include microwaves, refrigerators, and ice machines. Smaller pieces of building equipment include items such as water heaters and variable-drive motors. All of these items are recycled by a contracted vendor at the contractor's expense.

#### **PART 2 - PRODUCTS**

## 2.1 PROCUREMENT OF HAZARDOUS MATERIALS

- A. The Subcontractor shall submit to the Project Representative, for review by the EH&S Division, any proposed procurement, stocking, installing, or other use of materials containing asbestos, cadmium, chromates, or lead.
- B. All materials and applications shall comply with requirements of any and all Districts Regulations, including, but not limited to architectural coatings, general solvent and surface coatings, solvent cleaning operations, adhesive and sealants, visible emissions, and asbestos.
- C. Contractor shall keep and maintain proof of compliance with the above-referenced regulations, including any recordkeeping obligations, for a period of two years after completion of the project. Contractor shall make such documents or evidence available if so requested by CITY.
- D. No materials outlawed in any of the 50 US states are to be used. Only equipment and material legal in alL 50 states is to be used. All Federal, state, county and local codes and ordinances regarding are to be considered deciding if a piece of equipment or material is to be used.

#### **PART 3 - EXECUTION**

## 3.1 ACCIDENTS

- A. The contractor's representative shall immediately notify the Project Representative of any accidents, injuries or occupational illnesses that occur on the project, regardless of the employer of the involved personnel or the owner of the involved materials or equipment. For OSHA recordable injuries, the subcontractor shall also furnish a copy of the OSHA Form 301(or equivalent) to the Project Representative within five days of the injury.
- B. In the event a job site accident occurs, the contractor shall immediately implement controls and restrictions on the accident site to ensure the site remains undisturbed until released in writing by the OWNER to resume work. The contractor shall provide accident investigation follow-up and shall support Owner's accident Investigation and reporting protocol.

# 3.2 SPILLS

A. The contractor shall promptly report to the Project Representative any spill, deposit, leak, drainage, debris, residue, spoil, residual, and/or by-product, whether its presence at the jobsite is occasioned by accident, inadvertence, intent, discarding, or abandonment by the Subcontractor or its lower tier subcontractors. This reporting requirement applies to petroleum products, oil, lubricants, chemical substances, waste materials, and waste substances, which are in such quantities as to constitute a hazardous substance or hazardous waste. All such occurrences of any quantity involving paints, solvents, thinners, degreasers, PCBs, halogenated hydrocarbons, volatile organic compounds, and/or asbestos shall be deemed a reportable event. These identification and reporting requirements shall be the responsibility of the contractor for both its own work forces as well as for any sub tier contractor, material man or supplier performing work on site for the contractor. Reporting shall be made to the Owner's Project Representative. In no event shall the Owner's Project Representative remove any spill(s) identified as a hazardous substance or hazardous waste from the OWNER without prior direction. All removal, cleanup, and associated costs, which result from contractor or lower tier subcontractor, material man, or supplier

presence at the jobsite, shall be at the Subcontractor's sole expense. Either OWNER personnel or the contractor under the supervision of authorized CITY representative shall effect removal, cleanup and associated remedial measures at the exclusive option of the OWNER.

### 3.3 WASTE MANAGEMENT

- A. In accordance with the City's management practice, all contractors shall reduce, reuse, salvage, and/or recycle construction waste to the extent that is feasible.
- B. Waste materials removed from the site shall be managed by the contractor and disposed of in accordance with all applicable laws, regulations, codes, rules, and standards. The Contractor shall prepare all hazardous wastes for transport and disposal. Arrangements for disposal shall be coordinated through City's Project Representative. Charges for transport and disposal of hazardous waste by the City's hazardous waste service contractor will be paid directly by the City. Other materials such as soil, debris, sludge, water, etc. generated by project activities which may contain constituents exceeding federal, state, or local environmental cleanup standards must not be removed from the site, or treated and disposed on site without prior written approval of City. City mayor may not provide a list of acceptable offsite disposal or treatment facilities for disposal by Contractor.
- C. Prior to demolition or construction activities, the General Contractor, with input of all contractors and their subcontractors, shall develop and submit a Waste Management Plan to City. Priority is given to reuse, followed by recycling followed by disposal including proper land filling or incineration. This has to be done in exactly that order. Disposal only will be acceptable if other methods are not commercially available. The Waste Management Plan includes but is not limited to the following:
  - 1. A list of each material proposed to be salvaged, reused, or recycled, Materials to be included, at a minimum, are the following:
    - a. Concrete: Clean concrete, concrete with rebar, asphalt concrete.
    - b. Metals: Steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass or bronze, including banding, ductwork, framing, roofing and siding, flashing, piping and rebar.
    - c. Clean Fill: Earth, rocks, and gravel.
    - d. Wood: Clean dimensional wood, wood pallets, engineered wood products including plywood, particleboard,
    - e. Î joist.
    - f. Biodegradable landscaping materials.
    - g. Cardboard, paper, packaging.
    - h. Masonry: Brick, ceramic tile, CMU.
    - i. Roofing: Clay or concrete tiles, asphalt shingles.
    - j. Gypsum board.
    - k. Acoustic ceiling panels.
    - 1. Carpet and pad.
    - m. Paint.
    - n. Insulation.
    - o. Plastics: ABS, PVC
    - p. Beverage containers
    - q. Cardboard.
    - r. Concrete
    - s. Brick and concrete masonry units (CMU).
    - t. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
    - u. Gypsum wallboard.
    - v. Clean dimensional wood
    - w. Wood doors
    - x. Acoustical ceiling tiles/panels
    - y. Glass

- 2. Separation and Materials Handling Procedures: How waste materials (as identified above), will be separated, cleaned (if necessary) and protected from contamination.
- 3. Waste Material Estimating Sheet (Appendix A at the end of this Section)
- 4. Proposed Alternatives to Land filling: List each material planned to be salvaged or recycled, quantities, and proposed destination.
- D. The General Contractor shall be responsible for coordination of separation, handling, recycling, salvage, reuse, and return methods to be used by all contractors and for reporting the results of the Waste Management Plan. The contractor shall provide separation, bins for temporary onsite storage, handling, transportation, recycling, salvage, and land filling for all demolition and waste materials and keep recycling and waste bins areas neat, clean and clearly marked in order to avoid contamination or mixing materials and maintain logs onsite for each load of materials removed from site.
- E. During the progress of the work, the General Contractor shall report to City, the quantity of each material recycled, reused, or salvaged, and the receiving party. All contractors shall maintain a record of weight tickets, manifests, receipts, and invoices for review by City on request.
- F. At the completion of the project the General Contractor shall submit a final summary of the progress reports, including the percentage of recycled waste (weight or volume) to the quantity of waste that would have been otherwise land filled.
- G. Contractor is to provide the following documents upon request for payment:
  - 1. Waste Materials Estimating Sheet (Appendix A at the end of this Section)
  - 2. Landfill Log (Appendix B at the end of this Section)
  - 3. Waste Diversion Log (Appendix C at the end of this Section)
  - 4. Legible copies of manifests, weight tickets, and receipts. Manifests shall be from recycling and/or disposal site operators that can legally accept the materials for the purpose of reuse, recycling or disposal. These documents shall include the contract number and the job site name.
- H. Examples of documents include, but are not limited to:
  - 1. Cover sheet for hazardous materials recycling contract
  - 2. Vendor "Pickup Request"
  - 3. Vendor "Certificate of Recycling and/or Disposal"
  - 4. Vendor invoice
- I. Maintain at the Project site Landfill Logs and Waste Diversion Logs for each load of materials removed from site. Discuss Waste management plans and implementation at the following meetings:
  - 1. Pre-bid meeting.
  - 2. Pre-construction meeting.
  - 3. Regular job-site meetings.
- J. Immediately Inform the City Engineer if hazardous materials are encountered or suspected, and stop work in the suspect area. Do not proceed with work in the suspect area until approved by the City Engineer.
- K. The following resources are provided for information only, to aid the Contractor in managing the construction waste:
  - 1. The Wisconsin DNR, Bureau of Waste Management http://www.dnr.state.wLus/org/aw/wm/
  - The UW-Extension's Solid and Hazardous Waste Education Center http://www1.uwex.edu/ces/shwec/, email shwec@uwm.edu or telephone: 608-262-0385.
  - 3. WasteCap Wisconsin, Inc. http://www.wastecapwLorg or telephone: 414-961-1100 or 608-245-1100
- L. The contractor shall provide summaries of type and amount of material recycled, reused or disposed off.

  Those summaries shall include enough information and detail to satisfy requirements by external auditors. At a minimum the documentation needs to meet the current LEED requirements and

requirements set by the EPA and federal government for federally funded projects. These requirements mayor may not be mentioned specifically in this contract and the contractor is required to learn about specifics and to add documentation as required by such third party auditors.

## 3.4 EROSION CONTROL AND STORM WATER MANAGEMENT

- A. In accordance with state law, where applicable, the General Contractor shall be governed by the following:
- B. The General Contractor hereby covenants to maintain all project grounds, public streets and associated areas, including fill areas in a manner consistent with state laws and the general policy to conserve soil and soil resources, and to control and prevent soil erosion and to control and prevent siltation into waters of the state. This clause is to be liberally construed to further the above stated objectives. The following shall include, but not limit areas in which control is to be executed:
- C. Erosion Control Plan: Implement the erosion control plan developed for the project and maintain erosion control practices throughout the construction period. Modifications to the erosion control plan, addressing phases of construction shall be the responsibility of the General Contractor. Erosion control practices that are compromised as the result of construction activity shall be returned to their functioning state by the end of the current workday. Where applicable, erosion control practices shall comply with Chapters NR 151 and 216, Wis, Adm. Code.
- D. Minimum Stripping: Limit stripping of sod and vegetation and limit land disturbance to an area and a time period that will expose bare soil to least possibility of erosion that construction requirements will allow. Stockpiling: Materials, including soil, shall be stored and protected in a manner that will prevent runoff of material from the stockpiles into streets, drainage facilities, storm sewer systems, or waters of the state in the event of rain.
- E. Soil Erosion and erodible Materials: Take positive measures to prevent soil erosion from the construction area and areas disturbed by construction activities by employing such means as seed and mulch, mulches, intercepting embankments and berms, sedimentation basins, ditch checks, riprap, erosion mats, silt fence, approved polyacrylamides, inlet protection, or other temporary erosion control devices or methods.
- F. Record Keeping: Maintain a copy of the current erosion control plan on site. Maintain maintenance records and inspection logs on-site for erosion control and storm water management practices. Contractor shall provide project representative with a weekly maintenance and inspection report.
- G. Street Maintenance: Control the tracking of soil onto street and paved surfaces to a minimum. Any such tracking shall be removed no less than on a daily basis.
- H. Storm Water Management: Practices installed for post-construction storm water management shall be protected during construction activity, and in the event that their intended function becomes compromised during construction activity, shall be restored and/or repaired according to Chapters NR 151 and 216, Wis. Adm. Code, for post-construction storm water management. Erosion control and storm water management practices shall be installed and maintained in accordance with the WDNR approved technical standards available at the following website: <a href="http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm">http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm</a> Responsibility and authority for inspections</a>
  - http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm Responsibility and authority for inspections are vested in the City. Responsibility and authority for maintaining records for NR 216 is the responsibility of the General Contractor.
- I. The contractor's storm drain protective actions shall include but not be limited to:
  - 1. Identification of storm drain inlets that may be affected by this subcontract work and installation of needed protective filters and structures
  - 2. Regular inspection and maintenance of drain inlet protective assemblies

- Soils erosion and sediment control 3.
- Proper storage and containment of soil and other material stockpiles to prevent them from running off into storm catch basins
- Effective management of vehicular and equipment site ingress and egress to avoid mud tracking 5.
- Collection and proper disposal of waste material and slurry from concrete, mortar, or saw cutting 6.
- Collection and proper disposal of waste water resulting from washing or hydro blasting of 7. equipment, vehicles or buildings
- 8.
- Contingency plans for containing and disposing spills from sewer lines
  Training of personnel in housekeeping practices aimed at protecting storm drains during 9.. construction.

END OF SECTION 010003

# SECTION 024000 - SELECTIVE DEMOLITION, ALTERATION, AND PATCHING

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Selective demolition at and within the existing building.
  - 2. Restoration of surfaces altered by demolition.

## 1.3 SUBMITTALS

A. Submit to A/E, permits and notices authorizing demolition if required.

## 1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing state or local government agency regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

## 1.5 PROTECTION

- A. Do not interfere with use and operation of existing adjacent work areas. Maintain free and safe passage to and from.
- B. Cease operations and notify Owner and A/E immediately if safety of adjacent work areas appears to be endangered. Do not resume operations until safety is restored.
- C. Protect existing work not indicated or scheduled to be altered. Promptly repair damages at no cost to the Owner.
- D. Provide, erect and maintain safety devices as required to protect general public, workers, and adjoining work area employees.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS

A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site. Store items as directed by Owner.

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# 2.2 SALVAGED MATERIALS

A. Conform to requirements specified in Division One – General Requirements, Alteration Project Procedures.

## 2.3 PRODUCTS FOR PATCHING

A. Provide as required to match adjacent surfaces or as indicated.

#### **PART 3 - EXECUTION**

## 3.1 DEMOLITION

- A. Demolish in an orderly and careful manner as required to salvage products indicated.
- B. Perform demolition in accordance with applicable authorities having jurisdiction.
- C. Repair all demolition performed in excess of that required at no cost to the Owner.
- D. Remove demolished materials, tools and equipment from site upon completion of work. Leave site in a condition acceptable to A/E.

#### 3.2 SALVAGE

A. Carefully remove, salvage, and reuse or turn over to Owner items designated on the Drawings to be salvaged.

## 3.3 PATCHING

- A. Comply with installation requirements specified elsewhere for products used.
- B. Patch all damaged surfaces with products to match existing

END OF SECTION 024000

#### SECTION 044300 - STONE MASONRY

#### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section includes solid masonry construction of base supported natural full stone veneer, set in cement mortar, with a structural back-up.
- B. Related Sections:
  - 1. Division 3 Cast-in-place Concrete: Supporting wall.
  - 2. Division 4 Cold-Formed Metal Framing: Formed steel framed supporting wall

### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Cleaning methods.
- B. Quarrier's Certificate: Certify stone properties and mortar mix will conform to specified requirements.
- C. Samples for Verification: For each stone product specified, submit (2) samples, minimum size 48"x48" representing actual product, color and texture.
- D. Mock-up: Provide a sample panel for evaluation of construction techniques, finishes and workmanship:
  - 1. Size: 6'-0"x4'-0"
  - 2. Include stone types and sizes to be used and include a typical corner condition.
  - 3. Clean the sample panel using the same materials and tools as planned for the final stone masonry construction.
  - 4. Do not proceed with remaing work until workmanship and color is approved by Architect.
  - 5. Sample panel will be used as a standard for the balance of the work.
  - 6. Sample panel may be incorporated into the work.

## 1.4 QUALITY ASSURANCE

- A. Stone Materials: Stone shall be standard grade, free of crack or seam which may impair its structural integrity or function and shall comply with industry standards and practices specified.
- B. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to masonry and cleaning including, but not limited to, the following:
  - a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
  - b. Materials, material application, sequencing, tolerances, and required clearances.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.
- B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store lime putty covered with water in sealed containers.
- F. Store sand where grading and other required characteristics can be maintained and contamination avoided.

#### 1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.
- B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.
- C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
  - 1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
  - 2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.
- D. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

- E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.
- F. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.

#### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Eden Stone Co. Inc. which is located at: W4520 Lime Road, Eden, WI 53019; Tel: 920-477-2521
  - 1. Requests for substitutions will be considered in accordance with provisions of Division 1.

## 2.2 VENEER STONE

- A. Windsor: Eden seamface. Color: Casual medium golden brown.
  - 1. Lengths: 8 to 30 inches
  - 2. Heights: 2 to 12 inches
  - 3. Thickness: 3-1/2 to 4-1/2 inches
  - 4. Material shall conform to ASTM C 567 with the following properties:
    - a. Maximum absorption rate of 0.40 percent when tested in accordance with ASTM C 97.
    - b. Minimum density of 170 lbs/cubic ft when tested in accordance with ASTM C 97.
    - Minimum compressive strength of 33,000 average psi when tested in accordance with ASTM C 170.

#### 2.3 MORTAR MATERIALS

- A. Mortar: ASTM C270,
  - 1. Type: S
  - 2. Color: To match Solomon Colors Inc. 20x Dark Buff
  - Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Sand: ASTM C 144 unless otherwise indicated.
  - 1. Color: Provide natural sand of color necessary to produce required mortar color.
  - 2. For pointing mortar, provide sand with rounded edges.
  - 3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
- D. Water: Potable.

### 2.4 ACCESSORY MATERIALS

A. Sealant Materials:

- 1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Division 7 Section "Joint Sealants."
  - a. Single-component, nonsag urethane sealant.
- 2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.

# B. Joint-Sealant Backing:

- 1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- 2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where acceptable.

#### C. Anchors:

1. Formed steel whire, 22 gauge diameter, stainless steel conforming to ASTM A 580.

## D. Weeps:

1. Medium density polyethylene, outside diameter of ¼ inch and length required to extend between exterior face of stone cavity behind.

## E. Setting Shims:

1. Stainless Steel, sized to suit joint thicknesses and bed depths of stonework involved without intruding into required depths of joint sealants.

# 2.5 MORTAR MIXES

- A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
  - 1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
- B. Do not use admixtures in mortar unless otherwise indicated.
- C. Mortar Proportions: Mix mortar materials in the following proportions:
  - 1. Pointing Mortar for Brick: 1 part portland cement, 2 parts lime, and 6 parts sand.
  - 2. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Do not begin installation until backing structure is plumb, bearing surfaces are level and substrates are clean and properly prepared.
- B. Verify that built-in items are in proper locations, and ready for roughing into stone masonry,
- C. Notify architect of unsatisfactory preparation before proceeding.

## 3.2 PREPARATION

- A. Stone must be water saturated, surface-dry when placed. Water down stone 24 hours prior to placement until saturated. Reapply water to keep stone saturated as required by weather conditions.
- B. Coordinate placement of reinforcement, anchors and accessories, flashings and other moisture control products supplied by other sections.
- C. Clean all built-in items of loose rust, ice, mud, or other foreign matter before incorporating into the wall. All ferrous metal built into the wall shall be primed or galvanized.
- D. If required, provide temporary bracing during installation of masonry work. Maintain bracing in place until building structure provides permanent support.

#### 3.3 INSTALLATION

- A. Install veneer stone and mortar in accordance with ACI 530.1/ASCE 6/TMS 602 specifications for Masonry Structures.
- B. Maintain masonry courses to uniform dimension(s). form vertical and horizontal joints of uniform thickness.

#### C. Pattern Bond:

- 1. Lay stone with the bedface, splitface, or weathered edge exposed. Take care to avoid a concentration of any one color to any one wall surface.
- 2. Maintain an approximate ½ inch joint as stone allows.
- 3. Do not used stacked vertical joints.
- 4. Lay out work in advance and distribute color range of stone uniformly over total work area.
- D. Anchoring: Tie stone to backing as required by the applicable Building Code.
- E. Joining Work: Where fresh masonry joints partially set masonry.
  - 1. Remove loose stone and mortar.
  - 2. Clean and lightly wet surface of set masonry.
  - 3. To avoid a horizontal run of masonry rack back ½ the length of stone in each course.
  - 4. Toothing is not permited.

### F. Joints:

- 1. Lay stone with an approximate ½ inch mortar joint, as stone allows.
- 2. Tool joints when "thumb-print" hard with a round jointer slightly larger than the width of the joint.
- 3. Trowel-point or concave exterior joints below grade.
- 4. Flush cut joints to be finished with soft brush only.
- 5. Retempering or mortar is not permitted.
- 6. Use non-corrosive stone shims as required to maintain uniform joint thickness.

#### G. Flashing:

- 1. Clean surface of masonry smooth and remove any projections, which could damage flashings.
- 2. Place flashing on bed of mortar.
- 3. Cover slashing with mortar.
- 4. Provide weep vents at head joints placed every 16 inches along the first course immediately above flashing or as recommended by weep vent manufacturer.
- 5. Use a non-corrosive, fluid conducting polymer mesh such as "Mortar Net", "Control Cavity", "CavClear", or equal to keep the air space behind the installed veneer stone, clear of mortar and mortar droppings.
- H. Control and Expansion Joints: Keep joints open and free of debris.
- I. Sealant Recesses: Provide open joint <sup>3</sup>/<sub>4</sub> inch deep and <sup>1</sup>/<sub>4</sub> inch wide, where masonry meets doors, windows and other exterior openings.
- J. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, grounds, and other penetrations and adjacent materials.

#### 3.4 REPOINTING MASONRY

- A. Rake out and repoint joints to the following extent:
  - 1. Joints where mortar is missing or where they contain holes.
  - 2. Cracked joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
  - 3. Cracked joints where cracks are 1/16 inch (1.6 mm) or more in width and of any depth.
  - 4. Joints where they sound hollow when tapped by metal object.
  - 5. Joints where they are worn back 1/4 inch (6 mm) or more from surface.
  - 6. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
  - 7. Joints where they have been filled with substances other than mortar.
  - 8. Joints indicated as sealant-filled joints.
- B. Do not rake out and repoint joints where not required.
- C. Rake out joints as follows, according to procedures demonstrated in approved mockup:
  - 1. Remove mortar from joints to depth of joint width plus 1/8 inch (3 mm) 2 times joint width, but not less than 1/2 inch (13 mm) or not less than that required to expose sound, unweathered mortar.
  - 2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
  - 3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
    - a. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet. Strictly adhere to approved quality-control program.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.

2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch (9 mm) until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before

applying next layer.

3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch (9 mm). Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated

in approved mockup. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

## 3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Cover the top of unfinished stone masonry work to protect from the weather.
- C. Extend cover a minimum of 24 inches down both sides and hold securely in place.
- D. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials from stone without damage to the stonework.
- E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- F. Protect sills, ledges and projections from droppings of mortar and sealants.
- G. Touch-up, repair or replace damaged products before substantial completion.
- H. Clean exposed faces to remove dirt and stains which may be on units after erection and completion of joint treatments.
- I. Wash and rinse in accordance with stone panel manufacturer's instruction.
- J. Do not use cleaning materials or processes which could change the character of the exposed finishes.

### END OF SECTION 044300

#### SECTION 060110 - ROUGH CARPENTRY

## **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Wood furring and grounds.
  - 2. Plywood backing panels.

# 1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

#### **PART 2 - PRODUCTS**

#### 2.1 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
  - 1. Use Exterior type for exterior locations and where indicated.
  - 2. Use Interior Type A, High Temperature (HT) for enclosed roof framing and where indicated.
  - 3. Use Interior Type A, unless otherwise indicated.
- B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- C. Application: Treat all rough carpentry, unless otherwise indicated.
  - 1. Plywood backing panels.

## 2.2 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Furring.
  - 2. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.3 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

#### 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- B. Power-Driven Fasteners: NES NER-272.
- C. Wood Screws: ASME B18.6.1.

#### **PART 3 - EXECUTION**

## 3.1 INSTALLATION, GENERAL

A. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

## 3.2 WOOD BLOCKING INSTALLATION

A. Install level and plumb with cut edges treated. Secure to resist anticipated loading of equipment and casework.

## 3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

#### END OF SECTION 060110

#### SECTION 060120 - FINISH CARPENTRY

#### **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Standing and Running trim.
- B. Related Sections include the following:
  - 1. Section 060110: Rough Carpentry

#### 1.3 SUBMITTALS

- A. Submit samples and shop drawings in accordance with the General Requirements.
- B. Product Data: For each type of product indicated, including cabinet hardware and accessories.
- C. Samples:
  - 1. 6" length of each type, profile, and surface finish.
- D. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
  - 1. Indicate materials, component profiles, fastening, jointing details, and accessories.
- E. Quality Assurance: Perform finish carpentry work in accordance with recommendations of the Millwork Standards of the Architectural Woodwork Institute.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

### 1.5 PROJECT CONDITIONS

- A. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Installer shall advise Prime Contractor of temperature and humidity requirements for finish carpentry installation areas. Do not install finish carpentry until a minimum of 60 deg. F and

relative humidity of 25-55 percent have been stabilized and will be maintained in installation areas.

#### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS

#### A. General

- 1. Nominal sizes are indicated, except as shown by detailed dimensions, Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and patterns as shown, unless otherwise indicated.
- 2. Optimum Moisture Content: Kiln-dry finish carpentry woodwork to an average moisture content of 8 percent, or as otherwise recommended by applicable AWI Quality Standards for the regional climatic conditions involved.

## B. Interior Finish Carpentry:

- 1. Standing and Running Trim: AWI Premium Grade
  - a. Species: Match Existing
  - b. Finish: Match Existing
- 2. Miscellaneous lumber for blocking, furring: Provide materials and comply with provisions specified in Section 06100.
- 3. Particleboard: NPA 1-M-2
- 4. Hardboard: AHA A135.4

## C. Fasteners and Anchorages:

1. Provide all nails, spikes, screws, lag screws, steel angles, hangers, bolts, nuts, washers, and other anchoring devices of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.

## 2.2 FABRICATION

A. Fabricate Interior Standing and Running Trim to dimensions, profiles, and details indicated for intended use in accordance with AWI Section 300, Premium Grade

## **PART 3 - EXECUTION**

## 3.1 PREPARATION

- A. Field Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain measurements and verify dimensions to assure accurate fit.
- B. Preparation of Surfaces: Deliver materials and fabrications to Section 09912 contractor for back priming and/or pre-finishing prior to installation. Back prime wood materials for painted finish exposed to moisture and high relative humidity.
- C. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.

#### 3.2 INSTALLATION

- A. Quality Standard: Install standing and running trim, interior frames and jambs, and other finish carpentry work to comply with AWI section 1700 for the same grade specified in Part 2 of this section for type of finish carpentry work involved.
- B. Apply all nails, spikes, screws, lag screws, steel angles, hangers, bolts, nuts, washers, anchors, and other items of hardware required for the assembling and securing of this work. Use best suitable type of nails and anchors for various types of carpentry. Use annular nails and other special nails where required. Correct and defective work caused by inadequate nailing, holding power or nails used and the use of nails which result in the staining of other materials. All finish work shall have nails set for puttying. Recess all screws and bolt heads and provide flush hardwood plugs where exposed.
- C. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes or patterns.
- D. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8 inch in 8 feet for plumb and level countertops; and with 1/16 inch maximum offset in flush adjoining surfaces and 1/8 inch maximum offsets in revealed adjoining surfaces.
- E. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum lengths of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end-to-end joints. Use construction adhesives of type recommended by manufacturer for use intended. Sort trim to achieve close match of graining for each assembly, especially if splicing is required.
- G. Countertops: Cut, fit, scribe and secure in place.

## 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork at no cost to Owner. Adjust joinery for uniform appearance.
- B. Cleaning: Clean all work of this Section prior to acceptance by Owner, including installed work furnished by others.
- C. Adjustment: Adjust all hardware for proper operation.
- D. Protection: Protect all work of this Section until acceptance by Owner. Advise GC of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.
- 3.4 END OF SECTION 060120

#### SECTION 061443 - GYPSUM SHEATHING

## **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Fiberglass-mat faced, moisture and mold resistant gypsum sheathing.
- B. Related Sections include the following:
  - 1. Section 060110: Rough Carpentry

## 1.3 SUBMITTALS

A. Product Data: For each type of product indicated, including installation instructions.

#### 1.4 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay)
- B. Manufacturer's Warranty:
  - 1. Five years against manufacturing defects.

#### **PART 2 - PRODUCTS**

## 2.1 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:
  - 1. Thickness: ½ inch.
  - 2. Width: 4 feet.
  - 3. Length: 8 feet.
  - 4. Weight: 1.9 lb/sq. ft.
  - 5. Edges: square
  - 6. Surfacing: Fiberglass mat on face, back and long edges.
  - 7. Racking Strength: not less than 540 pounds per square foot, dry.
  - 8. Flexural Strength: 80 lbf, parallel.
  - 9. Humidified Deflection: not more than 2/8 inch.
  - 10. Permeance: 23 perms.
  - 11. R-value: 0.56.
  - 12. Mold Resistance: 10.
  - 13. Microbial Resistance: Will not support microbial growth.

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- 14. Acceptable Products:
  - a. ½ inch DensGlass Sheathing, Georgia-Pacific Gypsum.

## 2.2 ACCESSORIES

A. Screws: ASTM C1002, corrosion resistant treated.

## **PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

# 3.2 INSTALLATION

A. General: In accordance with GA-253, ASTM C1280 and the manufacturer's recommendations.

## 3.3 PROTECTION

- A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.
- 3.4 END OF SECTION 061643

### SECTION 072100 - BUILDING INSULATION

#### **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Glass-fiber blanket sound control insulation.

## 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
  - 2. Documentation indicating formaldehyde free manufacturing.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

## 1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

## **PART 2 - PRODUCTS**

# 2.1 GLASS-FIBER BLANKET SOUND CONTROL INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CertainTeed Corporation.
  - 2. Johns Manville.
  - 3. Owens Corning.

- B. UnFaced, Glass-Fiber Blanket Insulation: ASTM C 665
- C. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
  - 1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
  - 2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

#### D. Products:

- 1. CertainTeed Corp:
  - a. Batts. 30% recycled content, some from curbside recycling. Batts with polypropylene wrap to contain any particulates. Available in standard unfaced or faced. Insulsafe contain no toxic binders.
- 2. Johns Manville:
  - a. Fiberglass blankets, batts. Formaldehyde-free, low-emission Grid-SHIELD Rx batts and rolls. Perforated polyethylene wrapped. 20% to 30% recycled glass. SCS Certified and Environmental Choice Program. R-1 1 to R-25 batts.
- 3. Owens-Corning:
  - a. Non-offgassing, less toxic fiberglass in rolls rated R-13 and R-25. Rolls and batts. 30% recycled glass, some from curbside pickup. SCS certified.

# 2.2 FOAM BOARD INSULATION

- A. Extruded Polystyrene Board Insulation: Comply with ASTM C 578.
  - 1. Thermal Resistance: R-5.6 per inch of thickness, with 90% lifetime warranty on thermal resistance.
  - 2. Recycled content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.
  - 3. Warranty: Limited Lifetime warranty covering all ASTM C578 physical properties.

#### **PART 3 - EXECUTION**

# 3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

## 3.2 INSTALLATION OF INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

### SECTION 072500 - WEATHER BARRIER

## **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Weather Barrier membrane.
  - 2. Seam Tape

#### 1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

## 1.4 QUALITY ASSURANCE

- A. Qualifications
  - 1. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
  - 2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.

3.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

## **PART 2 - PRODUCTS**

## 2.1 MATERIALS

A. Basis of Design: High-performance, non-woven, non-perforated, spun-bonded polyethylene sheet, with an aluminum coating on one face, secondary weather barrier is based upon DuPont Tyvek ThermaWrap and related assembly components.

## 2.2 ACCESSORIES

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- A. Seam Tape: Basis of design: DuPont Tyvek Tape.
- B. Fasteners: Basis of design: Tyvek Wrap cap screws.
- C. Sealants: Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
- D. Adhesives: Provide adhesive recommended by weather barrier manufacturer.
- E. Primers: Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
- F. Flashing: Basis of Design: Dupont FlexWrap and/or Dupont StraighFlash

#### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

## 3.2 INSTALLATION

- A. Install weather barrier over exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier silver side facing air space.
- E. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- F. Sill plate interface: extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- G. Window and Door openings: extend weather barrier completely over openings.
- H. Overlap weather barrier
  - 1. Exterior corners: minimum 12 inches.
  - 2. Seams: minimum 6 inches.
- I. Weather Barrier Attachment: attach weather barrier to stude through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 6-18 inches vertically on center along stud line, and 24 inch on center maximum horizontally.
- J. Apply 4inch by 7inch piece of DuPont StraightFlash to weather barrier membrane prior to the installation cladding anchors.

## 3.3 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal and tears or cuts as recommended by weather barrier manufactuer.

### 3.4 OPENING PREPARATION

- A. Cut weather barrier in a modified "I-cut" pattern.
  - 1. Cut weather barrier horizontally along the bottom of the header.
  - 2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
  - 3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
  - 4. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

#### 3.5 FLASHING

- A. Cut 7-inch wide DuPont<sup>TM</sup> FlexWrap<sup>TM</sup> a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont<sup>TM</sup> FlexWrap<sup>TM</sup> edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont<sup>TM</sup> StraightFlash<sup>TM</sup> at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont<sup>TM</sup> StraightFlash<sup>TM</sup> as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont<sup>TM</sup> StraightFlash<sup>TM</sup> over the 45-degree seams.
- I. Tape head flap in accordance with manufacturer recommendations
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

#### 3.6 THRU-WALL FLASHING INSTALLATION

A. Apply primer per manufacturer's written instructions.

- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall. [Terminate into reglet, counterflashing or with termination bar.]
- I. Apply sealant bead at each termination.

### 3.7 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

#### 3.8 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.
- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

## 3.9 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.

- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners
- 3.10 PROTECTION
  - A. Protect installed weather barrier from damage.

#### SECTION 076200 - SHEET METAL FLASHING AND TRIM

#### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. Section Includes:
  - 1. Formed Products:
    - a. Formed parapet coping.

## 1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C).

### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 4. Details of termination points and assemblies, including fixed points.
  - 5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
  - 6. Details of connections to adjoining work.

C. Warranty: Sample of special warranty.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

## 1.6 DÉLIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

### 1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

#### PART 2 - PRODUCTS

#### 2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
  - 1. Surface: Smooth, flat.
  - 2. Exposed Coil-Coated Finishes:
    - a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and

Olbrich Gardens Madison Wisconsin Destree Design Architects, Inc. Page 2 of 5 Project # 120410.00 7 January 2013 Section 076200 Sheet Metal Flashing and Trim apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 3. Color: As selected by Architect from manufacturer's full range.
- 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

## 2.2 UNDERLAYMENT MATERIALS

A. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397.

### 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
    - b. Blind Fasteners: Stainless-steel rivets suitable for metal being fastened.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

## 2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- E. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

## 2.5 SHEET METAL COPING FABRICATIONS

- A. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.
  - 1. Coping Profile: As indicated on drawings.
  - 2. Joint Style: Butt, with 12-inch- (300-mm-) wide, concealed backup plate.
  - 3. Fabricate from the following materials:
    - a. Aluminum: 0.050 inch (1.27 mm) thick.

#### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Polyethylene Sheet: Install polyethylene sheet with adhesive for anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches (50 mm).

# 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- B. Seal joints as shown and as required for watertight construction.

## 3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

## SECTION 079200 - JOINT SEALANTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

## A. Section Includes:

- 1. Elastomeric joint sealants.
- 2. Latex joint sealants.
- 3. Acoustical joint sealants.

## B. Related Sections:

- 1. Division 9 Section "Gypsum Board" for sealing perimeter joints.
- 2. Division 9 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters with acoustical sealants.

## 1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
  - 1. For sealants and sealant primers used inside the weatherproofing system, including printed statement of VOC content.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- C. Samples: Submit manufacturer's color chart of not less than 30 colors for initial selection purposes. Upon request, submit cured strip samples of actual product of each color selected by A/E.
- D. Warranties: Sample of special warranties.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

## 1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

- 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
- 2. When joint substrates are wet.
- 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
- 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

#### 1.6 WARRANTY

- A. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  - 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

# 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.
- B. Store and handle material to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
- C. Do not use caulking materials that have been stored for a period of time exceeding the maximum recommended shelf life of the materials.

# 1.8 PROJECT/SITE CONDITIONS

A. Examine Drawings and verify that all joints are properly detailed and proportioned for expansion and/or control as recommended in writing by the sealant manufacturer. Immediately notify A/E of any deviation.

## **PART 2 - PRODUCTS**

# 2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.

- 2. Sealant Primers for Nonporous Substrates: 250 g/L.
- 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses.
  - 1. Type-1: Multi-part nonsag urethane sealant, Type M, Grade NS, Class 25, Uses NT, M, A, and as applicable to joint substrates indicated, O. Equivalent to Tremco DyMeric 240FC.
  - 2. Type-2: Multi-part pourable urethane sealant, Type M, Grade P, Class 25, Uses NT, M, A, and as applicable to joint substrates indicated, O. Equivalent to Tremco THC-900/901.

#### 2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Bostik, Inc.; Chem-Calk 600.
    - b. Pecora Corporation; AC-20+.
    - c. Tremco Incorporated; Tremflex 834.

## 2.4 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products: Subject to compliance with requirements, provide the following:
    - a. Pecora Corporation; AC-20 FTR.
    - b. USG Corporation; SHEETROCK Acoustical Sealant.

## 2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- C. Cleaners for Non Porous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturers of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.

### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
    - Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

## 3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

## 3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

## 3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - Joint Locations:
    - a. Vertical joints on exposed surfaces of partitions.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors.
  - 2. Joint Sealant: Latex.
- B. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
- C. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Location:
    - a. Acoustical joints where indicated.
  - 2. Joint Sealant: Acoustical.

#### SECTION 081213 - METAL FRAMES

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Standard hollow metal frames.
- B. Related Sections:
  - 1. Division 8 Section "Wood Doors" for doors installed in hollow metal frames.
  - 2. Division 8 Section "Door Hardware" for door hardware for hollow metal doors.
  - 3. Division 9 Sections "Interior Painting" for field painting hollow metal doors and frames.

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

## 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data substantiating that products comply with requirements.
- B. Shop Drawings: Submit for fabrication and installation of steel frames. Include details of each frame type, conditions at openings, details of constructions, and details of joints and connections. Provide full-size details of cutout stops. Show anchorage and accessory items.
- C. Schedule: Submit schedule of frames using same reference numbers for details and openings as those on the Drawings.

## 1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

# 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

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- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

#### 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

## **PART 2 - PRODUCTS**

## 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

### 2.2 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Interior Frames: Fabricated from cold-rolled steel sheet with metallic-coated sheet required at insulated doors frames.
  - 1. Fabricate frames as full profile welded unless otherwise indicated.
  - 2. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.

C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

#### 2.3 FRAME ANCHORS

- A. Jamb Anchors:
  - Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.

## 2.4 STOPS AND MOLDINGS

A. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

#### 2.5 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
      - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
      - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
      - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
      - 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
  - 4. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

- E. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."
  - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  - 2. Reinforce frames to receive nontemplated, mortised and surface-mounted door hardware.
  - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  - Coordinate locations of conduit and wiring boxes for electrical connections with Division 16 Sections.
- F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  - 1. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  - 2. Provide loose stops and moldings on inside of hollow metal work.
  - Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

#### 2.6 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
  - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

#### 3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
  - Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors
    are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth
    and undamaged.
    - a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - b. Install frames with removable glazing stops located on secure side of opening.
    - Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  - 2. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
  - 3. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) o.c. from each corner.

#### 3.4 ADJUSTING AND CLEANING

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

#### SECTION 081400 - WOOD DOORS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

#### A. Section Includes:

- 1. Solid-core doors with wood-veneer faces.
- 2. Factory finishing flush wood doors.
- 3. Factory fitting flush wood doors to frames and factory machining for hardware.

## B. Related Sections:

1. Division 8 Section "Metal Frames" for hollow metal frames.

## 1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
  - 1. Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
  - 2. For adhesives and composite wood products, documentation indicating that product contains no urea formaldehyde.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.
  - 3. Indicate requirements for veneer matching.
  - 4. Indicate doors to be factory finished and finish requirements.

## C. Samples for Verification:

- 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish.
- D. Warranty: Sample of special warranty.

### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors and wood paneling from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."
- D. Forest Certification: Provide doors made with cores not less than 70 percent of wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

#### 1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

### **PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Algoma Hardwoods, Inc.:

- 2. Marshfield Door Systems, Inc.
- 3. VT Industries Inc.

## 2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade: Standard Duty.

### 2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
  - 1. Grade: Premium, with Grade AA faces.
  - 2. Species: To Match Existing.
  - 3. Cut: Plain sliced (flat sliced).
  - 4. Match between Veneer Leaves: Book match.
  - 5. Assembly of Veneer Leaves on Door Faces: Balance match.
  - 6. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
  - 7. Exposed Vertical Edges: Applied wood-veneer edges of same species as faces and covering edges of faces.
  - 8. Core: Glued wood stave.
  - 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

## 2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
- C. Openings: Cut and trim openings through doors in factory as indicated or scheduled.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 8 Section "Glazing."

## 2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
  - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Finish doors at factory.

- C. Transparent Finish: Match existing doors.
  - 1. Grade: Premium.
  - 2. Finish: WDMA TR-6 catalyzed polyurethane.
  - 3. Staining: Match existing.
  - 4. Effect: Match existing.
  - 5. Sheen: Match existing.

#### **PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Hardware: For installation, see Division 8 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

## 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

#### SECTION 084100 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Furnish and install aluminum entrance, entrance door frames complete with hardware, and related components as shown on the drawings and specified in this section.
  - 1. Interior manual-swing entrance doors and door-frame units.

#### B. Related Sections:

- 1. Division 8 Section "Glass" for glass required for entrances.
- 2. Division 8 "Automatic Door Operators" for ADA accessible door hardware.

## 1.3 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

## 1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
- B. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).

## 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.
- B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

#### C. Other Action Submittals:

- 1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.
- D. Warranties: Sample of special warranties.

#### 1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Basis-of-Design Product: Kawneer Heavy Wall 500

## 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  - 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM B 308/B 308M.
  - 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

## 2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.
- E. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

#### 2.4 GLAZING SYSTEMS

- A. Glazing: As specified in Division 8 Section "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

## 2.5 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
  - 1. Doors shall be Kawneer Heavy Wall 500Entrance Door or comparable from approved manufacturer.
  - Door Design:
    - a. stile; 5-inch nominal width.
    - b. Bottom rail; 10-1/4 inch nominal height
    - c. Top rail; 5-inch nominal height
  - 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.

## 2.6 ENTRANCE DOOR HARDWARE

- A. General: Provide entrance door hardware for each entrance door to comply with requirements in this Section.
  - 1. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
  - 2. Opening-Force Requirements:
    - a. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.

- B. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- C. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- D. Weather Stripping: Manufacturer's standard replaceable components.
  - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
  - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

#### 2.7 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 7 Section "Joint Sealants."
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil (0.762-mm) thickness per coat.

#### 2.8 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Storefront Framing: Fabricate components for assembly using head-and-sill-receptor system with shear blocks at intermediate horizontal members.
- F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
- G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
- H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.9 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
  - 1. Color: Dark bronze.

#### PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

#### A. General:

- 1. Comply with manufacturer's written instructions.
- 2. Do not install damaged components.
- 3. Fit joints to produce hairline joints free of burrs and distortion.
- 4. Rigidly secure nonmovement joints.
- 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
- 6. Seal joints watertight unless otherwise indicated.

## B. Metal Protection:

- 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
- 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Set continuous sill members and flashing in full sealant bed as specified in Division 7 Section "Joint Sealants" to produce weathertight installation.
- E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

- F. Install glazing as specified in Division 8 Section "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
- H. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" to produce weathertight installation.

## 3.3 ERECTION TOLERANCES

- A. Install aluminum-framed systems to comply with the following maximum erection tolerances:
  - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
  - 2. Alignment:
    - a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch (1.5 mm).
    - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch (0.8 mm).
- B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

#### 3.4 ADJUSTING

- A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.
  - 1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches (75 mm) from the latch, measured to the leading door edge.

### SECTION 085000 - WINDOWS

### PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. This Section includes casement aluminum/wood composite framed windows for exterior locations.

## 1.3 RELATED SECTIONS

A. Section 099123 – Interior Painting: Field finishing of interior wood window with stain.

### 1.4 SYSTEM PERFORMANCE

- A. General: Provide aluminum/wood composite window units that meet or exceed performance requirements specified:
  - 1. AAMA/WDMA 101/I.S. 2-97 Section 2.2.9 Fixed Windows and Section 2.2.5 Casement Windows. Rating shall be: C-AW70.
- B. Design Requirements: Comply with structural performance, air infiltration, and water penetration requirements indicated in AAMA/WDMA 101/I.S. 2-97 for type, grade, and performance class of window units required.
- C. Testing: Test each type and size of required window unit through a recognized Independent Testing Laboratory or Agency, in accordance with ASTM E283 for air infiltration, and with ASTM E331 for water penetration.

### 1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
  - 1. Joinery details.
  - 2. Expansion provisions.
  - 3. Glazing details.
  - 4. Window cleaning provisions.
- C. Warranty: Special warranty specified in this Section.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to window manufacturer for installation of units required for this Project.
- B. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

## 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

### 1.8 WARRANTY

- A. Window Warranty: Submit a written warranty, executed by the Window Manufacturer, against defects in material and workmanship of the windows under normal use.
  - 1. Glass: Warranty period starts from the date of manufacture printed on the insulated glass spacer. Insulating glass shall be warranted against obstruction of vision between interior glass surfaces (seal failure) for a period of 20 years.
  - 2. Hardware: 10 years on hinges and handle assembly from the date of manufacture.
  - 3. Exterior Finishes: 20 years from the date of manufacture.
  - 4. Materials and Workmanship: 10 years from the date of manufacture.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings.
  - 1. Pella- ProLine.
  - 2. Requests for substitutions will be considered in accordance with provisions of the General Requirements.

### 2.2 WINDOW

- A. Window Type:. Factory mulled units in single frame.
- B. Aluminum: Manufacturer's standard formed sheet or extruded-aluminum cladding, mechanically bonded to exterior exposed wood members. Provide aluminum alloy and temper recommended by wood window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, and not less than 16,000-psi (110-MPa) minimum yield strength.
- C. Interior Wood: Clear Ponderosa Pine, free of finger joints, or veneer wrapped over finger jointed clear cut Ponderosa Pine. Kiln dried to a moisture content of 6-12 percent and preservative treated. Wood frame and sash will be a minimum of 1-1/4" thick.
  - 1. FSC chain-of-custody certified for wood certified by a third party certification.

- D. Triple Pane Insulating Glass: CBA rated dual seal clear insulating glass; DSB clear glass interior and exterior with High Performance Low E on surface #2 and #5, argon gas filled and warm edge spacer technology.
  - 1. Manufacturer: Viracon as supplied by H Window LLC for Direct Set Window.
  - 2. Low-E: #2 and #5.
  - 3. Visible Light: 56 %.
  - 4. (Unit) Shading Coefficient: 0.29.
  - 5. (Unit) U-Value (center of glass): 0.20.

## 2.3 FABRICATION

- A. Corner Joinery: Sash and Frame
  - 1. Wood fabrication; Mortise and tenon joints. Glued, stapled and caulked.
  - 2. Aluminum fabrication: Sash: 45 degree mitered corners, double crimped to extruded aluminum corner keys. Frame: Butt jointed corners sealed with gasket and silicone.
- B. Composite Frame Construction: Fabricate window units with a continuous Butyl tape or closed cell foam tape thermal/moisture barrier, located between exterior aluminum and interior wood. Aluminum is nailed to wood with stainless steel ring-shanked nails on 6 inch spacing around perimeter of frame and sash.
- C. Weep holes: Weep holes shall be processed into each sill to allow water drainage to exterior.
- D. Wood Surfaces: Wood shall be smooth and free of surface defects. Unfinished for finishing in field.
- E. Insulated glass: Glazing shall be factory-installed.

## 2.4 ACCESSORIES

A. Receptor Panning: .080 extruded 6063-T6 aluminum finished to match windows. Provide in sizes to cover all exterior exposed wood or metal.

### 2.5 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
  - 1. Color: Dark bronze.

### PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine

wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.

- 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
- 2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
- 3. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

## 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

**END OF SECTION 085000** 

#### SECTION 087100 - DOOR HARDWARE

## **PART 1 - GENERAL**

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Commercial door hardware for the following:
    - a. Swinging doors.
    - b. Other doors to the extent indicated.
- B. Related Sections include the following:
  - 1. Section 08110: Steel Frames
  - 2. Section 08210: Wood Doors

### 1.3 SUBMITTALS

- A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Warranty: Special warranty specified in this Section.
- C. Door Hardware Schedule
  - 1. Submit to A/E, (4) complete computer generated or typewritten copies of the proposed door hardware schedule for approval. Prepare schedule using the scheduling sequence and vertical format in Door and Hardware Institute's (DHI) "Sequence and Format for the Hardware Schedule". Do not order hardware until schedule has been reviewed positive by A/E.
  - 2. When submitting schedules for approval, include 2 manufacturer's cut sheets on each hardware item proposed. Index with the use of numbers or letter or a combination of both, with the hardware schedule. The index numbers/letters are to be in the right hand column on the same line as the respective manufacturer's numbers. All manufacturers' numbers shall be indexed even when appearing more than once.
- D. Keying Schedule: Submit a separate keying schedule
- E. Samples: Upon request, provide to A/E one sample of each item of door hardware that is to be furnished for this project. Sample need not be of specified finish unless requested by A/E. Samples will be returned to contractor upon completion of Project.
- F. ANSI: Upon request by A/E, provide hardware manufactures' letters of compliance that their products meet specified ANSI standards and that they have been tested and meet grades specified.

G. Templates: Provide templates and/or physical hardware to all trades requiring them in order they may cut, reinforce or otherwise prepare their material or product to receive the hardware item. If physical hardware is required by any manufacturer, ship to them such hardware via prepaid freight in sufficient time to prevent any delay in the execution of their work.

## 1.4 QUALITY ASSURANCE

## A. General:

- 1. Hardware has been specified by manufacturer's name, brand, and catalog numbers for the purpose of establishing a basis for quality, finish, design, and operational function.
- 2. Hardware shall be substantially manufactured in the United States of America as defined in Wisconsin Statutes.
- B. Supplier Qualifications: Supplier furnishing hardware in the vicinity for a period of not less than 5 years. This supplier shall have experience in the preparation of architectural hardware specifications, estimating, detailing, ordering, servicing of architectural hardware in all its branches and will be available at reasonable times during the course of the work for project hardware consultation to the Owner, A/E, and GC.
- C. Supplier's principal office shall be located within a 100 mile radius of the Project Site.
- D. Keying Meeting:
  - 1. Consult with Owner and prepare a detailed keying schedule.
  - 2. Key meeting to be attended by the Owner and Hardware supplier. Notify A/E of time and date at least 7 days before meeting.

### 1.5 COORDINATION

A. Existing Openings: Where new hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide for proper operation.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package all items of hardware to be delivered to the job site. Package, arrange, and label in a manner acceptable to GC. Include all necessary screws, bolts, miscellaneous parts, instructions and where necessary installation templates for manufacturer's suggested installation. Do not include miscellaneous parts and accessories not specified nor intended to be used on the Project. Clearly label to conveniently identify them and their intended location in the building. Use A/E door schedule mark where applicable.
- B. The GC or contractor of his choice will receive the hardware when delivered at the job site. A dry locked storage space complete with shelving, will be provided for the purpose of unpacking, sorting out, checking and storage.
- C. Deliver door hardware to and jointly inventory with GC. Direct factory shipments to the job site not acceptable. Promptly replace items damaged in shipment with proper material without additional cost.
- D. Handle hardware in a manner to minimize marring, scratching, or damage.

### 1.7 OWNERS INSTRUCTIONS

A. Upon completion of hardware installation, assist the GC in instructing Owner in function, operation, and maintenance of all hardware and other work of this Section. Include demonstration of electrically controlled hardware devices.

### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of operators and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Three years from date of Substantial Completion, except as follows:
    - a. Exit Devices: Two years from date of Substantial Completion.
    - b. Manual Closers: 10 years from date of Substantial Completion.

# 1.9 EXTRA STOCK/SPARE PARTS

- A. Furnish and deliver the following items of hardware to the Owner upon-Substantial Completion.
  - 1. Cylinders (cylinder cores): Two master key set; verify keying with Owner.
  - 2. Locking Devices: Five for each different function.
  - 3. Closers: One right-hand, one left-hand.

### **PART 2 - PRODUCTS**

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.

# 2.2 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
  - 1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
  - 2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
  - 3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
  - 4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).

- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: Unless otherwise indicated, provide the following:
  - General:
    - BB1279 standard weight, 2 ball bearing, brass, with brass pin ANSI A2133.
  - 2. Entrance Doors: Heavy-weight hinges.
  - 3. Doors with Closers: Antifriction-bearing hinges.
  - 4. Interior Doors: Standard-weight hinges.
- D. Hinge Options: Where indicated in door hardware sets or on Drawings:
  - 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
- E. Fasteners: Comply with the following:
  - 1. Wood Screws: For wood doors and frames.
  - 2. Screws: Phillips flat-head; wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

## 2.3 LOCKS AND LATCHES

- A. General:
  - 1. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
    - a. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
  - 2. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
  - 3. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
    - a. Strikes for Bored Locks and Latches: BHMA A156.2.
    - b. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
- B. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
  - 1. Bored Locks: BHMA A156.2.
  - 2. Basis of Design:
    - a. Manufacturer: Best Access
    - b. Series: 9k, with 16 lever and K rose
  - 3. Certifications: ANSI A156.2, 1996, Series 4000, Grade 2. UL Listed for all functions up to 3-hour doors.
  - 4. Keying: 7-pin tumbler, removable core, with two nickel silver keys per lock.
  - 5. Backset: 2-3/4 inches (70 mm). Verify to match existing.
  - 6. Strikes: Equivalent to ASA ANSI A115.2 with box.
- C. Miscellaneous Locks and Cylinders:
  - 1. Provide miscellaneous lock devises as scheduled.
  - 2. Furnish locksets with construction cores, or construction keying.

## 2.4 EXIT DEVICES

### A. General:

- Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are
  indicated to comply with accessibility requirements, comply with the U.S. Architectural &
  Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA),
  Accessibility Guidelines for Buildings and Facilities (ADAAG)."
  - a. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- 2. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

## 2.5 CLOSERS

### A. General

- Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
  - a. Comply with the following maximum opening-force requirements:
    - Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
- 2. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
- 3. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- B. Surface Closers: BHMA A156.4, Grade 1 unless Grade 2 is indicated. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
  - 1. Acceptable Manufacturer: LCN or approved equal
    - a. Product: 1460 Standard Cover with Parallel Arm/Hold Open "Cush-n-Stop"
      - 1) Provide Closers with arms, brackets, drop plates, and other closer accessories to suit the door and frame conditions.

## 2.6 KEYING

- A. Key lock and lock cores in sets or subsets, and master key as directed by Owner.
- B. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:
  - 1. Master Key System: Cylinders are operated by a change key and a master key.
  - 2. Existing System: Master key or grand master key locks to Owner's existing system.
- C. Keys: Nickel silver.
  - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

- a. Notation: "DO NOT DUPLICATE."
- 2. Quantity: One extra key blank for each lock:

### 2.7 STOPS AND HOLDERS

- A. Rigid Wall Stops: Polished cast brass, bronze, or aluminum; 3-1/2 inches (89 mm) long, with rubber bumper.
- B. Wall Bumpers: Polished cast brass or aluminum with rubber bumper; 2-1/2-inch (64-mm) diameter, minimum 3/4-inch (19-mm) projection from wall, with backplate for concealed fastener installation; with convex bumper configuration.
- C. Rigid Floor Stops: Polished cast brass, bronze, or aluminum, with rubber bumper.
- D. Dome-Type Floor Stops: Polished cast brass, bronze, or aluminum, with rubber bumper; and as follows:
  - 1. Height: Minimum 1 inch (25 mm) high, for doors without threshold, 1-3/8 inches (35 mm) high, for doors with threshold.

## 2.8 PUSH PLATE & DOOR PULLS

- A. Basis of Design: Brookline #807 pull, finish to match existing.
- B. Push plates to match existing size and finish.

## 2.9 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  - 2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

3. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

### 2.10 FINISHES

- A. Standard: BHMA A156.18, as indicated in door hardware sets.
- B. Finish: Satin Bronze US10.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### **PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Deliver hardware scheduled or required to be built-in to metal frames to contractors for that work.
- B. Deliver all electronically operated products requiring electrician installation to Division 16 contractor for installation.

### C. General:

- 1. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Securely fasten all parts to be attached. Fit faces of mortised parts snug and flush. Make sure all operating parts move freely and smoothly without binding, sticking, or excessive clearance.
- D. Mounting Heights: Mount door hardware units at heights to match existing unless required to comply with governing regulations.
  - 1. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- E. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
- 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- 3. Electric Strikes: Install power supplies in ceiling above.
- 4. Door Closers: Install surface mounted closers on doors without thru-bolting. Refer to door specifications for door construction. Install for maximum degree of 180 degrees whenever possible, or to adjoining wall. Indicate degree of openings on final hardware schedules.

## 3.3 ADJUSTING AND CLEANING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

### 3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

# 3.5 DOOR HARDWARE SCHEDULE

- A. DOOR E1002A, E1002B
  - 1. Push/Pull
  - 2. Kickplate
  - 3. Closer
  - Floor Stop
- B. DOOR 1004A, 1005A
  - 1. Push/Pull
  - 2. Kickplate
  - 3. Floor Stops
  - 4. Closer

- DOOR 1004B C.
  - Kickplate Closer 1.
  - 2.
  - 3. Floor Stop
  - Storeroom lock 4.

END OF SECTION 087100

## SECTION 087113 - AUTOMATIC DOOR OPERATORS

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Low-energy, power-operating door operators and motion-sensor operators, as scheduled.
  - 2. Power-assist door operators.
- B. Related Sections include the following:
  - 1. Division 08 Section "Aluminum entrances and storefront" for entrance doors.
  - Division 08 Section "Door Hardware" for door hardware that must be reinforced and coordinated with automatic door operators for project.
  - 3. Division 16 Electrical Specification Sections for electrical connections including conduit and wiring for automatic door operators.
  - 4. Division 16 Electrical Specification Sections for interface with the building fire alarm system, access control, and infant security systems.

## 1.3 DEFINITIONS

- A. Activation Device: Device that, when actuated, sends electrical signal to automatic door operator to open door.
- B. Safety Device: Device that prevents door from opening or closing.

# 1.4 PERFORMANCE REQUIREMENTS

A. Opening and closing forces shall be adjustable as selected from the manufacturer's standards to suit the application.

# 1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators and activation and safety devices.
- B. Shop Drawings: Show fabrication and installation details for automatic door operators. Include locations and elevations of entrances showing activation and safety devices.
- Samples for Verification: For exposed components and activation and safety devices with factory-applied color finishes.

- D. Operation and Maintenance Data: For automatic door operators to include in emergency, operation, and maintenance manuals.
- E. Warranties: Special warranties specified in this Section.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project, and who employs an inspector certified by AAADM.
  - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Manufacturer Qualifications: Company certificate issued by AAADM.
- C. Testing Agency Qualifications: An independent agency with inspector certified by AAADM.
- D. Source Limitations: Obtain automatic door operators through one source from a single manufacturer.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. UL Standard: Comply with UL 325.

## 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify door openings by field measurements before fabrication of exposed covers for automatic door operators and indicate measurements on Shop Drawings.

## 1.8 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing automatic door operators. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies and security access control system.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Faulty or sporadic operation of automatic door operator or activation and safety devices.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.

2. Warranty Period: Two years from date of Substantial Completion.

# 1.10 MAINTENANCE SERVICE

- A. Maintenance: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of automatic door operator Installer. Include quarterly planned and preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
  - 1. Engage inspector certified by AAADM to perform safety inspection after each adjustment or repair and at end of maintenance period. Submit completed inspection form to Owner.
  - 2. Perform maintenance, including emergency callback service, during normal working hours.
  - 3. Include 24-hour-per-day, 7-day-per-week emergency callback service.

### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, product that shall be incorporated into the Work includes the following (substitutions are prohibited):
  - 1. "Magic Force Operator" by Stanley Access Technologies; Div. of The Stanley Works.

## 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with standards indicated below:
  - 1. Sheet: ASTM B 209.
  - 2. Extrusions: ASTM B 221.
- B. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

## 2.3 AUTOMATIC DOOR OPERATORS, GENERAL

- A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
  - 1. Provide door operators that comply with NFPA 80 requirements for doors as emergency exits and that do not interfere with fire ratings.
- B. Electro-mechanical Operating System: Unit powered by permanent-magnet DC motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, and with manual operation including spring closing with power off.
- C. Hinge Operation: Refer to Division 08 Section "Door Hardware" to determine type of hinge for each door that door operator shall accommodate.
- D. Housing: Fabricated from thick extruded or formed aluminum.

- E. Exposed Cover: Fabricated from thick extruded aluminum; continuous over full width of door opening; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
  - 1. Finish: Baked enamel.
  - 2. Color: Match Architect's sample.
- F. Fire-Door Package: Consisting of UL-listed latch mechanism, power-reset box, and caution labels for fire-resistance-rated doors.
  - Latch mechanism shall allow door to swing free during automatic operation; when fire is detected, latch actuator shall cause exit hardware to latch when door closes. Provide latch actuators with fail-safe design.
  - 2. Equip system to discontinue power to automatic door operator when door is in emergency breakout position, and to return to closed position after breakout and automatically reset.

# 2.4 LOW-ENERGY, POWER-OPERATING DOOR OPERATORS

- A. Standard: Comply with BHMA A156.19.
- B. Operation: Power opening and power-assisted spring closing.
  - Power-Assisted Opening: Power-assisted opening that reduces force to open self-closing door.
     Pushing or pulling on door activates automatic door operator.
- C. Operating System: Electro-mechanical.
- D. Microprocessor Control Unit: Solid-state controls.
- E. Features:
  - 1. Adjustable opening and closing speed.
  - 2. Adjustable opening force.
  - 3. Adjustable backcheck.
  - 4. Adjustable hold-open time of not less than 0 to 30 seconds.
  - 5. Adjustable time delay.
  - 6. Adjustable acceleration.
  - 7. Obstruction recycle.
- F. Mounting: Surface.

# 2.5 ACTIVATION AND SAFETY DEVICES

- A. Microwave-scanner Motion Detector: Self-contained motion detector consisting of a microwave-scanner sensing device to activate door operator. Sensing device shall be adjustable to provide detection patterns and sensitivity equivalent to those required for control mats. Provide time delay for closing set at no less than 1.5 seconds. Provide metal or plastic housing with black finish for sensing device.
- B. Wall Push-Plate Switch: Manufacturer's standard semiflush, wall-mounted, aluminum storefront mounted, door control switch; consisting of round, rectangular or square, flat push plate; of material indicated; and actuator mounted in recessed junction box. Provide engraved message as indicated.
  - 1. Material: Stainless steel.

- 2. Message: International symbol of accessibility and "Push to Open."
- C. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

### 2.6 ACCESSORIES

A. Low-Energy Automatic Door Operator Signage: Comply with BHMA A156.19.

# 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

### 2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
  - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils, medium gloss.
  - 2. Color and Gloss: Custom to match the Architect's sample.

### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame supports, and other conditions affecting performance of automatic door operators.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
- B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install complete automatic door operator system, including activation and safety devices, control wiring, and remote power units.
- B. Low-Energy Power Door Operator Installation Standard: Comply with BHMA A156.19 for installation.
- C. Automatic Door Operators: Install door operator system, including control wiring. Refer to Electrical Specification Sections for connection to electrical power distribution system.
- D. Activation and Safety Devices: Install devices and wiring, including connections to automatic door operators, according to BHMA A156.10 and as follows:
  - 1. Microwave-Scanner Motion Detectors: Install scanners on both interior and exterior sides of each door indicated to receive automatic door operators.
  - 2. Wall Switches: Provide push plates on both sides of each opening indicated to receive automatic door operators.
- E. Connect wiring according to Electrical Specification Sections.

## 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Remove and replace automatic door operators where test results indicate they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

## 3.4 ADJUSTMENT

- A. Adjust automatic door operators and activation and safety devices to operate smoothly, easily, and properly, and for safe operation and weathertight closure. Adjust doors with low-energy door operators to close according to BHMA A156.19.
- B. Lubricate operators, hardware, and other moving parts.
- C. After completing installation of exposed, factory-finished automatic door operators, inspect exposed finishes and repair damaged finishes.
- D. Readjust automatic door operators and activation and safety devices after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.

## 3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators. Refer to Division 01.

## SECTION 088100 - GLAZING

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3	1.1	RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- 6 1.2 SUMMARY
- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
- 10 1. Window Privacy Panels
- 11 1.3 DEFINITIONS
- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- 15 1.4 PERFORMANCE REQUIREMENTS
- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- 20 1.5 SUBMITTALS
- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: 12 inch x 12 inch glass
- C. Product Certificates: For glass and glazing products, from manufacturer.
- D. Preconstruction adhesion and compatibility test report.
- E. Warranties: Sample of special warranties.
- 26 1.6 QUALITY ASSURANCE
- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."
  - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- 9 D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

# 14 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

## 19 1.8 WARRANTY

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- A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulatingglass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty
  period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not
  attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's
  written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior
  surfaces of glass.
- 26 1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

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- 28 2.1 GLASS PRODUCTS, GENERAL
- 29 A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lights in thicknesses as needed to comply with requirements indicated.
- 31 1. All interior glass shall be tempered.
- 32 2.2 GLASS PRODUCTS
- A. Safety Glass, Type I, Class 1, Quality Q3, Kind FT- fully tempered, 1/4 inch thick.

- B. Textured Laminated Safety Glass, Type I, Class 2, Quality Q3. Product to be composite of 1/8" patterned glass laminated to 1/8" clear glass.
- 3 1. Pattern to be selected from manufacturers standard options.

# 4 2.3 GLAZING GASKETS

5 A. Dense Compression Gaskets: Molded or extruded dense EPDM or neoprene gaskets, complying with ASTM C 864, of profile and hardness required to maintain watertight seal.

## 7 2.4 GLAZING SEALANTS

- 8 A. General: Provide products of type indicated, complying with the following requirements.
- Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- 16 3. Colors of Exposed Glazing Sealants: As selected by A/E from manufacturer's full range of colors.
- B. Elastomeric Glazing Sealant: Equivalent to Tremco Proglaze one-part, moisture curing, silicone elastomeric sealant complying with ASTM C 920, FS-TT-S-001543A, FS-TT-S-00230C.

### 19 2.5 GLAZING TAPES

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- A. Back-Bedding Mastic Glazing Tapes: Performed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below.
- AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

# 26 2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- 31 C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

### 35 2.7 FABRICATION OF GLAZING UNITS

1 2 3	A.	Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
4 5	В.	Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
6	C.	Grind smooth and polish exposed glass edges and corners.
7	PART 3	EXECUTION
8	3.1	COORDINATION
9	A.	Coordinate the work of this Section with Section 08210 contractors.
10	3.2	EXAMINATION
11	A.	Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
12 13 14		<ol> <li>Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.</li> <li>Presence and functioning of weep systems.</li> </ol>
15 16		<ol> <li>Minimum required face and edge clearances.</li> <li>Effective sealing between joints of glass-framing members.</li> </ol>
17	В.	Proceed with installation only after unsatisfactory conditions have been corrected.
18	3.3	PREPARATION
19 20	A.	Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
21 22 23	В.	Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.
24	3.4	GLAZING
25 26 27 28	A.	General: 1. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
29 30 31		2. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
32 33 34 35		3. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

- 1 Apply primers to joint surfaces where required for adhesion of sealants, as determined by 2 preconstruction testing. 3 5. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing 4 publications, unless otherwise required by glass manufacturer. Set blocks in thin course of 5 compatible sealant suitable for heel bead. 6 6. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites. 7 7. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm). 8 Locate spacers directly opposite each other on both inside and outside faces of glass. 9 Install correct size and spacing to preserve required face clearances, unless gaskets and 10 glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements. 11 12 Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to b. 13 sealant width. With glazing tape, use thickness slightly less than final compressed 14 thickness of tape. 15 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in 8. 16 glazing channel, as recommended in writing by glass manufacturer and according to requirements 17 in referenced glazing publications. 18 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics. 19 10. Set glass lites with proper orientation so that coatings face exterior or interior as specified. 20 3.5 TAPE GLAZING 21 A. Dry/Dry: 22 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush 23 with or protrude slightly above sightline of stops. 24 2. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to 25 make them fit opening. 26 3. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover 27 horizontal framing joints by applying tapes to jambs and then to heads and sills. 28 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal 4. 29 joints in tapes with compatible sealant approved by tape manufacturer. 30 5. Do not remove release paper from tape until just before each glazing unit is installed. 31 6. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense 32 compression gaskets formed and installed to lock in place against faces of removable stops. Start 33 gasket applications at corners and work towards centers of openings. 34 3.6 CLEANING AND PROTECTION 35 A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to 36 framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and 37 clean surfaces. 38 В. Protect glass from contact with contaminating substances resulting from construction operations. If, 39 despite such protection, contaminating substances do come into contact with glass, remove substances 40 immediately as recommended in writing by glass manufacturer. 41 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent 42 intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, 43 or stains; remove as recommended in writing by glass manufacturer. 44 D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural
  - Olbrich Gardens
    Madison Wisconsin
    Destree Design Architects, Inc.

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causes, accidents, and vandalism, during construction period.

- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.
- 4 END OF SECTION 08810

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### SECTION 092116 - GYPSUM BOARD ASSEMBLIES

### **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Interior gypsum wallboard.
  - 2. Non-load-bearing steel framing.

## 1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

# 1.5 QUALITY ASSURANCE

- A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
  - STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

## 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Steel Framing and Furring:
    - a. Dietrich Industries, Inc.
    - b. National Gypsum Company.
    - c. Unimast, Inc.
  - 2. Gypsum Board and Related Products:
    - a. G-P Gypsum Corp.
    - b. Certainteed ProRoc.
    - c. United States Gypsum Co.

## 2.2 STEEL PARTITION FRAMING

- A. Components, General: As follows:
  - 1. Comply with ASTM C 754 for conditions indicated.
  - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40, hot-dip galvanized zinc coating.
- B. Steel Studs and Runners: ASTM C 645.
  - 1. Minimum Base Metal Thickness: 0.027 inch (22 gauge).
  - 2. Deflection Limit: L/240, unless otherwise indicated.
  - 3. Depth and Spacing: As indicated.
- C. Cold-Rolled Channel Bridging: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange.
  - 1. Depth: 1-1/2 inches, unless otherwise indicated.
  - 2. Clip Angle: 1-1/2 by 1-1/2 inch, 0.068-inch-thick, galvanized steel.
- D. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

# 2.3 INTERIOR GYPSUM WALLBOARD

- A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36, 100 percent post-industrial recycled content (synthetic) gypsum shall be used to manufacture the board materials. The synthetic gypsum shall be a byproduct of the flue gas desulfurization (FGD) process, which removes sulfur dioxide from the emissions of coal-burning electrical power plants. One local source of the gypsum board materials may be obtained from the USG Gypsum Plant in East Chicago, IN or GP Gypsum, Wheatfield, IN.
  - Regular Type:
    - a. Thickness: 5/8 inch, unless otherwise indicated.

- b. Long Edges: Tapered.
- c. Location: As indicated.

## 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
  - 2. Shapes:
    - a. Cornerbead: Use at outside corners, unless otherwise indicated.
    - b. L-Bead: L-shaped; exposed long leg receives joint compound.
    - c. Expansion (Control) Joints.

### 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
  - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Tile Backing Panels:
  - 1. Cementitious Backer Units: As recommended by manufacturer.

# 2.6 ACOUSTICAL SEALANT

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following. Refer to Division 7 Section "Joint Sealants" for applicable general requirements.
  - 1. Acoustical Sealant for Exposed and Concealed Joints:
    - a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
    - b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealantcomplying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

# 2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

### **PART 3 - EXECUTION**

### 3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Suspended Ceilings: Coordinate installation of ceiling suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers at spacing required to support ceilings and that hangers will develop their full strength.
  - Furnish concrete inserts and other devises indicated to other trades for installation in advance of time needed for coordination and construction.

## 3.3 INSTALLING STEEL FRAMING, GENERAL

- A. Installation Standards: ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

# 3,4 INSTALLING STEEL PARTITION

- A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.
  - Where studs are installed directly against exterior walls, install asphalt-felt isolation strip between studs and wall.

- B. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  - 1. Cut studs 1/2 inch short of full height to provide perimeter relief.
- C. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- D. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical study at jambs to jamb anchor clips on door frames; install runner track section (for cripple study) at head and secure to jamb study.
  - 1. Install two studs at each jamb, unless otherwise indicated.
  - 2. Extend jamb studs through suspended ceilings and attach to underside of top plate.
- E. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

## 3.5 APPLYING AND FINISHING PANELS, GENERAL

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Form control and expansion joints with space between edges of adjoining gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

- J. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- K. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- L. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
- M. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

# 3.6 PANEL APPLICATION METHODS

A. Single-Layer Application:

- On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
- 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
  - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
  - b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- 3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

# 3.7 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

# 3.8 FINISHING GYPSUM BOARD ASSEMBLIES

- General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
   Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

- 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
- 2. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
  - a. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges.
- 3. Level 4 is suitable for surfaces receiving light-textured finish wallcoverings and flat paints. It is generally the <u>standard exposed finish</u>.
  - a. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
- 4. Level 5 is suitable for surfaces receiving gloss and semigloss enamels and surfaces subject to severe lighting. It is considered a high-quality gypsum board finish.
  - a. Level 5 (For large uninterrupted surfaces where the Architect determines that Level 4 finish is unacceptable): Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface at extensive uninterrupted wall or ceiling surfaces including but not limited to curved walls and soffits.
- E. Texture Finish: By Section 099123 contractor.

END OF SECTION 092116

## SECTION 093000 - TILING

## **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
  - 1. Level Surfaces: Minimum 1/8" per foot

# 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Floor/Wall Tile

## 1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

## 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples:
  - 1. For of each type and composition of tile and for each color and texture required, at least 12 inches (300 mm) square, mounted on braced cementitious backer units, and with grouted joints.
  - 2. For of each type and finish of transition materials
- C. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

## 1.5 EXTRA MATERIALS

- A. Before installation begins, funish quantity of full-size units equal to 5 percent of each type and color of tiles installed.
- B. Deliver extra tile materials to Owner's designated storage space, properly packaged with protective covering and identified with labels describing contents.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
  - 1. Product to have Recycled Content
  - 2. See Finish Schedule located in drawings
    - a. Tile Products:
      - 1) Crossville
      - 2) Rex Ceamiche Artistiche
      - 3) Ergon Engineered Stone
    - b. Tile-Setting and -Grouting Materials:
      - 1) Bonsal: W.R. Bonsal Company.
      - 2) Bostik.
      - 3) C-Cure Corporation.
      - 4) Custom Building Products.
      - 5) Dal-Tile Corporation.
      - 6) DAP, Inc.
      - 7) Laticrete International, Inc.
      - 8) Mapei Corporation.
      - 9) Summitville Tiles, Inc.
      - 10) TEC Incorporated.

## 2.2 ANSI CERAMIC TILE STANDARD

A. Provide tile that complies with Standard Grade requirements of ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

## 2.3 ANSI STANDARD FOR TILE INSTALLATION MATERIALS

- A. Provide materials complying with referenced ANSI standards.
- B. Comply with recommendations and installation guidelines of the TCA's "Handbook for Ceramic Tile Installation".
- C. Comply with the State of Wisconsin Enrolled Commercial Building Code.
- D. For tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, comply with the following requirements:
  - 1. Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.
  - 2. Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for products of type indicated.
  - 3. See Finish Schedule located in Construction Drawings

### 2.4 FACTORY BLENDING

A. For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

B. All base materials in toilet room areas to extend upward onto walls a minimum of 6 inches (152 mm).

#### 2.5 PORCELAIN TILE

- A. Indicated as Tile-2, Wall-Tile-1, Wall-Tile-2, Wall-Tile-3, Wall-Tile-4
  - 1. Provide tile complying with following requirements
    - a. Manufacturer: Crossville, Color Blox
    - b. Composition: Porcelain
    - c. Module Size: 6-inch by 12-inch & 12-inch by 18-inch
    - d. Thickness: 7/16 inch
    - e. Color: See architectural drawings
- B. Indicated as Wall-Tile-5, Wall-Tile-6
  - 1. Provide tile complying with the following requirements
    - a. Manufacturer: Crossville, Mixology
    - b. Module Size: 6-inch by 6-inch
    - c. Pattern: see architectural drawings.

## 2.6 CERAMIC TILE

- A. Indicated as Tile-1, Tile-Base-1 on Finish schedule in drawings
  - 1. Provide flat tile complying with the following requirements:
    - a. Manufacturer: Unicom Starker
    - b. Composition: Ceramic.
    - c. Module Size: 16-inch by 24-inch (floor) & 4-inch by 16-inch (base)
    - d. Color: See Finish Schedule located in Construction Drawings

# 2.7 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1C and as specified below:
  - 1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15), or polyethylene sheeting ASTM D 4397, 4.0 mils (0.1 mm) thick.
  - 2. Crack Isolation Membrane: "Hydra Flex" by TEC, install in accordance with manufacturers installation procedures.
  - 3. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches (50.8 by 50.8 mm) by 0.062-inch (1.57-mm) diameter; comply with ASTM A 185 and ASTM A 82, except for minimum wire size.
  - 4. Latex additive (thin-set) (water emulsion) described below, serving as replacement for part or all of gauging water, of type specifically recommended by latex additive manufacturer for use with job-mixed portland cement and aggregate mortar bed.
    - a. Latex Additive: Manufacturer's standard.
  - 5. Latex-Portland cement Mortar: ANSI A118.4, composed as follows:
  - 6. Mixture of Dry-Mortar Mix and Latex Additive: Mixture of prepackaged dry-mortar mix and liquid-latex additive complying with the following requirements (Contractors option):
    - a. Latex Additive: Styrene butadiene rubber.
    - b. Latex Additive: Acrylic resin.
  - 7. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3.
  - 8. Organic Adhesive: ANSI A136.1, Type I.

# 2.8 GROUTING MATERIALS

- A. Epoxy Grout: ANSI A118.3, a two part grout system consisting of epoxy resin and epoxy hardener. Made to have impervious qualities, stain and chemical resistant:
  - 1. Mix per manufactures recommendations to produce the following:
    - a. Epoxy grout mixture for joints 1/8 inch (3.2 mm) and narrower.
    - b. Products equal to Laticrete SpectraLOCK Pro grout
    - c. Color: See Finish Schedule located in Construction Drawings

## 2.9 ELASTOMERIC SEALANTS

- A. Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."
  - 1. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide.
  - 2. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

## 2.10 CEMENTITIOUS BACKER UNITS

A. Provide products complying with ANSI A118.9, of thickness and width indicated, and in maximum lengths available to minimize end-to-end butt joints.

# 2.11 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Crack Isolation Membrane: "Hydra Flex" by TEC, install in accordance with manufacturers installation procedures.
- C. Penetrating Sealer for Grout: Fluoro-chemical invisible penetrating sealer "Guard All" by TEC, install in accordance with manufacturers installation procedures.
- D. Metal Edge Strips: Schluter Systems, Quadec-Q-80-ABGB, color to be: Brushed antique bronze anodized aluminum.

# **PART 3 - EXECUTION**

# 3.1 INSTALLATION

- A. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
- B. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
- C. Remove protrusions, bumps, and ridges by sanding or grinding.

- D. Follow manufacturer guidelines to level and reshape with self-leveling underlayment.
- E. The concrete surface shall be prepared by steel shot blasting. Surface shall be free of all latency, form release agents, curing agents, oil, grease and other penetrating contaminates.
- F. Cracks and voids shall be repaired or filled only with materials approved by the manufacturer of the floor coating specified.

#### 3.2 BLENDING

A. For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

# 3.3 ANSI TILE INSTALLATION STANDARDS

- A. Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated.
- B. Comply with recommendations and installation guidelines of the TCA's "Handbook for Ceramic Tile Installation".
- C. Comply with the State of Wisconsin Enrolled Commercial Building Code.
- D. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
  - 1. Provide edge strips at all exposed edges of tile meeting carpet, wood or resilient flooring, unless otherwise indicated.
- E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

# 3.4 JOINTING PATTERN

- A. Align joints where adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. See interior elevations for tile layouts. Provide uniform joint widths, unless otherwise indicated.
- B. Floor tile: Grid Pattern

# 3.5 EXPANSION JOINTS, CONTROLS JOINTS, ISOLATION JOINTS

- A. Verify joint layouts with Architect prior to layout/installation. Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. At locations where tile bridges joint, provide soft joints on both sides of joint. Filling with Type "T" joint sealant.

- a. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."
- 3. Provide expansion type (caulk) joints to match color and texture of grout. Provide at all cold joints/saw cut joints in concrete floor slabs, at perimeter joints (floor tile to base or wall) and at locations recommended in the TCA "2005 Handbook for Ceramic Tile Installation, 42<sup>nd</sup> Edition.
  - a. Joints for the control of changes in liner dimensions and isolation:
    - 1) Space expansion joints 24'-0" on center each direction the width of the grout joint in interior floors not subject to moisture and direct sunlight.
    - 2) Space expansion joints 12'-0" on center each direction the width of the grout joint in interior floors subject to direct sunlight and moisture.
    - 3) Provide isolation joints at locations where flooring meets surfaces such as perimeter walls, columns, piers, dissimilar flooring materials, etc.
- 4. Provide joint preparation for isolated cracks as outlined below and recommended by membrane manufacturer.
  - a. Provide non-asbestos fiber reinforced polymer modified bitumen sheet membrane for treatment of cracks in substrate. Membrane sheet width 3 tiles minimum, 1 full tile over joint plus 1 full tile on each side. Materials by N.A.C. Products "ECB Membrane", the Noble Company "Nobleseal CIS" or equal.

#### 3.6 GROUT

- A. Grout tile to comply with the requirements of the following tile installation standards:
  - 1. For ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, latex-portland cement grouts, and epoxy), comply with ANSI A108.10.
  - 2. Install waterproofing to comply with waterproofing manufacturer's written instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.
  - 3. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

# 3.7 FLOOR TILE INSTALLATION

- A. Install tile to comply with requirements indicated, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.
  - 1. Joint Widths: Install tile on walls with 1/8" Joint Width

#### 3.8 CLEANING

A. On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter. Use cleaning materials and methods that comply with tile and grout manufacturers' written instructions.

END OF SECTION 093000

#### **SECTION 099123 - INTERIOR PAINTING**

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

# 1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Gypsum board.
  - 2. Hollow metal frames.
  - 3. Stain finish for wood windows and doors.
  - 4. Miscellaneous interior surfaces.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Product Data: For paints, including printed statement of VOC content and chemical components.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Label each Sample for location and application area.

## 1.4 QUALITY ASSURANCE

### A. MPI Standards:

- 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
- 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" and "MPI Maintenance Repainting Manual" for products and paint systems indicated.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

### 1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Before painting is started in any area, broom clean and remove excessive dust.
- D. After painting operations begin in a given area, broom cleaning will not be allowed; cleaning shall be done only with commercial vacuum cleaning equipment.
- E. Provide adequate illumination in all areas where painting operations are in progress.

#### **PART 2 - PRODUCTS**

### 2.1 MANUFACTURERS

- A. Manufacturer:
  - 1. Sherwin-Williams Company
  - 2. Hallman Lindsay Quality Paints
  - 3. Davis Paint Company
  - 4. American Formulating and Manufacturing (AFM) Safecoat.

# 2.2 PAINT, GENERAL

- A. Provide all painting materials of the best quality and approved by the Owner. They shall bear identifying labels on the containers with the manufacturer's instructions printed thereon. Paint containers not bearing manufacturer's identifying labels or bearing identifying labels of the manufacturers not approved by the Owner will not be permitted on the project site.
- B. Paint shall not be badly settled, cakes, or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.
- C. Deliver paint to the job color-mixed except for tinting of undercoats and possible thinning.
- D. Tinting materials shall be recommended by the manufacturer for the particular material tinted.
- E. Insure that all mixed colors match the color selection made by the A/E prior to application of the coating.
- F. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- G. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according

to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

- 1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
- 2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
- H. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  - 2. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein.
    - b. Acrylonitrile.
    - c. Antimony.
    - d. Benzene.
    - e. Butyl benzyl phthalate.
    - f. Cadmium.
    - g. Di (2-ethylhexyl) phthalate.
    - h. Di-n-butyl phthalate.
    - i. Di-n-octyl phthalate.
    - j. 1,2-dichlorobenzene.
    - k. Diethyl phthalate.
    - 1. Dimethyl phthalate.
    - m. Ethylbenzene.
    - n. Formaldehyde.
    - o. Hexavalent chromium.
    - p. Isophorone.
    - q. Lead.
    - r. Mercury.
    - s. Methyl ethyl ketone.
    - t. Methyl isobutyl ketone.
    - u. Methylene chloride.
    - v. Naphthalene.
    - w. Toluene (methylbenzene).
    - x. 1,1,1-trichloroethane.
    - y. Vinyl chloride.
- I. Colors: See architectural plans for color information.

# 2.3 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer:
  - 1. Safecoat New Wallboard Primecoat HPV
  - 2. Safecoat Transitional Primer
  - 3. AFM MetalCoat Acrylic Metal Primer

#### 2.4 LATEX PAINTS

- A. Institutional Low-Odor/VOC Latex (Low Sheen): MPI #144 (Gloss Level 2).
  - 1. VOC Content: E Range of E3.
- B. Institutional Low-Odor/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).
  - 1. VOC Content: E Range of E3.
- C. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).
  - 1. VOC Content: E Range of E3.

#### **PART 3 - EXECUTION**

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

  1. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
   Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

# 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
  - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

#### E. Wood Surfaces:

- 1. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended know sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- 2. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood.

#### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in occupied spaces including, but not limited to, the following:
  - 1. Mechanical Work:
    - Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
  - 2. Electrical Work:
    - a. Electrical equipment that is indicated to have a factory-primed finish for field painting.

# 3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

## 3.5 INTERIOR PAINTING SCHEDULE

A. Surfaces to be painted are listed in the Room Finish Schedule, and indicated on the Drawings

#### B. Steel Substrates:

- 1. Institutional Low-Odor/VOC Latex System: MPI INT 5.1S.
  - a. Prime Coat: Rust-inhibitive primer (water based).
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex semi gloss as scheduled.

# C. Gypsum Board Substrates:

- 1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.
  - a. Prime Coat: Interior latex primer/sealer.
  - b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
  - c. Topcoat: Institutional low-odor/VOC interior latex as scheduled with the following sheen:
    - 1) Walls, ceilings and soffits: (eggshell).
    - 2) Walls requiring clean-down, as scheduled: (semi gloss).

## D. Stained Wood Substrates:

- 1. Moisture-Cured Clear Polyurethane Over Stain System: MPI INT 6.3Y.
  - a. Stain Coat: Interior wood stain (semitransparent).
  - b. Two Finish Coats: Moisture-cured clear polyurethane (flat).

## E. Miscellaneous Finishes

1. Finish mechanical piping and electrical conduits, boxes; sprinkler piping and brackets; ductwork and accessories scheduled to receive wall and ceiling finishes with 2 spray coats Interior Latex Satin Dryfall I-1450(waterborne Acrylic Dryfall B42 Series) over appropriate primer.

END OF SECTION 099123

#### SECTION 123613 - CONCRETE COUNTERTOPS

#### PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Countertops
- B. Related Sections include the following:
  - Section 060110: Rough Carpentry
  - 2. Section 060120: Finish Carpentry

# 1.3 PERFORMANCE REQUIREMENTS

- A. Countertops: Products shall meet or exceed the following performance characteristics:
  - 1. Accelerated weathering: ASTM G 155, 2,000 hours; no deleterious effects, no cracking, checking, crazing, erosion, rusting, blistering, peeling or delaminating.
  - 2. Tensile Adhesion: ASTM C 297, 25 psi, minimum 15 psi.
  - 3. Water Resistance: ASTM D 2247, passed 14 days; no deleterious effects, no cracking, checking, crazing, erosion, rusting, blistering, peeling or delaminating.
  - 4. Compressive Strength: ASTM C 39,  $\leq$  7,000 psi.
  - 5. Flexural Strength: ASTM C 1185/!!86,  $\leq$  1,560 psi.

# 1.4 SUBMITTALS

- A. Shop Drawings:
  - 1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
    - a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
    - b. Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.
    - c. Show locations and sizes of cutouts and holes in solid surface.
- B. Samples:
  - 1. Submit minimum 4-inch by 4-inch sample in specified finish & color.
  - 2. Cut sample and seam together for representation of inconspicuous seam.
  - 3. Indicated full range of color and pattern variation.
  - 4. Approved samples will be retained as a standard for work.

## C. Product Data:

1. Indicate product description, fabrication information, Storage and handling requirements, installation methods, and compliance with specified performance requirements.

- D. Product Certificates:
  - 1. For each type of product, signed by product manufacturer.
- E. Fabricator/Installer Qualifications:
  - 1. Provide copy of certification number.
- F. Manufacturer Certificates:
  - 1. Signed by manufacturers certifying that they comply with requirements.

## 1.5 QUALITY ASSURANCE

- A. Qualifications:
  - Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.
- B. Fabricator/installer qualifications:
  - . Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.
- C. Applicable standards:

American National Standards Institute (ANSI)

American Society for Testing and Materials (ASTM)

National Electrical Manufacturers Association (NEMA)

NSF International

- D. Allowable tolerances:
  - 1. Variation in component size:  $\pm 1/8$ " (3 mm) over a 10' length.
  - 2. Location of openings:  $\pm 1/8$ " (3 mm) from indicated location.
  - 3. Maximum 1/8" (3 mm) clearance between quartz surfaces and each wall.
- E. Coordination drawings:
  - 1. Shall be prepared indicating:
    - a. Electrical work
    - b. Miscellaneous steel for the general work
    - c. Indicate location of all walls (rated and non-rated), blocking locations and recessed wall items, etc.
  - 2. Content:
    - a. Project specific information, drawn accurately to scale.
    - b. Do not base coordination drawings on reproductions of the contract documents or standard printed data. Each location must be field measured and verified.
    - c. Indicate dimensions shown on the contract drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements.
    - d. Provide alternate sketches to designer for resolution of such conflicts.
    - e. Minor dimension changes and difficult installations will not be considered changes to the contract.
- 1.6 DELIVERY, STORAGE, AND HANDLING
  - A. Do not deliver components to project site until areas are ready for installation.
  - B. Store components indoors prior to installation.

- C. Handle materials to prevent damage to finished surfaces.
  - 1. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

## 1.7 WARRANTY

- A. Provide manufacturer's warranty against defects in materials.
  - 1. Warranty shall provide material and labor to repair or replace defective materials.
  - 2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
- B. Warranty Length: 5- years

## 1.8 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

## **PART 2 - PRODUCTS**

# 2.1 MANUFACTURERS

- A. Approved Manufacturer: Custom Crete Werks, 1220 Mound Ave #222, Racine, WI 53404. Telephone: 262-632-1300
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Division 1.

# 2.2 MATERIALS

- A. Material:
  - 1. Homogeneous quartz surfaces material.
    - a. N-viroCrete
  - 2. Material shall have minimum physical and performance properties specified.
- B. Color:
  - 1. N-Earthed
- C. Thickness:
  - 1. 1-inch countertop
  - 2. 2-inch apron
- D. Edge Treatment:
  - 1. Hand eased
  - 2. 5" high apron
- E. Sink Style:
  - 1. 24" Gates with slot drain

- F. Finish:
  - 1. N-Hansed StainProof Surface
- G. Seam width:
  - 1. <1/8" unless otherwise specified.

## 2.3 ACCESSORY PRODUCTS

- A. Joint adhesive:
  - 1. Manufacturer approved adhesive to create color-matched seam.

#### 2.4 FACTORY FABRICATION

- A. Shop assembly
  - Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
  - 2. Form joints between components using manufacturer's standard joint adhesive joints.
    - a. Reinforce as required.
  - 3. Rout and finish component edges with clean, sharp returns.
    - a. Rout cutouts, radii and contours to template.
    - b. Smooth edges.

#### **PART 3 - EXECUTION**

# 3.1 INSTALLATION

- A. Install components plumb and level, in accordance with approved shop drawings and product installation details.
  - 1. Tops:
    - a. Flat and true to within 1/8" (3 mm) of a flat surface over a 10' length.
    - b. Allow a minimum of 1/16" to a maximum of 1/8" (3 mm) clearance between surface and each wall.
- B. Form field joints using manufacturer's recommended adhesive, with joint widths no greater than 1/8" (3 mm) in finished work.
  - 1. Keep components and hands clean when making joints.
- C. Keep components and hands clean during installation.
  - 1. Remove adhesives, sealants and other stains.
  - 2. Components shall be clean on date of substantial completion.
- D. Connections:
  - 1. Make plumbing connections in accordance with Division 15.
  - 2. Make electrical connections in accordance with Division 16.

## 3.2 CLEANING AND PROTECTION

- A. Keep components clean during installation.
  - 1. Remove adhesives, sealants and other stains.

- B. Protect surfaces from damage until date of substantial completion.
  - 1. Replace damaged work.

END OF SECTION 123613

#### SECTION 22 00 00 - PLUMBING

## PART 1 - GENERAL

# 1.01 DESCRIPTION

- A. <u>Work Included:</u> Provide plumbing where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
  - 1. Site Plumbing Utilities.
  - 2. Domestic Hot and Cold Water Piping.
  - 3. Drain, Waste, and Vent Systems.
  - 4. Plumbing Fixtures and Trim.

# B. Related Work:

- 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
- 2. Cutting and patching existing exterior paving and hard surfaces for site utilities by the Plumbing Contractor.

# C. Work of Other Sections:

- 1. Openings for new Plumbing work in new construction walls, floors, roof, ceiling, etc. shall be provided by the General Contractor. Location and size of these openings shall be the responsibility of the Plumbing Contractor.
- 2. Electrical line voltage wiring (110 volts and greater) by the Electrical Contractor. Wiring diagrams shall be furnished to the Electrical Contractor by the Plumbing Contractor.
- 3. Final gas piping connections for HVAC Equipment by the HVAC Contractor.
- 4. Roofing, exterior wall and related exterior openings shall be caulked, sealed and patched by the General Contractor.

#### 1.02 GENERAL PROVISIONS

- A. This specification Section is a general description of the work requirements. The particular descriptions are not intended to be all-inclusive. Bidders shall also refer to the Drawings.
- B. Prior to submitting a bid, the Contractor shall call the Engineer's attention (in writing only) to any materials or items of work believed to be inadequate. Bidders are required to visit the premises, take measurements, inspect existing conditions and limitations, and obtain first hand information necessary to submit a bid. The intent of the Contract is to obtain complete system installations, tested, ready for operation. No extras will be allowed because Contractor's misunderstanding of the scope work involved.
- C. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.
- D. The Drawings show various details indicating the general arrangement of the plumbing work, sizes and locations of piping, equipment, etc. The said Drawings with figures, lettering, etc., shall be considered a part of these Specifications and no charge or alternation shall be made in any case unless ordered by the Engineer.
- E. In addition to the Plumbing work, refer to the Plumbing work shown on the general Construction Drawings of the building as being part of this Contract, unless specified to be done by other contractors.

### 1.03 QUALITY ASSURANCE

- A. Use adequate number 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. Without additional cost to the Owner, provide such other labor and materials as required to be complete the work of the Section in accordance, with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in the Contract Documents.
- C. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.
- D. For the actual field fabrication, installation and testing of the Plumbing work, use only thoroughly trained and experienced workmen complete familiar with the items required and manufacturer's current recommended methods of installation.

### E. Reference Standards:

ANIOL

MINOI	Afficial National Standards Institute
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society of Testing and Material
AWWA	American Waterworks Association
CISPI	Cast Iron Soil Pipe Institute
FM	Factory Mutual
MCA	Mechanical Contractors Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
WQA	Water Quality Association

American National Standards Institute

#### 1.04 CODES AND PERMITS

- A. This contractor must comply with building codes and other ordinances in force where the building is located as far as same apply to his work.
- B. Plumbing work shall meet all Federal, State, Local Codes, ordinances and utility regulations.
  - 1. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern when so directed by the Engineer.
- C. Plumbing Contractor must secure permits from proper offices and pay all legal fees as may be necessary for fulfilling the requirements of these specifications.
- D. Submit one (1) copy of all permits to the Owner.

#### 1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems pertaining to the Plumbing work shall be installed in the best feasible arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

- B. Arrange plumbing work in neat, well organized manner with piping and similar services running with primary lines of building construction, and with minimum of 8 foot overhead clearance, where possible.
- C. Locate equipment properly to provide easy access, and arrange entire plumbing work with adequate access for operation and maintenance.
- D. Give right-of-way to piping, which must slope for drainage.
- E. Where Plumbing work is to connect to existing, the Contractor must field verify all connection points before beginning any rough-in work. Verify gravity flow lines and proper invert elevations required prior to starting piping installation.

# 1.06 ELECTRICAL PROVISIONS OF PLUMBING WORK

- A. <u>Line Voltage Wiring:</u> The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.
- B. <u>Low Voltage Control Wiring</u>: Exposed low voltage (less than 100 volts) temperature control wiring in connection with the Plumbing systems shall be in EMT conduit by the Plumbing Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed low-voltage control* wiring may be routed to equipment without conduit, unless subject to physical damage.
- C. The Plumbing Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. Plumbing Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to the Electrical Contractor.
- D. <u>Motors:</u> Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.
  - 1. <u>Phases and Current:</u> 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide 2 separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
  - 2. <u>High Efficiency Motors:</u> All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
  - 3. <u>Temperature Rating:</u> Class B insulation for 70 degree C temperature rise.
  - 4. Service Factor: 1.15 for three-phase; 1.35 for single-phase.
  - 5. *Construction:* General purpose, continuous duty.
  - 6. Frames: NEMA Standard for horsepower specified.
  - 7. <u>Overload Protection:</u> Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.
  - 8. Bearings: Permanently lubricated and sealed ball bearings.
- E. <u>Motor Starter & Disconnect Switches:</u> Where motor starters and disconnect switches are indicated to be an integral part of equipment furnished by Plumbing Contractor, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.
  - Field assembled motor starters and disconnect switches are to be the responsibility of the Electrical Contractor, unless indicated otherwise.
- F. <u>Wiring Connections:</u> Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.
- G. <u>General Wiring:</u> Comply with applicable provisions of Division 16 Section.

H. <u>Drip Pans:</u> Furnish drain pans below piping which passes directly above electrical work. Install drain piping and drain valve.

# 1.07 PAINTING PLUMBING WORK

- A. <u>General</u>: All field painting of plumbing equipment shall be done by the General Contractor, unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.
- B. All equipment shall be provided with factory-applied prime and final coat paint finish, unless otherwise specified.
- C. If factory-applied paint finish in any Plumbing equipment furnished by the Plumbing Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Plumbing Contractor to the satisfaction of the Architect or Engineer.
- D. Prime paint all field-fabricated metal work under plumbing work, comply with applicable provisions of Division 9.

## 1.08 PLUMBING SYSTEM IDENTIFICATION

- A. <u>General:</u> Provide adequate marking of plumbing system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals.
  - 1. Furnish and install adequate marking, tagging and labeling of all accessible and exposed Plumbing equipment, piping and control devices, per ANSI A13.1-1981. Accessible locations shall include all ceiling spaces above accessible ceilings.
- B. <u>Equipment:</u> Identify all major Plumbing equipment with plastic-laminate signs of 2" high painted stencils and contrasting background. Provide test of sufficient clarity and lettering to convey adequate information at each location and mount permanently. Identify control equipment by 1-1/2" x 4" plastic laminate nameplates with 1/4" high lettering.
- C. <u>Piping:</u> Identify piping once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping system for identification of flow direction. Provide lettering of the appropriate size to convey information on wrap-around signage, adhesive-backed or paint stenciled labels.
- D. <u>Valves:</u> Identify all valves with 1-1/2" diameter polished brass tags with stamp-engraved labels or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, listing location, service and tag description, and incorporate in Instruction Operations Manual.
- E. <u>Operational Labels: Where</u> needed for proper or adequate information on operation and maintenance of Plumbing systems, provide tags or labels of plastic or laminated card stock, typewritten to convey the message.

## 1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

- A. The General Contractor will be required to leave openings in ceiling, floors, walls, roof, partitions, etc., as required to install the Plumbing work specified or shown on the Drawings. The Plumbing Contractor is responsible for correct size and location of his openings. Where penetrations through existing construction are required, they shall be the responsibility of the Plumbing Contractor.
  - 1. Pipe Sleeves: Schedule 40 black steel pipe, 1" larger than carrier pipe.
- B. The Plumbing Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.

- C. Pack annular space between sleeves and pipe with fiberglass insulation and seal with approved caulking materials. Where penetrations occur through fire-rated walls or floors, fill space with fire-resistive insulation similar to high-temperature mineral wool, US Gypsum Thermafiber batts or Cerablanket FS insulation by Tremco. Seal openings with UL approved fire-resistive fire stop caulk/sealant or assembly.
  - 1. Fireproof plastic piping through fire-rated construction per approved UL listed assembly.
- D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.
- E. If the Plumbing Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the Plumbing Contractor shall pay the General Contractor for providing such openings.
- F. Make arrangements with various other contractors for all special framing, spacing and chases. Mason will leave chases in mason work, but Plumbing Contractor is responsible for correct size and location.

#### 1.10 CUTTING AND PATCHING

- A. <u>General:</u> Refer to Division 1 General Requirements.
- B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
  - 1. All cutting and patching necessary of structural members to install any Plumbing work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.
- C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.
  - 1. All patching work in existing areas shall match existing work and restore the finish to its original condition in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

# 1.11 TESTS AND INSPECTIONS:

- A. All plumbing tests shall be conducted in the presence of and to the satisfaction of the Governing Authorities, Architect/ Engineer, and Owner or his authorized representative.
- B. The Plumbing Contractor shall be responsible for applying tests and ordering inspections as required by Federal. State and local Code and Inspection authorities.
  - All work shall remain exposed until it has been tested, inspected and approved.

# 1.12 TEMPORARY SERVICES

A. Provide temporary services for all plumbing services to the existing facility to maintain function of sanitary, storm, natural gas and water services during the construction period.

# 1.13 TRENCHING AND BACKFILLING

A. Trench, excavate and tunnel to place place all piping and other related work necessary at the elevations indicated or required, as shown on the Drawings.

- 1. Cut bottom of trench to grade, make trench 12" wider than the widest dimension of the pipe.
- 2. All pipes shall be laid on a compacted bed of sand 6" deep. Do not lay piping on large stones, rocks or bricks.
- B. Backfill in layers and compact sufficiently to prevent settlement. Backfill with damp sand and fine gravel mixture.
  - 1. Exterior locations shall be backfilled to 12" of grade with sand and fine gravel mixture and the remainder with native compacted topsoil.
  - 2. Do not start backfill operations until plumbing work has been properly inspected and approved.

#### 1.14 CONCRETE FOR PLUMBING WORK

- A. <u>General</u>: Comply with pertinent provisions of Division 1 and Division 3.
- B. All concrete work for equipment pads by the Plumbing Contractor.
- C. <u>Concrete Equipment Pads</u>: For each piece of floor or ground mounted HVAC equipment as indicated on the Drawings, provide a 4" concrete housekeeping pad at a minimum of 4 inches wider than the full size of the respective equipment's base. Equipment pads are required for the following equipment:
  - 1. Water Heater.
  - 2. Water Softener.

## 1.15 EQUIPMENT ACCESS

- A. <u>General:</u> All valves, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.
- B. <u>Location:</u> Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.
- C. <u>Construction:</u> Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and furred-in spaces. Milcor or approved equal, 14-gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

# 1.16 EQUIPMENT SUPPORTS

- A. <u>General:</u> Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.
  - Prime coat paint all metal supports.

# 1.17 EQUIPMENT GUARDS

- A. <u>General:</u> Provide equipment guards over belt-driven assemblies, pump shafts, exposed fans and related elsewhere, as indicated in this specification or required by Code.
  - 1. All belt guards shall be OSHA-approved types.

#### 1.18 GUARANTEE

- A. All material and workmanship must be new and first class in every respect; the plumbing equipment must be turned over to the owner in complete working order and free from mechanical or performance defects.
- B. The Plumbing Contractor must guarantee all labor and materials for one (1) year from the completion of the plumbing system. Maintain and repair plumbing equipment for the above period, unless such defects are clearly the result of bad management after plumbing system is turned over to the Owner.
- C. Before final acceptance of the plumbing work, the Plumbing Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by Owner.
- D. The Plumbing Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the Drawings and Specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

#### 1.19 SUBMITTALS

- A. Refer to Division 1 for additional submittal requirements.
- B. The Plumbing Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Architect/Engineers final approval.
- C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.
  - 1. Incomplete drawings will be disapproved.
- D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings.

  Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.
- E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:
  - 1. Valves.
  - 2. Pipe and piping specialties.
  - 3. Insulation systems.
  - 4. Plumbing fixtures.
  - Instructions and O&M manuals(2 copies).
  - 6. As-built Drawings(1 copy).

# 1.20 HOUSEKEEPING AND CLEANUP

A. Periodically as work progress and/or as directed by the Architect/Engineer, the Contractor shall remove waste materials from the building and leave the area of the work room clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

### 1.21 LUBRICATION

- A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.
  - 1. The Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.
- B. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

### 1.22 INSTRUCTIONS AND MANUALS

- A. Upon completion of the installation, but before final acceptance of the system, the Plumbing Contractor shall instruct the Owner on the care and operation of all parts of the Plumbing system.
- B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to Architect for disbursement.

## 1.23 AS-BUILT DRAWINGS

- A. During construction maintain a set of prints showing installed as-built work for the project.
- B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

### **PART 2 - PRODUCTS**

# 2.01 DOMESTIC WATER PIPE SCHEDULE

# A. Above Ground Piping:

- 1. Type 'L' copper water tube, H(hard drawn) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813.
- Wisconsin approved PEXa piping.
- 3. Mechanically formed brazed tee connections may be used in lieu of specified fittings.

# B. Below Ground: 2-1/2" and Smaller:

- 1. Type 'K' copper water tube, O(annealed-soft) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813; or cast copper flared pressure fittings, ANSI B16.26.
- 2. Wisconsin approved PEXa piping.

# 2.02 DRAIN, WASTE AND VENT PIPE SCHEDULE

### A. Interior Above Ground:

- 1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketted neoprene joints.
- 2. Hubless cast iron soil pipe and fittings, CISPI 301; with no-hub couplings, CISPI 310.
- 3. PVC plastic pipe, Schedule 40, Class 12454-B(PVC 112), ASTM D1785; PVC plastic drain, waste and vent pipe and fittings, ASTM D2665; socket fitting patterns, ASTM D3311; primer, ASTM F656; solvent cement, ASTM D2564.

- 4. Galvanized steel vent pipe, Schedule 40, zinc-coated, ASTM 120 or 53 Grade B; malleable iron threaded fittings, zinc-coated.
- 5. Type "DWV" copper water tube, H(hard drawn) temper, ASTM B88; with cast copper drainage fittings(DWV), ANSI B16.23; wrought copper drainage fittings(DWV), ANSI B16.29; lead-free(less than 0.2%) solder, ASTM B32; flux, ASTM B813.

# B. <u>Interior Below Ground:</u>

- 1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketted neoprene joints.
- 2. PVC plastic pipe, Schedule 40, Class 12454-B(PVC 112), ASTM D1785; PVC plastic drain, waste and vent pipe and fittings, ASTM D2665; socket fitting patterns, ASTM D3311; primer, ASTM F656; solvent cement, ASTM D2564.

## 2.03 VALVES

# A. Approved Manufacturers:

- 1. Conbraco Apollo;
- Milwaukee:
- 3. Watts:
- 4. Nibco.

### B. Check valves:

1. 2" and smaller: Bronze, screwed, Y-pattern, 200# WOG, swing check type.

### C. Ball valves:

1. <u>2" and smaller:</u> Two or Three piece, bronze-body, chrome-plated bronze ball, Teflon seat and packing, 400 pig WOG, with stem extensions on insulated piping. Appollo 70-200 series.

# 2.04 VENT FLASHING

- A. Where pipes of this Section pass through the roof, flash the opening with seamless 3 lb./sq.ft. lead flashing with 15" x 17" minimum base size, steel reinforced boot and cast iron counterflashing sleeve.
- B. Approved Manufacturers: SSMC, Oatey or approved equal.

#### 2.05 PIPE HANGERS

# A. Piping:

- 1. Split ring hangers with supporting rods.
- 2. Adjustable clevis.

## B. Multiple or Trapeze Hangers:

Steel channels with welded spacers and hanger rods.

# C. Floor Support:

1. Painted steel pipe saddle, stand and bolted floor flange.

# D. Copper Pipe Supports:

- 1. All supports, fasteners, clamps, etc. directly connected to copper piping shall be copper-plated or polyvinylchloride(PVC)-coated.
- 2. Where steel strut supports are used, provide isolation collar between supports/clamp and copper piping.
- E. Approved Manufacturers: Fee and Mason, B-line, Grinnell or approved equal.

#### 2.06 CLEANOUTS

- A. <u>Exterior:</u> Smith #4253 with XH cast iron top in concrete areas.
- B. <u>Interior Floors:</u> Smith 4930-PB square nickel-bronze top.
- C. Finished walls: Smith #4532 stainless steel with access plate and screw.
- D. Provide cleanout plugs of extra heavy bronze
- E. Approved Manufacturers: Josam, Smith, Wade, Zurn or approved equal.

#### 2.07 ACCESS

- A. <u>General:</u> All piping, conduit and accessories shall be installed to permit access to equipment for maintenance. Any relocation of piping, equipment or accessories required to provide maintenance access shall be accomplished by the Contractor at no additional cost.
- B. <u>Removable Access Plates:</u> Where only hand access is sufficient for valve access, provide removable plate-type access unit of minimum size which will facilitate required access.
  - 1. Provide units of type, style, design, material and finish appropriate for location and exposure in each instance.
  - In exposed surfaces of occupied spaces provide round plate units, flush floor units and frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome or stainless steel finish in other surfaces.

# C. Walls:

- 1. Smith #4767 flush wall stainless steel cover plate with screw latch lock in finished tile walls at wet locations.
- 2. Smith #4760 or #4765 with bonderized prime-coated steel face and screw latch lock in walls of other finished rooms.

# D. Ceilings:

1. Provide Smith #4765 flush ceiling bonderized prime-coated steel face with screw latch lock.

# E. Floors:

1. Smith #4910 with aluminum or nickel-bronze non-skid top.

### 2.08 WATER HAMMER ARRESTORS

- A. Provide Smith #5000 series or equal, stainless steel or air chambers at each fixture group utilizing a flush valve or fast closing solenoid valve, as sized and recommended by the manufacturer.
- B. Approved Manufacturers: Josam, PPP, Smith, Wade, Zurn or approved equal.

# 2.09 HANDICAPPED INSULATION

A. Where shown on the Drawings or required by governmental agencies having jurisdiction, provide "Truebro" insulation system or approved equal on exposed hot and cold water supply piping, waste tailpiece and trap at lavatories requiring ADA compliance.

## 2.10 PIPE INSULATION

- A. <u>General:</u> Provide composite piping insulation (insulation, jackets, coverings, sealers, mastics, and adhesives) with ratings not exceeding flame spread of 25 and a smoke developed of 50 in active return air plenums. Ratings in all other areas shall not exceed a flame spread of 25 and a smoke developed of 150 (test method ASTM E-84). Comply with all codes regarding the use of foam insulation.
- B. Insulate piping located in interior space, including (but not necessarily limited to) the following services:
  - 1. Interior cold and hot domestic water piping.
- C. Insulate each piping system with one of the following types and thickness of insulation, except as otherwise indicated (Installer's option where more than one type is indicated).
  - 1. <u>Fibrous Glass</u>: Minimum density 3 lb./cu.ft., thermal conductivity of not more than 0.23 at 75 degrees F mean temperature, suitable for temperatures to 450 degrees F. Kraft-reinforced, foil-vapor barrier, laminate all-service jacket, factory applied to insulation with a self-sealing pressure sensitive adhesive lap, maximum permeance of 0.02 perms and minimum beach puncture resistance of 50 units.
  - 2. <u>Elastomeric Insulation:</u> Closed-cell type, with minimum nominal density of 5.5 lbs./cu.ft., thermal conductivity shall be not more than 0.27 at 75 degrees F mean temperature, and maximum water vapor transmission of 0.17 perm/inch. The material shall be suitable for a temperature range from 220 degrees F to minus 40 degrees F.

# D. <u>Insulation Installation Schedule:</u>

	Service	<u>Pipe Size</u>	<u>Insulation Thickness</u>
1.	Hot Water Piping	Less than 1"	1"
	. •	1-1/4 thru 4"	1"
2.	Cold Water Piping	Less than 1"	1/2"
		1-1/4"thru 4"	1"

# 2.11 FIXTURES AND EQUIPMENT

- A. <u>General:</u> Provide plumbing fixture, trim, and equipment as shown on the **"Fixture and Equipment Schedule"** on the Contract Drawings, and as specified herein.
- B. All vitreous chinaware and porcelain fixtures shall be select quality.
  - 1. All wastes and supplies for fixtures, except as otherwise specified or required, shall turn back into walls.
- C. All trim, except as otherwise specified, shall be constructed of brass. Finish shall be polished chrome, except where concealed(inside cabinets, etc.).
- D. Faucets shall have replaceable control assemblies or replaceable washers and seats.
- E. Exposed waste fittings shall be constructed of 17 gauge tubular brass. Slip joints are permitted only on the fixture side of the trap.

- F. All fixtures with non-accessible traps such as bathtubs, showers, floor drains, shall have a completely removable stopper or grate in order to be accessible for cleanout.
- G. Quarter-turn(1/4) ball valve type fixture stops shall be installed at each fixture. It is the Contractor's option to install straight or angle type. All stops are to have a minimum of ½" inlets with flexible riser and loose key handles where exposed to the public.
  - 1. All shower/bath valves are to have integral stops.
  - 2. All loose stops shall be from the same manufacturer.
- H. Approved manufacturer's for Vitreous China and enameled Cast Iron Fixtures:
  - 1. American Standard.
  - Crane.
  - 3. Kohler.
- 1. Approved manufacturer's for Stainless Steel Sinks:
  - 1. American Standard.
  - 2. Dayton/Just.
  - 3. Elkay.
- J. Approved manufacturer's for Water Closet Seats:
  - 1. Bemis.
  - 2. Church.
  - 3. Olsonite.
- K. Approved manufacturer's for Sink and Lavatory Fittings:
  - 1. American Standard.
  - 2. Chicago faucet.
  - 3. Delta.
  - 4. T&B Brass.
  - 5. Symmons.
- L. Approved manufacturer's for Supplies, Stops and Traps:
  - 1. McQuire Manuf.
  - 2. Brass Craft.
  - 3. Chicago Faucet.
  - Dearborn Brass.

# 2.12 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 Architect.

#### PART 3 - EXECUTION

### 3.01 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.

#### 3.02 SITE UTILITIES

- A. Pay all permits and fees for new services.
- B. Verify all flow lines to the septic system sewer prior to installing any underground sewer piping.

  Advise the General Contractor of site conditions or inverts inconsistent with the plumbing layout and proposed flow line prior to proceeding.

# 3.03 PLUMBING SYSTEM LAYOUT

- A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only the minimum number of bends to produce a satisfactorily functioning system.
- B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.
- C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other that as shown on the Drawings.
- D. Where work is to connect to existing, Plumbing contractor must field verify all connection points before beginning any rough-in work. Verify all connecting invert elevations and flow lines of new work connected to existing gravity drainage.

#### 3.04 TRENCHING AND BACKFILLING

- A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of these Specifications and consistent with the national, state and local plumbing codes.
- B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the pipe.
- C. Bedding and backfilling:
  - 1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
  - 2. Under the building, install pipes on a 6" bed of damp sand. Backfill to bottom of slab with damp sand.
  - 3. Outside the building, install underground piping on a 6" bed of damp sand. Backfill to within 12" of finish grade with damp sand. Backfill remainder with native topsoil.
  - 4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

# 3.05 INSTALLATION OF PIPING AND EQUIPMENT, GENERAL

#### A. General:

- 1. Proceed as rapidly as the building construction will permit.
- 2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
- 3. Cut pipe accurately, and work into place without springing or forcing properly clearing window, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
- 4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
- 5. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of the pipe.
- 6. Run horizontal sanitary piping at a uniform grade of 1/4" per ft., unless otherwise noted. Run horizontal water piping with an adequate pitch upwards in direction of flow to allow complete drainage.

- 7. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
- 8. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment.
- 9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain and unthreaded pipe 6" above the drain.
- 10. Securely bolt all equipment, isolators, hangers, and similar items in place.
- 11. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.
- 12. Provide complete dielectric isolation between ferrous and non-ferrous metals.
- 13. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus.

# B. Equipment access:

- 1. Install piping, equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Owner.
- 2. Provide access doors where valves, motors, or equipment requiring access for maintenance are located in wall or chases or above ceilings. Coordinate location of access doors with other trades as required.

#### 3.06 PIPE JOINTS

# A. Copper tubing:

- 1. Cut square, remove burrs, and clean inside of female filling to a bright finish.
  - a. Apply solder flux with brush to tubing.
  - b. Remove internal parts of solder-end valves prior to soldering.
- 2. Provide dielectric unions at points of connection of copper tubing to ferrous piping and equipment.
- 3. For joining copper tubing, use the following:
  - a. Water piping 3" and smaller: 95-5 solder;
  - b. Water piping larger than 3": "Sil-fos" brazing;
  - c. Underground: "Sil-fos" brazing.

# B. Screwed piping:

- 1. Deburr cuts.
  - a. Do not ream exceeding internal diameter of the pipe.
  - b. Thread to requirements of ANSI B2.1.
- 2. Use Teflon tape on male thread prior to joining other services.
- 3. Use litharge and glycerin on joint prior to cleaning for air and oil piping.

# C. Leaky joints:

- 1. Remake with new material.
- 2. Remove leaking section and/or fitting as directed.
- 3. Do not use thread cement or sealant to tighten joint.

# 3.07 PIPE SUPPORTS

- A. Support suspended piping with clevis or trapeze hangers and rods.
- B. Space hangers and support for horizontal steel pipes according to the following schedule:

Pipe size: 1-1/4" and smaller: Maximum spacing on centers:

8'-0"

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Section 22 00 00 Plumbing 1-1/2" to 3": 10'-0" 4" to 5": 14'-0"

C. Space hangers and supports for horizontal copper tubing according to the following schedule:

Tube size:	Maximum spacing on centers
1" and smaller:	6'-0"
1-1/2":	7'-0"
2":	8'-0"
2-1/2":	9'-0"
3" and larger:	10'-0"

- D. Provide sway bracing on hangers longer than 18".
- E. Support vertical piping with riser clamps secured to the piping and resting on the building structure. Provide at each floor unless otherwise noted.
- F. Provide insulation continuous through hangers and rollers. Protect insulation by galvanized steel shields.
- G. Arrange pipe supports to prevent excessive deflection, and to avoid excessive bending stress.
- H. Hubless piping:
  - 1. Provide hangers on the piping at each side of, and within 6" of, hubless pipe coupling so the coupling will bear no weight.
  - 2. Do not provide hangers on couplings.
  - 3. Provide hangers adequate to maintain alignment and to prevent sagging of the pipe.
  - 4. Make adequate provision to prevent shearing and twisting of the pipe and the joint.

# 3.08 SLEEVES AND OPENINGS

- A. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, and ceilings.
  - 1. Set pipe sleeves in place before concrete is placed.
  - 2. For uninsulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2" clearance between inside and outside of the pipe.
  - 3. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.
- B. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with noncombustible asbestos cotton, or fiberglass to within 1/2" of both wall faces, and provide the waterproof compound described above.
- C. Finish and escutcheons:
  - 1. Smooth up rough edges around sleeves with plaster or spackling compound.
  - 2. Provide 1" wide chrome or nickel plated escutcheons on all pipes exposed to view where passing through walls, floors, partitions, ceilings, and similar locations.
    - a. Size the escutcheons to fit pipe and covering.
    - b. Hold escutcheons in place with set screw.

#### 3.09 CLEANOUTS

A. Secure the Architect's approval of locations for cleanouts in finished areas prior to installation.

- B. Provide cleanouts of same nominal size as the pipes they serve; except where cleanouts are required in pipes 4" and larger provide 4" cleanouts.
- C. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite the cleanout threads.

#### 3.10 VALVES

- A. Provide valves in water and gas systems. Locate and arrange so as to give complete regulation of apparatus, equipment, and fixtures.
- B. Provide valves in at least the following locations:
  - 1. In branches and/or headers of water piping serving a group of fixtures.
  - 2. On both sides of apparatus and equipment.
  - 3. For shutoff of risers and branch mains.
  - 4. For flushing and sterilizing the system.
  - 5. Where shown on the Drawings.
- C. Locate valves for easy accessibility and maintenance.

### 3.11 WATER HAMMER ARRESTORS

- A. Provide water hammer arrestors on hot water lines and cold water lines.
  - Install in upright position at all quick closing valves, isolated plumbing fixtures, and supply headers at plumbing fixture groups.
  - Locate and size as specified, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
  - 3. Install water hammer arrestors behind access panels.

# 3.12 BACKFLOW PREVENTION

- A. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back siphonage.
- B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

## 3.13 PLUMBING FIXTURE INSTALLATION

## A. Installation:

- 1. Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.
- 2. Provide supplies in proper alignment with fixtures and with each other.
- B. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.
- C. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

# 3.14 DISINFECTION OF WATER SYSTEMS

- A. Disinfect hot and cold water systems.
  - 1. Perform disinfection under the Architect's observation. Notify the Architect at least 48 hours prior to start of the disinfection process.

- 2. Upon completion of disinfecting, secure and submit the Certificate of Performance, stating system capacity, disinfectant used, time and rate of disinfectant applied, and resultant residuals in ppm at completion.
- 3. Use disinfectant method approved by the Architect.
- B. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory approved by the Architect, based on water samples from the system, showing test negative for coliaerogene organisms. Provide a total plate count of less than 100 bacteria per cc, or equal to the control sample.
- C. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

## 3.15 OTHER TESTING AND ADJUSTING

- A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction.
- B. Where test show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.
- C. Adjust the system to optimum standards of operation.

**END OF SECTION** 

# SECTION 23 00 00 - HEATING, VENTILATING AND AIR CONDITIONING

### **PART 1 - GENERAL**

## 1.01 DESCRIPTION

- A. <u>Work Included:</u> Provide heating, ventilating, and air conditioning systems where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
  - Radiant floor system.
  - Exhaust systems including, inline fans, motors, dampers, grilles, registers, louvers, controls, and related items:
  - 3. Temperature control systems including timeclocks, low-voltage wiring, relays, thermostats, control dampers and damper operators, and related items;
  - 4. Acoustical and thermal insulation of ductwork and related equipment.
  - 5. Test, adjust, and balance air systems;
  - 6. O&M manuals, warranty work and Owner instructions.

# B. Related Work:

- 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
- 2. Equipment structural supports, etc.
- 3. Louvers provided by HVAC Contractor; installed by General Contractor.

# C. Work of Other Sections:

- Openings for ventilating work in walls, floors, roof, ceiling, etc., will be provided by General Contractor. Location and size of these openings will be the responsibility of the HVAC Contractor.
- 2. Lintels and structural supports for HVAC openings and equipment by the General Contractor.
- 3. Electrical line voltage wiring (110 volts and greater). Wiring diagrams will be furnished to Electrical Contractor by the HVAC Contractor.
- 4. Motor starters not provided integral with HVAC equipment shall be provided by the Electrical Contractor.
- 5. Floor drains and open site drains by Plumbing Contractor.
- 6. Painting HVAC equipment will be the responsibility of General Contractor.
- 7. Roofing, exterior wall and related exterior opens shall be caulked, sealed and patched by the General Contractor.

# 1.02 GENERAL PROVISIONS

- A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.
- B. The plans show various details indicating the general arrangement of the heating and ventilating work, sizes and locations of pipe work, ducts, units, etc., the said plans with figures, lettering, etc., shall be considered a part of these Specifications and no charge or alternation shall be made in either case unless ordered by the Engineer.
- C. In addition to the heating and ventilating plans, see General Plans of the building, as all heating and ventilating work appearing on the latter plans will be part of this Contract unless especially specified to be done by other contractors, as well as, the said work detailed on the heating and ventilating plans.

#### 1.03 QUALITY ASSURANCE

#### Qualifications of Installers: Α.

- For the actual fabrication, installation and testing of heating and ventilating work, use only 1. thoroughly trained and experienced workmen completely familiar with the items required and manufacturer's current recommended methods of installation.
- In acceptance or rejection of installed work, the Architect or Engineer shall make no 2. allowance for lack of skill on the part of the Workmen.
- Reference Standards: The following standards are imposed, as applicable to work in each instances: B.

AABC

Associated Air Balance Council

ARI

Air Conditioning and Refrigeration Institute

**ASHRAE** 

American Society of Heating, Refrigerating and Air Conditioning Engineers

ASME

American Society of Mechanical Engineers

**ASTM** MCA

American Society of Testing and Materials Mechanical Contractors Association

MSS

Manufacturers Standardized Society

NEC

National Electric Code

NEMA

National Electrical Manufacturers Association

**NFPA** 

National Fire Protection Association

SMACNA

Sheet Metal and Air Conditioning Contractors National Association

Environmental design conditions for all occupied areas are as follows: C.

Inside:

70 deg. F

74 deg. F 50% RH

Outside:

-15 deg. F

91 deg. dbF/74 deg. wbF

#### 1.04 **CODES AND PERMITS**

- This Contractor must comply with building laws and other ordinances in force where the building is Α. located as far as same apply to his work.
- He must secure permits from proper offices and pay legal fees as may be necessary for fulfilling the B. requirements of these Specifications.
- One (1) copy of all permits must be furnished to the Owner. C.

#### 1.05 COORDINATION

- Cooperate and coordinate with other trades to assure that all systems in the heating and ventilating A. work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.
- Arrange heating and ventilating work in neat, well organized manner with piping and similar services B. running parallel with primary lines of building construction, and with minimum of 8 foot overhead clearance where possible.
- Locate operating and control equipment properly to provide easy access, and arrange entire heating C. and ventilating work with adequate access for operation and maintenance.
- Give right-of-way to piping which must slope for drainage. D.

#### **ELECTRICAL PROVISIONS OF HVAC WORK** 1.06

- A. Line Voltage Wiring: The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.
- B. Control Wiring: Exposed low voltage (less than 100 volts) temperature control wiring in connection with heating and ventilating system shall be in EMT conduit by the Heating Contractor in strict accordance with the applicable sections of the Electrical Specifications. Concealed control wiring may be routed to equipment without conduit, unless subject to physical damage.
- C. This Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. HVAC Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Electrical Contractor.
- D. Motors: Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.
  - 1. Phases and Current. 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide two (2) separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
  - 2. High Efficiency Motors: All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
  - 3. Service Factor, 1.15 for three-phase; 1.35 for single-phase.
  - Construction: General purpose, continuous duty. 4.
  - 5. Frames: NEMA Standard for horsepower specified.
  - 6. Overload Protection: Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.
- E. Starter and Switches: Where motor starters and switches are indicated to be an integral part of equipment furnished by Heating installer, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.
- F. Wiring Connections: Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.
- G. General Wiring: Comply with applicable provisions of Division 16 Section.

#### 1.07 **PAINTING HVAC WORK**

- Α. General: All field painting of mechanical equipment will be done by the General Contractor unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.
- B. All equipment shall be provided with factory-applied prime finish, unless otherwise specified.
- C. If the factory shop paint finish on any equipment furnished by the Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Contractor to the satisfaction of the Architect/Engineer.
- D. Prime paint all field-fabricated metal work under HVAC work, comply with applicable provisions of Division 9.

#### **IDENTIFICATION** 1.08

A. General: Provide adequate marking of the HVAC system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals. Tag and label HVAC equipment located in exposed or accessible areas to conform to ANSI A13.1-1981. After painting and/or covering is complete, identify all equipment, piping and ductwork by its abbreviated generic name as shown/scheduled/specified.

- B. <u>Equipment:</u> Identify all major HVAC equipment with plastic-laminate signs of 2" high painted stencils and contrasting background. Provide test of sufficient clarity and lettering to convey adequate information at each location and mount permanently. Identify control equipment by 1-1/2" x 4" plastic laminate nameplates with 1/4" high lettering.
- C. <u>Piping and Ductwork:</u> Identify all <u>exposed and accessible</u> piping and ductwork once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping or duct identification. Provide appropriate sized letters to convey information on wrap-around signage, adhesive-backed or paint stenciled labels.
  - 1. <u>Exposed</u> includes all piping and ductwork above suspended ceiling systems.
- D. <u>Valves:</u> Identify all valves with 1-1/2" diameter minimum polished brass stamp-engraved or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, service and tag description, incorporate in Instruction/O&M Manual.
- E. <u>Operational Labels:</u> Where needed for proper or adequate information on operation and maintenance of HVAC systems, provide labels or markers of plasticized or laminated card stock, typewritten of appropriate size to convey the information.
- F. Submit schedule of Identification labels for Architect/Engineer approval.

### 1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

- A. The General Contractor will be required to leave openings in new ceiling, floors, walls, roof, partitions, etc., as required to install the ventilating work specified or shown on the Drawings. The HVAC Contractor is responsible for correct size and location of his openings. Where penetrations through existing construction are required, they shall be the responsibility of the HVAC Contractor.
- B. The HVAC Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.
  - 1. Pipe sleeves: Schedule 40 black steel pipe, 1" larger than the pipe;
  - 2. <u>Duct sleeves:</u> 24 gauge galvanized sheetmetal, ½" larger than the duct on all sides.
  - 3. <u>Interior Sound Wall Penetrations:</u> All duct and piping penetrating sound walls shall be sleeved and sealed with fiberglass insulation and caulked for sound and odor control. Verify all required sound wall locations with Architect/General Contractor prior to bidding.
- C. Pack annular space between sleeves and pipe or ducts with fiberglass insulation and seal. Where penetrations through fire rated walls or floors, fill space with fire-resistive insulation similar to US Gypsum Thermafiber batts or other approved fire-resistive insulation material and seal annular openings with a UL approved, fire-stopping sealant/caulk.
- D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.
- E. If the HVAC Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the HVAC Contractor shall pay the General Contractor for providing these openings.
- F. Make arrangements with various other contractors for all special framing, spacing and chases.

  Mason will leave chases in mason work, but HVAC Contractor is responsible for correct size and location.
- G. <u>Plastic Pipe Penetrating Fire-Rated Construction</u>: Refer to proper UL approved assemblies.

#### 1.10 CUTTING AND PATCHING

- A. <u>General:</u> Refer to Division 1 General Requirements.
- B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
  - All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.
- C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

#### 1.11 CONCRETE FOR HVAC WORK

- A. General: Comply with pertinent provisions of Division 1 and Division 3.
- B. All concrete work for equipment pads by the HVAC Contractor

#### 1.12 EQUIPMENT ACCESS

- A. <u>General:</u> All valves, volume dampers, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, ducts or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.
- B. <u>Location:</u> Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.
- C. <u>Construction:</u> Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and or furred-in spaces. Milcor or approved equal; 14 gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

#### 1.13 EQUIPMENT SUPPORTS

- A. <u>General:</u> Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.
  - 1. Prime coat paint all supports.
  - 2. Turn over equipment curbs to the General Contractor for installation; structural steel supports under equipment curbs by the General Contractor.

# 1.14 EQUIPMENT GUARDS

- A. General: Provide equipment guard over belt-driven assemblies, pump shafts, exposed fans and elsewhere, as indicated in this specification or required by code.
  - 1. Prime coat paint all supports.

#### 1.15 GUARANTEE

- A. All material and workmanship must be new and first class in every respect; the heating, ventilating and air conditioning equipment must be turned over to the owner in complete working order and free from mechanical defects.
- B. The HVAC Contractor must guarantee all labor and materials for one (1) year from the substantial completion and acceptance of the HVAC system and keep or place same in repair for said period, unless such defects are clearly the result of bad management after HVAC system was turned over to the Owner.
- C. The system must be guaranteed to operate noiselessly and to the satisfaction of the Owner and to supply and exhaust quantities of air shown on the Drawings.
- D. Before final acceptance of this work, the Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by the Owner.
- E. The HVAC Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the plans and specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

#### 1.16 SUBMITTALS

- A. Refer to Division 1 for additional submittal requirements.
- B. The HVAC Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Engineer's final approval.
- C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.
  - 1. Incomplete drawings will be disapproved.
- D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings.

  Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.
- E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:
  - Radiant floor system and accessories;
  - 2. Exhaust fans and accessories;
  - 3. Diffusers, grilles, registers and louvers;
  - Insulation systems;
  - Temperature controls and wiring diagrams;
  - 6. TAB air balance report;
  - 7. Instructions and O&M manuals (2 copies);
  - 8. As-built drawings.
- F. Submit complete temperature control wiring diagrams and description of components and their operation, prior to installing temperature control system.
- G. Marked-up drawings indicated record installation as-built HVAC work.

### 1.17 HOUSEKEEPING AND CLEANUP

A. Periodically as work progress and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the work room clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

#### 1.18 LUBRICATION

- A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.
  - 1. The Contractor is responsible for maintaining and lubrication of all mechanical equipment under his contract until the work is accepted by the Owner.

#### 1.19 INSTRUCTIONS AND MANUALS

- A. Upon completion of the installation, but before final acceptance of the system, this Contractor shall instruct the Owner on the care and operation of all parts of the system.
- B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all HVAC equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to the Architect for distribution.

### 1.20 AS-BUILT DRAWINGS

- A. During construction maintain a set of prints showing installed as-built work for the project.
- B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

### PART 2 - PRODUCTS

### 2.01 DUCTWORK

- A. <u>Sheet Metal:</u> Furnish, install, fit and secure in place all supply, return, exhaust and vent air ducts, risers, branches, etc., as shown and detailed on plans, built of galvanized iron as hereinafter specified.
  - Sheet metal work shall be constructed according to practices recommended in the HVAC Duct Construction Standards - Metal and Flexible 1st ED. 1985, as published by SMACNA, and hereinafter specified. All duct dimensions noted on the drawings are finished inside dimensions.
  - 2. <u>Ductwork Pressure-Velocity Classification:</u> + 2" static pressure class 2,500 FPM velocity level.
  - 3. <u>Duct Sealing Requirements:</u> Seal Class B. Transverse and longitudinal joints.
  - 4. Install ducts, risers, etc., as indicated on plans, making necessary changes in cross section, offsets, etc., whether or not same is specifically indicated. If ducts cannot be run as shown on drawings, install ducts between required points, subject to the approval of Engineer without additional cost to the Owner.
  - 5. At all outlets and inlets in rooms, flange ducts for attachment of grilles. Install grilles according to manufacturer's recommendations.
  - 6. Sheet metal work throughout shall be assembled and erected in such a manner that no vibration will occur and no noise be transmitted by the moving air due to inappropriate fitting or offsets. All corrective measures will be determined by the Engineer at the HVAC Contractor's expense.
  - 7. All duct turns shall have either an inside radius equal to the duct width or be a miter turn with turning vanes. Turning vanes shall be double wall air-foil type.

8. <u>Branch Take-Off Fittings:</u> Round branch take-off fittings shall be low-loss type fittings such as bellmouth or conical type; no scoops or 90 degree tee fittings allowed. Square/rectangular branch take-off fittings shall have 45 degree leading edge with 4 inch minimum depth; no air turns or scoops allowed.

### B. Ductwork Accessories:

1. <u>Volume Dampers:</u> Furnish and install in branches of supply air and exhaust ducts. Substantial volume dampers to be fitted with locking devices for adjusting the air delivery. Damper blades shall not exceed 6" width.

2. <u>Access Panels:</u> Install access panels with latches and gaskets in ducts at automatic dampers, coils, fire dampers, louver plenums and other duct mounted equipment. Panels in

insulated ducts must be internally insulated.

3. <u>Openings around Ducts:</u> Through walls must be filled with fiber-glass, caulked and sealed with 14 gauge galvanized sheet metal angle around duct on each side of wall.

#### 2.02 VIBATION ISOLATION

### A. General:

1. Isolate all motor driven mechanical, unless otherwise noted, from the building structure and from the systems which they serve, to prevent equipment vibrations from being transmitted to the structure.

2. Consider equipment weight distribution to provide uniform deflections.

- 3. For equipment with variable speed capability, select vibration isolation devices based on the lowest speed.
- B. <u>Manufacturers:</u> Products and methods of fabrication shall be as manufactured by Mason Industries, Korfund Co., Amber/Booth Co., Vibration Mounting and Controls, or Kinetics, similar to the manufacturers model listed.

### C. Performance:

1. Select all vibration isolation devices to provide minimum 95% isolation efficiency or based on the minimum static deflection and mounting criteria listed below, whichever is greater.

2. Vibration Isolation Schedule:

Type of Isolation Minimum Static

<u>Equipment</u> Type
Inline Exhaust Fans Type 'X' Flexible Duct Connector & Type 'D' Hanger

Isolation Minimum Static

<u>Deflection - Inches</u>

3/4"

Type 'D' Hanger

### D. Type D Hangers:

1. Mason type 30N, vibration hangers with a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30 degrees are before contacting the hole and short circuiting the spring.

2. Springs shall have a minimum additional travel to solid equal to 50% of the rated

deflection

# E. <u>Type X Flexible Duct Connectors:</u>

- 1. Laminated flexible sheet of cotton duct and sheet elastomeric (neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated.
- 2. Form connectors with full-faced flanges and accordion bellows to perform as flexible isolation units
- 3. Provide galvanized steel retaining rings for airtight connections with ductwork.

#### 2.03 GRILLES, REGISTERS AND DIFFUSERS

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- A. Furnish grilles, registers and diffusers in the sizes, type and capacity as shown on the Drawings by the selected manufacturer or approved equal.
- B. Grilles, Registers and Diffusers shall be suitable and compatible with ceiling construction in which they are installed. Check architectural schedules for ceiling construction. Coordinate locations with T-bar ceiling system and lighting fixtures.

#### 2.04 LOUVERS

- A. Extruded aluminum louver, 2" deep, 30 deg. blades mounted 1-3/4" O.C. with rain hooks. Stainless steel screws.
  - 1. Frame: Aluminum extrusions 0.081" 6063-TS
  - Blades: Z-shaped extruded aluminum 6063-TS.
  - 3. Bird Screens: 1/2" mesh PVC crated.
  - 4. Finish: Powder-coat baked-on enamel finish, finish color selection by Architect.

#### 2.05 FANS

- A. <u>General:</u> Furnish fans in the size and capacity as shown on the drawings. Shall be manufactured by Broan, Carnes, Greenheck, ILG, Penn or approved equal.
- B. <u>Inline Fan</u>: Furnish duct mounted centrifugal, direct-driven or belt-driven inline fan. Fan shall be constructed of heavy gauge steel with acrylic enamel finish over iron phosphate primer. Motor or drive compartment shall be isolated from the airstream and be externally ventilated. Bearings shall be prelubricated and sealed for 200,000 hours operation. Fan wheel shall be aluminum, backward inclined, centrifugal type, dynamically and statically balanced with venturi inlet. One side of the housing shall be equipped with a hingeable service door assembly supporting the motor, drives, wheel and inlet venturi for servicing without disconnecting the fan connections. Fan shall be AMCA certified for air and sound performance.
  - 1. Accessories (as indicated on plans and schedules).
- C. <u>Motors:</u> 1/2 HP and larger shall be suitable for 208/60/1 or 3-phase operation and less than 1/2 HP shall be 115/60/1 with integral thermal overload. Horsepower rating shall be such that motor will not be overloaded at rated capacity. Motors in air stream shall be totally enclosed, other shall be open type. Motors shall have permanently lubricated ball bearings, mounted on neoprene vibration-isolator supports. All units shall have remote disconnect switch.
  - 1. ECM motor with local speed control, where scheduled.

# 2.06 RADIANT FLOOR SYSTEM

#### A. QUALITY ASSURANCE

Installer Qualifications: Use an installer with demonstrated experience on projects of similar size and complexity and possessing documentation proving successful completion of radiant floor heating training by the PEX tubing manufacturer.

Certifications: Provide letters of certification as follows.

- 1. Installer is trained by the PEX tubing manufacturer to install the radiant floor heating system.
- Installer uses skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed tradesperson.

#### Pre-installation Meetings:

- 1. Verify project requirements, substrate conditions, floor coverings, manufacturer's installation instructions and warranty requirements.
- 2. Review project construction timeline to ensure compliance or discuss modifications as required.

3. Interface with other trade representatives to verify areas of responsibility.

# B. DESIGN CRITERIA

Use only new material, free of defects, rust and scale, and meeting the latest revision of ASTM specifications as listed in this specification.

- 1. Construct all piping for the highest pressures and temperatures in the respective system in accordance with ANSI B31, but not less than 125 psig unless specifically indicated otherwise.
- 2. Standard Grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-3 as listed in TR-4. The following three standard-grade hydrostatic ratings are required. 200 degrees F (93 degrees C) at 80 psi (551 kPa) 180 degrees F (82 degrees C) at 100 psi (689 kPa) 73.4 degrees F (23 degrees C) at 160 psi (1102 kPa)
- C. Performance Requirements: Provide hydronic radiant floor heating system that is manufactured, fabricated and installed to comply with regulatory agencies and authorities with jurisdiction, and maintain performance criteria stated by the PEX tubing manufacturer without defects, damage or failure.
  - 1. Show compliance with ASTM F877.
  - 2. Show compliance with DIN 4726 regarding oxygen diffusion concerns where applicable.
  - 3. Show compliance with ASTM E119 and ANSI/UL 263 through certification listings with
  - 4. Underwriters Laboratories, Inc. (UL).

# D. HYDRONIC RADIANT FLOOR TUBING

Material: Crosslinked polyethylene (PEX) manufactured by PEX-a or Engle method

- 1. Material Standard: Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third-party agency.
- 2. Pressure Ratings: Standard Grade hydrostatic design and pressure ratings as issued by the
- 3. Plastics Pipe Institute (PPI), a division of the Society of the Plastics Industry (SPI).
- 4. Show compliance with ASTM E119 and ANSI/UL 263 through certification listings through
- 5. Minimum Bend Radius (Cold Bending): No less than six times the outside diameter. Use the PEX tubing manufacturer's bend supports if radius is less than stated.
- 6. Barrier Tubing Type: Tubing with an oxygen diffusion barrier does not exceed an oxygen diffusion rate of 0.10 grams per cubic meter per day at 104 degrees F (40 degrees C) water temperature in accordance with German DIN 4726.
- 7. Nominal Inside Diameter: Provide tubing with nominal inside diameter in accordance with ASTM F876, as indicated.
- 8. Manufacturer: Wirsbo hePEX™ plus as design basis; approved equal will be accepted.

### E. MANIFOLDS

Manifolds: Light commercial, valved copper manifolds.

- 1. For system compatibility, use 11/4-inch copper type 'L' manifolds offered by the respective PEX tubing manufacturer.
- 2. Use manifold mounting brackets offered by the respective PEX tubing manufacturer.
- 3. Manifolds must provide individual flow control for each loop of the manifold through valve actuators available from the manifold supplier.
- 4. Manifolds must feature manual flow balancing capability within the manifold body for balancing unequal loop lengths across the manifold.
- 5. Manifolds support 5/16 inch to 3/4 inch PEX tubing.
- 6. Each manifold location should have the ability to vent air manually from the system.
- 7. Install valved copper manifolds primarily for wall-hung or boxed applications.
- 8. Use manifolds with an isolation valve or a combination isolation and balancing valve on each outlet.
- 9. Ensure manifold end cap offers tapping for ¼ inch FNPT and ½ inch FNPT for vent and drain.

- 10. Install supply and return piping to the manifold in a reverse-return configuration to ensure self-balancing.
- 11. If the supply and return piping is in direct-return configuration, install and balance flow setters on the return leg of each manifold to the mains.

#### F. FITTINGS

For system compatibility, use fittings offered by the PEX tubing manufacturer. The fitting assembly must comply with ASTM F877 and CAN/CSA B137.5 requirements.

- 1. Use compression fittings or pro-pex expansion fittings as applicable.
- 2. Compression Fittings: Fitting assembly manufactured from brass material. The fitting assembly consists of a barbed insert, a compression ring and a compression nut. The barbed insert is manufactured with an o-ring to facilitate air pressure testing.
- 3. Pro-pex Fittings: Fittings manufactured in accordance with ASTM F1960. Fitting assembly manufactured from material listed in paragraph 5.1 of ASTM F1960. The fitting assembly nsists of a barbed adapter and an applicable sized PEX ring. The barbed insert may include o-ring to facilitate pressure testing with air.

### 2.07 TEMPERATURE CONTROLS

A. This Contractor shall be responsible for all automatic electric controls for HVAC equipment as indicated on the plans and as specified in Section 23 09 00 Temperature Controls.

#### **PART 3 - EXECUTION**

#### 3.01 JOB CONDITIONS

- A. Examine and check conditions at the actual job site and determine facilities for delivery, storing and handling of materials and equipment.
- B. Drawings show approximate locations of equipment, verify exact locations.
- C. Cooperate as necessary with other trades in order that all systems in the work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

#### 3.02 DUCTWORK INSTALLATION

- A. Ducts shall be constructed, supported and installed in accordance with the latest low pressure duct standards of SMACNA. Install all turning vanes, access doors, extractors, and accessories as indicated or specified herein.
- B. Fabricate and install all ductwork to be air tight in accordance with SMACNA Class B, seal. Evident air leaks in the ductwork shall be sealed.
- C. Seal exposed outside ductwork joints water tight with mastic sealant.
- D. Install all motor operated dampers per manufacturer's instructions in accordance with control sequence intended.

### 3.03 INSTALLATION OF EQUIPMENT

A. <u>Locations:</u> Install all equipment in the locations shown on the Drawings, except where specifically otherwise approved on the job by the Owner.

- B. All equipment, as called for on the drawings and herein specified, shall be installed in strict accordance with manufacturer's recommendations.
- C. <u>Interferences:</u> Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passageways.
- D. <u>Inspection:</u> Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

### 3.04 RADIANT FLOOR INSTALLATION

# A. SLAB-ON-GRADE INSTALLATION:

Fasten the tubing to the flat mesh or reinforcing bar in accordance with the PEX tubing manufacturer's installation recommendations.

1. Use closer tubing on-center distances along exterior walls. Increase tubing on-center distances as the installation moves away from the exterior wall.

2. Do not install tubing within 3 inches (152mm) of all exterior or interior walls.

3. When using high-density board insulation, staple the tubing to the insulation board with Foam Staples.

4. Use edge insulation when the heated panel directly contacts an exterior wall or panel.

5. Install tubing at a consistent depth below the surface elevation as determined by the project engineer.

6. Ensure sufficient clearance to avoid control joint cuts.

- 7. In areas where tubing must cross metal expansion joints in the concrete, ensure the tubing passes below the joints. Depending on the manufacturer's and structural engineer's recommendation, fibrous expansion joints may tolerate penetration.
- 8. For tubing that exits the slab in a 90-degree bend, use metal or PVC bend supports.

### B. PIPING SYSTEM LEAK TESTS

Verify that the piping system being tested is fully connected to all components and that all equipment is properly installed, wired, and ready for operation.

1. For hydrostatic tests, use clean water and remove all air from the piping being tested by means of air vents or loosening of flanges/unions. Measure and record test pressure at the high point in the system.

2. For air tests, gradually increase the pressure to not more than one half of the test pressure; then increase the pressure in steps of approximately one-tenth of the test pressure until the

required test pressure is reached.

3. Examine all joints and connections with a soap bubble solution or equivalent method. The piping system exclusive of possible localized instances at pump or valve packing shall show no evidence of leaking. After testing is complete, slowly release the pressure in a safe manner.

4. <u>System Pressure</u> Medium Duration
Radiant Floor Water System 100 psig Water 8 hr

# 3.05 TESTING, ADJUSTING, AND BALANCING

- A. Provide all necessary personnel, equipment, and services and perform all tests necessary to demonstrate the integrity of the completed installation to the approval of the Owner and Architect. The air system shall be tested, adjusted and balanced in accordance with the latest edition of the Associated Air Balance Council (AABC) Procedural Standards or equivalent by an independent TAB Contractor. TAB work by HVAC Contractor shall not be accepted.
- B. Submit three (3) certified copies of the final report to Architect on applicable AABC reporting forms or equivalent for approval.

- 1. Air volume at exhaust inlets;
- 2. Air volume at each fan unit for exhaust air;
- 3. Static pressure drops at fan assemblies;
- 4. Record fan speed, RPM, motor nameplates and amperage/voltage;
- 5. Report all equipment model #'s and related drawing identification on the TAB report;
- C. Upon completion of TAB work, mark equipment settings, including damper control levers, and similar devices to indicate final settings. Plug all holes in insulation, ductwork and housings with acceptable test plugs.
- D. Eliminate noise and vibration and assure proper function of all controls, maintenance of temperature, and operation with the approved design.

### 3.06 CLEANING

- A. <u>Ductwork:</u> After the ductwork has been tested and proved tight, thoroughly vacuum and clean all components of the ductwork. Remove all dirt, scale, oil and other foreign substances which may have accumulated during the installation process.
- B. <u>Equipment:</u> After the equipment has been started and proved operational, carefully clean all accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease and other foreign substances.

#### 3.07 LUBRICATION

- A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.
- B. Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.
- C. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

### 3.08 INSTRUCTIONS

- A. Instruct owner's representative in the operation and maintenance of all mechanical systems.
- B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment installed under this contract. Prepare in bound copies with index tabs. Information must include parts list and wiring diagrams. Submit to Architect for presentation to the Owner.

#### 3.09 CLOSEOUT OPERATIONS

- A. Refer to Division 1 for additional project closeout requirements.
- B. <u>Closeout Equipment/System Operations:</u> Sequence operations properly so that work of the project will not be damaged or endangered. Coordinate with seasonal requirements.
  - 1. Operate each item of equipment and each system in a test run of appropriate duration with the Owner's operating personnel present to demonstrate sustained, satisfactory performance.
  - Adjust and correct operations as required for proper performance.
  - 3. Clean and lubricate each system, and replace dirty filters, especially worn belts and parts and similar expandable items of the work.

- C. <u>Instruction, O&M:</u> Instruct Owner (Owner's personnel) in the proper operation and maintenance of the HVAC systems. Train personnel in the setting and scheduling of programmable thermostats for occupied/unoccupied periods.
- D. <u>Service Organization:</u> At time of substantial completion, Contractor shall provide Owner with a listing of qualified service organizations (including addresses and telephone numbers) for each piece of major equipment.
- E. <u>Turn-Over of Operations:</u> At time of substantial completion, turn over the prime responsibility for operation of HVAC equipment and systems to the Owner's operating personnel. However, during the guarantee period, provide and operating engineer, who is completely familiar with work, to consult with and continue training the Owner's personnel on an as-needed basis.

**END OF SECTION** 

#### **SECTION 23 09 00 - TEMPERATURE CONTROLS**

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

#### A. Work Includes:

- 1. Complete system of Direct Digital Automatic controls system.
- 2. Complete integration into existing Honeywell WebsAX network at Goodman Parks Adminstration Building
- 3 Electrical control system.
- 4 Control devices, components, wiring and material.
- 5 Instructions for users.

#### 1.2 DESCRIPTION OF WORK

- A. Extent of controls and instrumentation work is indicated on drawings and schedules and by requirements of this section. The Temperature Controls shall be standalone at this time with provisions for future incorporation with a building wide new DDC control system.
- B. Control system shall schedule exhaust fan EF-1 based on occupied schedule.
- C. Control system shall modulate radiant floor slab temperature with 3-way hot water valve based on outside air temperature and start-stop radiant floor pump.
- D. Motorized dampers for exhaust fans shall be supplied by the HVAC Contractor and interlocked with the fan operation using line voltage wiring. The wiring interlock is the responsibility of the Electrical Contractor.
- E. Instruction of Owner's personnel.

#### 1.3 RELATED WORK

- A. Applicable provisions of Division 1 shall govern work under this section.
- B. Specified Elsewhere:

1.	23 00 00	HVAC
2.	26 00 00	Flectrical

# 1.4 QUALITY ASSURANCE

### A. Regulatory Requirements:

- 1. National Electrical Code, NEC
- 2. National Electrical Manufacturers Association, NEMA
- 3. Underwriter's Laboratories, UL
- B. All equipment provided, including control panels, dampers, valves, controllers, transmitters, sensors and other control devices shall bear the manufacturer's nameplate.
- C. Entire control system including piping and wiring shall be installed by mechanics specifically authorized by the Temperature Control equipment manufacturer for the installation and having acceptable experience installing and servicing similar control equipment.

# D. <u>Acceptable Manufacturers/Contractor:</u>

- 1. Honeywell XL5000/WebsAX Network
- E. <u>Authorized Controls Integrator</u>: The control contractor shall be a Honeywell ACI Authorized Integrator.
- F. <u>Guarantee:</u> Guarantee the controls and instrumentation to maintain the temperature within one degree of the setpoint and further guarantee all work, materials, equipment, and controls against defects in workmanship and material, and provide service for a period of one (1) year from date of final acceptance.

#### 1.5 SUBMITTALS

### A. Shop Drawings:

- 1. Schematic control diagrams giving specific data on all settings, ranges, action, adjustments, and normal positions.
- 2. Wiring diagrams detailed adequately for field construction and include all related wiring.
- 3. Control valve and damper schedules with complete sizing data giving required design flow and temperature or pressure, and any other pertinent data.
- 4. Sequence of operation for each system corresponding to control schematics.
- 5. Panel drawings including complete internal wiring and piping schematics and complete data on all mounted components.
- 6. Damper operator schedule, listing quantity, size of operators and mounting arrangement.
- 7. Space thermostat sensor schedule indicating types of covers and adjustment means for each space.

### B. <u>Control Diagrams:</u>

- 1. Furnish and mount in each equipment room or space prints of schematic control diagrams and corresponding sequences of operation for all systems located therein.
- 2. Diagrams and sequences mounted in frames under clear plastic and located in easily visible location or as directed by A/E.

#### C. Product Data:

- 1. Submit published descriptive data on each item of equipment and accessories.
- 2. Submit manufacturer's installation instructions.

### D. Report:

- 1. At completion of work, submit report of check-out of automatic control system.
- 2. Report actual setpoints with record drawings.

#### 1.6 CALIBRATION AND ADJUSTMENTS

- A. After completion of the installation, perform final calibrations and adjustments of the control equipment provided under this contract and supply services incidental to the proper performance of the automatic control system under warranty.
- B. Submit letter to Engineer indicating all controls are calibrated and operating per sequence of control.

# 1.7 SYSTEM START-UP AND ACCEPTANCE PROCEDURE

A. Upon completion of the calibration, the Control Contractor shall start up the system and perform all necessary testing and run diagnostic tests to ensure proper operation. Control Contractor shall be

responsible for generating all software and entering all database necessary to perform the sequence of control and specified software routines. An acceptance test in the presence of the Owner's representative or engineer shall be performed.

#### 1.8 OWNER TRAINING

- A. Provide sufficient but not less than 2 hours of training to the Owner's representatives, concerning the proper operation and maintenance of all control systems, sensing, monitoring and control equipment. Training sessions shall be conducted during normal business hours after system start-up and acceptance by the Owner.
- B. Submit operating and maintenance manuals to Owner a minimum of five (5) working days prior to training session. Use these manuals as the basis for instruction at all training sessions.

### 1.9 DELIVERY, STORAGE AND HANDLING

- A. Factory shipping cartons for each piece of equipment.
- B. Factory-applied plastic end caps on each length of pipe and tube.
- C. Maintain cartons and end caps through shipping, storage and handling as required to prevent equipment and pipe-end damage, and to eliminate dirt and moisture from equipment and inside of pipe and tube.
- D. Where possible, store equipment and materials inside and protected from weather.
- E. When necessary to store outside, elevate well above grade and enclose with durable waterproof wrapping.

#### PART 2 - PRODUCTS

#### 2.1 SYSTEM REQUIREMENTS

- A. Provide complete control systems consisting of thermostats, sensors, control valves, dampers, operators, indicating devices, interface equipment, and other apparatus required to operate mechanical system and to perform functions specified and in compliance with the sequence of operations described herein.
- B. Provide necessary materials, labor and field work necessary to connect control components factory supplied as part of equipment controlled.

# 2.2 COORDINATION OF TEMPERATURE CONTROL WORK

- A. <u>Electric Wiring:</u> All electric wiring in connection with the automatic temperature control system shall be furnished and installed by the Controls Trade, except for equipment starter interlocks, which are the responsibility of the Electrical Trade.
  - 1. All 120 (line) volt or larger electrical service wiring and connections to equipment and motor starters is the responsibility of the Electrical Trade.
  - All additional line voltage power requirements beyond which is indicated on the Drawings and Specifications for the temperature control system shall be the responsibility of the Controls Trade.
- B. Valves and Piping Wells: Furnish by Controls Trade, installed by HVAC Trade under supervision.

C. <u>Dampers, Valves, Actuators and related Controlled Devices:</u> Furnished by Controls Trade, installed by HVAC Trade under supervision.

#### 2.3 CONTROL PANELS

- A. Provide local panels of unitized cabinet type for each system under automatic control. Mount relays, switches, and controllers with control point adjustment in cabinet and temperature indicators, pressure gages, pilot lights, push buttons, and clocks and switches flush on cabinet panel face. All components within the control panels shall be prewired to numbered terminal strips, ready for field connection to field-mounted control components.
- B. Control panels shall be constructed of steel or extruded aluminum with hinged door and keyed lock, with baked enamel finish of manufacturer's standard color.
- C. Panel mounted indicators or thermometers shall indicate the temperature sensed by each remote built sensor as shown or as required. Indicators or thermometers shall be 3-1/2" in diameter and have an accuracy of 1% of scale range.
- D. Mount panels adjacent to associated equipment on vibration free walls or free standing steel angle supports. One cabinet may accommodate more than system in same equipment room. Provide engraved plastic name plates for instruments and controls inside cabinet and on cabinet face.

#### 2.4 ELECTRICAL EQUIPMENT REQUIREMENTS

A. Provide electrical devices and relays that are UL listed and of a type meeting current and voltage characteristics of the project.

#### 2.5 SENSORS/TRANSMITTERS

- A. <u>Temperature Sensors (Room):</u> Use a surface mount zone temperature sensor housed in a durable, ventilated plastic wall-mount enclosure, with broad aluminum faceplate. The sensing element to be a 1,000 ohm RTD (nickel or silicon) 0-10 VDC, or 4-20 MA accuracy +/- 1/2% span.
  - 1. Tamperproof locking covers and concealed adjustment in public areas.
- B. <u>Temperature Sensors (Slab):</u> Use a surface mount duct temperature sensor housed in EMT metal conduit imbedded in concrete slab. The sensing element to be a 10,000 ohm RTD (nickel or silicon) 0-10 VDC, or 4-20 MA. Accuracy +/- 1/2% span.

#### 2.6 APPLICATION SPECIFIC CONTROLLERS - HVAC APPLICATIONS

- A. Each Digital Panel shall be able to extend its performance and capacity through the use of standalone Application Specific Controllers (ASCs).
- B. Each ASC shall operate as a standalone controller capable of performing its specific control responsibilities independently of other controllers in the network. Each ASC shall be of microprocessor-based, multi-tasking, real-time digital control processor.
- C. Each ASC shall have sufficient memory to support its own operating system and data bases including:
  - Control Processes
  - 2. Energy Management Applications
  - 3. Operator I/O (Portable Service Terminal)
- D. The operator interface to any ASC point data or programs shall be through the Digital Panel or portable operator's terminal connected to any ASC on the network.

- E. ASCs shall directly support the temporary use of a portable service terminal that can be connected to the ASC via zone temperature or directly at the controller. The capabilities of the portable service terminal shall include, but not be limited to, the following:
  - 1. Display temperatures
  - 2. Display status
  - 3. Display setpoints
  - 4. Display control parameters
  - 5. Override binary output control
  - 6. Override analog setpoints
  - 7. Modification of gain and offset constants
- F. <u>Powerfail Protection</u>: All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the ASC.
- G. Application Descriptions:
  - 1. <u>Unitary Controllers:</u>
    - a. Unitary Controllers shall support, but not be limited to, the following types of systems to address specific applications described in the "Execution" portion of this specification, and for future expansion:
      - 1.) Unit Vents (ASHRAE Cycle I., II, III, or W)
      - 2.) Heat Pumps (Air-to-Air, Water-to-Air)
      - 3.) Packaged Rooftops
      - 4.) Fan Coils (Two-Pipe, Four-Pipe)
      - 5.) Generic Point Multiplexing
    - b. Unitary Controllers shall support the following types of point inputs and outputs:
      - 1.) <u>Economizer Switchover Inputs</u>
        - a.) Drybulb
        - b.) Outdoor Air Enthalpy
        - c.) Differential Temperature
        - d.) Binary Input from a separate controller
      - 2.) Economizer Outputs
        - a.) Integrated Analog with minimum position
        - b.) Binary Output to enable self-contained
        - c.) Economizer Actuator
      - 3.) Heating and Cooling Outputs
        - a.) 1 to 3 Stages
        - b.) Analog Output with two-pipe logic
        - c.) Reversing valve logic for Heat Pumps
      - 4.) Fan Output
        - a.) On/Off Logic Control
    - c. Unitary controllers shall support the following library of control strategies to address the requirements of the sequences described in the "Execution" portion of this specification, and for future expansion:
      - 1.) Daily Schedules
      - 2.) Comfort/Occupancy Mode
      - 3.) Economy Mode:

Standby Mode/Economizer Available Unoccupied/Economizer Not Available Shutdown

- 4.) Temporary Override Mode:
  Temporary Comfort Mode (Occupancy-Based Control)
  Boost (Occupant Warmer/Cooler Control)
- d. <u>Alarm Management:</u> Each VAV Terminal Unit Controller shall perform its own limit and status monitoring and analysis to maximize network performance by reducing unnecessary communications.

#### 2.7 CONTROL SEQUENCE

- A. Systems shall perform in accordance with the following descriptions of the control strategy intent.
- B. BAS = Building Automation System (DDC Controls).

### C. RADIANT FLOOR

System consists of a radiant floor manifold and pump with 3-way valve and slab temperature controller with remote sensor in slab and space sensor.

- 1. Controller shall start radiant slab pump P-RP1 and run continuous during the heating season(ambient temperatures less than 50 deg F)
- 2. Controller shall modulate 3-valve to maintain setpoint slab temperature as reset by outside air temperature(adj.) and space sensor.
  - a. Reset Schedule: Ambient air temp = 0 deg F; Slab temp = 80 deg F. Ambient air temp = 50 deg F; Slab temp = 70 deg F.
  - b. Space Sensor shall reset slab temperature setpoint upon a deviation from setpoint (70 deg F) at 1 deg F slab temperature per 1 deg F space temperature offset.

# D. EXHAUST FAN EF-13.

- 1. Controller shall start and stop exhaust fan EF-13 with occupied schedule for building.
- 2. Motorized damper shall open with fan interlock(120 volt).

### 2.8 DDC POINT LIST

POINT DESCRIPTION	TYPE	OPERATION SCHEDULE	ALARM	FIELD DEVICE
EF-13 EXHAUST FAN EF-13 EXHAUST FAN P-RP1 RAD PUMP P-RP1 RAD PUMP RP MIXING VALVE SLAB SENSOR SPACE SENSOR AMBIENT SENSOR HWS - RP HWR - RP	BINARY OUTPUT BINARY INPUT BINARY OUTPUT BINARY INPUT ANALOG OUTPUT ANALOG INPUT	START/STOP STATUS START/STOP STATUS MODULATE TEMP TEMP TEMP TEMP TEMP TEMP	FLOW FAIL FLOW FAIL HIGH/LOW HIGH/LOW HIGH/LOW HIGH/LOW HIGH/LOW	RELAY CURRENT SENSOR RELAY CURRENT SENSOR 3-WAY VALVE SLAB SENSOR SPACE SENSOR AMBIENT SENSOR HWS SENSOR

### **PART 3 - EXECUTION**

#### 3.1 GENERAL

- A. Install all control equipment, wiring and air piping in a neat and workmanlike manner.
- B. All immersion wells, pressure tappings and any associated shut-off valves, flow switches, level switches and other such items furnished by the control manufacturer shall be installed by the mechanical contractor under the coordinating control and supervision of the control contractor.
- C. Install all control devices in an accessible location.
- D. <u>Electrical Wiring:</u> All electrical wiring for the automatic control system, excluding line voltage power to control panels, as indicated on the Drawings, shall be furnished and installed by the Temperature Control Contractor in accordance with this specification section. All the electrical sections of this specification and all applicable electric codes shall apply to the required work.
  - 1. Sensor and/or control wiring shall be provided with conduit independent of those used for high voltage, switches AC or other signals which may create interference or cause induced voltages which promote signal drift or reduced accuracy. Sensor and high voltage wiring may not be run in the same conduit.

#### 3.2 INSTALLATION

- A. Check and verify location of thermostats, room sensors and other exposed control sensors with plans and piping details before installation. Locate thermostats and sensors 60 inches above floor.
  - 1. Isolated from exterior walls as recommended by manufacturer.
  - 2. Located where not exposed to direct rays of sun, and where not influenced by concealed or adjacent heating, domestic hot water piping or warm air currents.
- B. Valve tops, inserts or bonnets, sensors, thermostats, thermometers, gauges, and damper motors of all types:
  - 1. Provide with access doors and/or access panels, in building construction so that they may be readily removed, replaced and serviced.
  - 2. Access doors and access panels by HVAC Contractor.

# C. Control Wiring of all Kinds:

- 1. All control wiring to be labeled at both ends identifying termination and origination point.
- 2. In conduit and included with temperature control system.
- 3. Concealed low voltage control wiring may be routed as cabling.
- Exposed control wiring shall be in EMT conduit.
- 5. Conforming to all requirements of Electrical Specifications, Division 16.
- D. Locate controls, relays, instruments, switches, valves, devices and accessories so they are readily accessible for adjustment, service, and replacement or as indicated on the drawings.
- E. Install control valves horizontal with power unit up unless otherwise indicated. Maximum variation from vertical is 45 degrees.
- F. Locate, size and support temperature sensing elements in water streams to properly sense the representative temperature.

- 1. For controlling, transmitting and indicating elements, sensing device located, sized and of the type to sense the average condition.
- 2. Wells shall not obstruct the flow of the fluid being measure.
- 3. Pipes 1" and smaller shall be increased at least one pipe size at point of insertion.
- G. Where insulation on piping, ductwork or equipment is punctured or penetrated due to the installation of sensing elements or tubing, reseal the openings air and vapor tight.
- H. Where control devices are to be located on insulated surfaces, provide brackets to clear the finished surface of the insulation avoiding punctures of the vapor seal.
- Locate support, enclose and install control devices and equipment so that they will not be subject to:
  - 1. Vibration
  - 2. Excessive temperatures
  - 3. Dirt, moisture or other harmful effects.
  - 4. Conditions beyond their rated limitations.
- J. Conceal all piping except piping in mechanical rooms and other areas where mechanical system piping may be exposed.
- K. Install all exposed piping and conduit parallel to or at right angles to the building structure and support adequately at uniform intervals. Use only tool made bends.
- L. Make tests on piping from time to time during the progress of installation to insure against leaks.

# 3.3 TESTING, ADJUSTING AND PERFORMANCE DEMONSTRATIONS

- A. All controlling devices which are a part of the automatic temperature control system, shall be tested and adjusted by the Contractor before system is offered for final acceptance.
  - 1. All associated devices, valves, operators and dampers adjusted.
  - 2. All operating and positioning of all dampers verified.
- B. After all calibrations, adjustment and checking have been completed and all systems are operational:
  - 1. Demonstrate to User's representative, the complete and correct functioning of all control systems and equipment.
  - 2. Demonstrations shall consist of operating the controls through their normal full ranges and sequences.
  - 3. Simulate abnormal conditions to demonstrate proper functioning of safety devices.
  - 4. Readjust all settings to their correct design values and after sufficient time, observe ability of controls to establish the desired conditions, noting any abnormal deviations.
  - 5. Make any necessary repairs, replacements or adjustments on all items which fail to perform satisfactorily, all to the satisfaction of the Owner's representative.
- C. Upon completion of the work and testing, but prior to final acceptance:
  - 1. A representative of the control system manufacturer shall spend such length of time as necessary to instruct the Owner's personnel in proper operation, adjustment and maintenance of the control equipment and systems.
  - 2. Instruction shall be performed by competent, trained, full-time employees of the control system manufacturer who have a complete working knowledge of the systems and equipment installed in this job.

### **END OF SECTION**

#### **SECTION 16400 - ELECTRICAL**

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. <u>Work Included:</u> Provide complete electrical service and distribution system with equipment and materials where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
  - 1. Branch circuit wiring, for lighting, receptacles, motors and equipment.

2. Lighting fixtures and lamps.

- 3. Wiring system for equipment and controls provided under other Sections of these specifications including, but not necessarily limited to, General Construction, Plumbing and HVAC trades.
- Motor starters and controls for motors provided under the Electrical trade, and motor starters and controls provided by the General Construction, Plumbing and HVAC trades for related equipment.
- 5. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and equipment.

6. Lighting Control System.

7. Other items and services required to complete the electrical systems.

#### B. Related Work:

- 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications;
- 2. Equipment structural supports, etc.;
- 3. All line voltage control wiring and starter interlocks, where specified;
- 4. Final equipment electrical connections.

### C. Work of Other Sections:

 Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC trades.

### 1.02 GENERAL PROVISIONS

- A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.
- B. In addition to the electrical plans, see General Plans of the building, as all electrical work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, the said work detailed on the electrical plans.

#### 1.03 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 methods needed for proper performance of the work of this Section.
- B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of this Section in accordance with the requirements of governmental agencies having

jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. <u>Reference Standard:</u> The following standards are imposed, as applicable to the work:

ASTM

American Society of Testing and Materials

NEC

National Electrical Code

NEMA

National Electrical Manufacturers Association

NFPA

National Fire Protection Association

UL

Underwriters Laboratories

#### 1.04 CODES AND PERMITS

- A. The Contractor must comply with national, state of Wisconsin and city of Madison building and electrical codes and other ordinances in force where the building is located as far as same apply to his work.
- B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the requirements of these Specifications.
- C. One (1) copy of all permits must be furnished to the Owner.
- D. <u>Electric Service Fee:</u> Electrical Contractor shall secure and pay all fees for new electrical service from electric utility, including temporary power services.

### 1.05 COORDINATION

- A. Cooperate and coordinate with other trades to assure that all systems in the electrical work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.
- B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel with primary lines of building construction.
- C. Locate operating and control equipment properly to provide easy access, and install entire electrical systems with adequate access for operation and maintenance.
- D. Give right-of-way to piping which must slope for drainage.

#### 1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK

- A. <u>Line Voltage Wiring:</u> The Electrical Contractor shall make all line voltage (100 volts and greater) electrical wiring, final connections and motor wiring for Mechanical equipment.
- B. <u>Control Wiring:</u> Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical work shall be by the Mechanical Contractor in strict accordance with the applicable sections of the Electrical Specifications.
- C. <u>Motors, Starters, and Disconnects:</u> All motors starter and disconnects shall be provided by the Electrical Contractor, unless provided with the equipment or indicated otherwise.
  - 1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and requirements for electrical connections, along with wiring diagrams.

#### 1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS

- A. The General Contractor will be required to leave openings in new construction ceiling, floors, walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the Drawings.

  The Electrical Contractor is responsible for correct size and location of openings.
- B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings and partitions are to be made in advance of construction of such parts of the building.
- The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the Drawings.
- D. Pack annular space between sleeves and conduit with fiberglass insulation and seal with caulk. Where penetrations through fire rated walls or floors, fill space with fire-resistive insulation similar to US Gypsum Thermafiber batts. Seal openings with UL approved fire-stopping sealant/caulk.

#### 1.08 CUTTING AND PATCHING

- A. <u>General:</u> Refer to Division 1 General Requirements.
- B. Perform all cutting and patching required for complete installation of the Electrical systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
  - All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.
- C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.
  - 1. All patching work in existing areas shall match existing work in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

### 1.09 TRENCHING AND BACKFILLING

- A. Comply with pertinent provisions of Division 1.
- B. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of the Specifications.

#### 1.10 SUBMITTALS

- A. Comply with pertinent provisions of Division 1.
- B. <u>Shop Drawing Submittals:</u> Submit six (6) copies of shop drawings to the Architect for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:
  - 1. Starters and Disconnects.
  - 2. Light Fixtures.
  - 3. Electrical Devices.
  - 4. Lighting Controls.
- C. Shop Drawings:

- 1. The Electrical Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the electrical work without approved shop drawings that have the Architect/Engineers final approval.
- 2. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities. Incomplete drawings will be disapproved.
- 3. This Contractor will be responsible for all figures, quantities and dimensions shown on the shop drawings.
- 4. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from responsibility of resubmitting equipment that will meet the space requirements.
- D. <u>O & M Manual:</u> Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Division 1 of these Specifications. Include the following within the bound O&M manual:
  - 1. Copy of the approved Record Documents for this portion of the Work;
  - 2. Copies of all circuit directories;
  - 3. Copies of all warranties and guaranties.
  - 4. As-built drawings.
- E. <u>As-built Drawings:</u> Record installation as-built on a set of blueline prints during construction. Plan shall represent actual locations, materials and circuiting of equipment installed.

#### 1.11 PRODUCT HANDLING

A. Comply with pertinent provisions of Division 1.

#### 1.12 WARRANTY

A. In addition to standard one year warranty on all labor and materials, provide an additional warranty on ballasts for all new fluorescent and HID lighting fixtures as specified.

#### 1.13 HOUSEKEEPING AND CLEAN-UP

A. Periodically as work progresses and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

#### 1.14 TEMPORARY SERVICES

- A. This Contractor shall provide temporary lighting and power as required throughout the construction period.
- B. Arrange for temporary electrical utility with local electrical utility. Electrical Contractor shall pay all temporary electrical service and usage fees.

#### PART 2 - PRODUCTS

### 2.01 GENERAL

A. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.

#### 2.02 GROUNDING SYSTEM

- A. Ground all equipment, including switches, transformers, conduit systems, motors, and other apparatus, by conduit or conductor to cold water main and to independent electrode, using ground clamps manufactured by Burndy or T&B, and approved by the Engineer.
- B. Provide new service ground. Add additional ground rods and water service grounding electrodes, as required.
- C. Provide grounding conductor from service ground to solid ground buss bar at all distribution panelboards.
- D. Provide grounding jumper from electrical devices to the metallic device boxes.
- E. Surge suppression receptacles(isolated ground) and GFI receptacles shall be provided with separate insulated ground wire conductor to the main service ground bar.
- F. Ground all motor and equipment connections with dedicated ground conductor.

#### 2.03 IDENTIFICATION

- A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following junction and pull boxes shall be identified using a coded system. Coding shall be submitted to Engineer for approval.
  - 1. Light and Power 120/208V.
  - 2. Fire Alarm System.
- B. Label circuit numbers for all accessible line voltage power distribution raceways and junction boxes.
- C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.
  - 1. Each section of main distribution switchboards and panelboards. Mount one next to each protection device to identify load served by each circuit breaker.
  - 2. Each contactor, time switch, metering cabinet, starter, motor disconnect switch. In Equipment and Mechanical Rooms this identification may be on the exterior of unit, in other areas identification shall be inside door or cover.
  - 3. Each feeder at all accessible locations, i.e., panels, junction boxes, pull boxes, etc. (strap plate to feeder conductors in junction boxes or pull boxes).
  - 4. Each end of empty conduit runs to indicate the intended use of the conduit and the location of opposite end. Use room numbers that are permanently assigned.
- D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel frame with plastic cover contained on the inside of panel door. These directories shall indicate load served and rooms served by each protective device in the respective panel.
- E. Identify all conductors per NEC:

120/208V

-Phase A - Black

-Phase B - Red

-Phase C - Blue

-Neutral - White

-Ground - Green

-Isolated Ground - Green with yellow stripe

#### 2.04 POWER DISTRIBUTION SYSTEM

- A. See plans for panelboard capacity, voltage ratings, and branch circuit breaker units.
  - 1. Provide sub-feed lugs and circuit breakers where indicated.
- B. All panelboards to be of the circuit breaker type with plug-on circuit breakers.
- C. Branch circuit breakers shall be thermal magnetic; quick-make and quick break. Multi-pole breakers to have common trip. Handle ties of any sort not allowed.
- D. Panelboards shall be Square "D" type NQOD with bolt-on branch circuit breakers, 10,000 Amp I.C.
- E. Each panel shall be provided with a typewritten directory mounted on inside of panel door and covered with clear plastic. This directory shall indicate the load supplied by each branch circuit breaker in panel. Room numbers shall be actual room numbers.
- F. Each panelboard shall be securely attached to the building structure on 3/4" AC plywood backer board with non-metallic painted surface.
- G. All panelboards shall be equipped with an equipment grounding bar that is separate from the solid neutral bar.

#### 2.05 WIRING DEVICES

### A. General:

- 1. Devices shall be provided at each location shown on the plans or called for in the Specifications.
- 2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour, Hubbell or General Electric.
- 3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.

#### B. Receptacles:

- 1. <u>Duplex Receptacles:</u> Industrial-specification grade, nylon face and base, ivory color, NEMA 5-15R, 15A, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Equal to Leviton 5262-W. Use of self-grounding option not permitted.
- 2. <u>GFCI Receptacle:</u> Specification grade, NEMA 5-15R, 15A with indicator light and feed through. Equal to Leviton 6598-W.

### C. Switches:

- 1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade ivory color.
- 2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
- 3. Switches to be back and side wired, silent or quiet type.
- 4. The following catalog numbers refer to Leviton, Inc.:
  - a. single pole 1221-2W
  - b. three way 1223-2W
  - c. four way 1224-2W
  - d. Single pole with pilot light 1221-PLR

# D. Plates:

1. Provide as required for each outlet, single or multiple gang.

- 2. Provide blank covers on all empty boxes or outlets.
- 3. Plates shall be 204 stainless steel construction in all finished areas.
- 4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.
- 5. Provide single gang die-cast weather resistant covers equal to Leviton 6196-V on receptacles in damp areas and exterior locations.

#### 2.06 RACEWAY SYSTEM

- A. <u>Steel Conduit:</u> Galvanized or sheradized steel intermediate or rigid metal conduit, or electrical metallic tubing (EMT) with steel compression ring type fittings.
  - 1. Provide steel conduits concealed in the walls, above the ceilings, or exposed in the work areas
  - 2. Indented or cast fittings are not acceptable.
  - 3. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel conduit, or PVC coated steel conduit is acceptable.
- B. Rigid Non-Metallic Conduit: Schedule 80 PVC with solvent welded fittings.
  - 1. Below grade installation only.
  - 2. Encase in concrete below drives and roadways.
- C. <u>Outlets, Junction Boxes and Switch Boxes:</u>
  - 1. Provide standard one-piece units, galvanized or sheradized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires without crowding.
  - 2. Provide deep boxes with 1" and larger conduit.
  - 3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.
  - 4. For switches and receptacles, provide boxes 4" square by 1 1/2" deep minimum with rings and covers as required.
- D. For pull boxes, provide galvanized code-gauge sheet units with screw-on covers, of size and shape required to accommodate wires without crowding and to suit the location.
- E. Provide sleeves and chases where conduits pass through floors and walls.

### 2.07 CONDUCTORS

- A. <u>Wire and Cable (600 Volt):</u> Provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by governmental agencies having jurisdiction. Use only copper wires and cables.
  - 1. With conductors No. 4 and larger, provide insulating bushings.
  - 2. Wire and cable shall be TW, THW, THHN, THWN.
  - 3. Branch circuit wiring installed in wiring channels of continuous row-mounted fixtures shall be provided. UL listed type RHH or other approved 90 degree C wires, rated at 600 V.
  - 4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be stranded wire.
  - 5. Wire in conduits subjected to direct sunlight shall be THWN or RHWN.
  - 6. Identify feeder neutrals with white tape or white paint.

# 2.08 LIGHTING FIXTURES

A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.

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## B. Fluorescent Fixtures:

1. Provide ballasts thermally protected against over-heating by built-in thermal protectors sensitive to ballast winding temperature and current.

2. Provide protector preventing winding temperature from exceeding 120 degrees C, allowing winding temperatures to reach 105 degrees C under normal operating conditions at 40 degrees C ambient and, after opening, not reclosing above 80 degrees C..

3. <u>Electronic Ballasts:</u> UL Class P, sound rated A, solid state ballast, THD less than 20%, power factor above 95%, and shall meet FCC part 18 requirements. Line transient protection shall be provided per IEEE 587 guidelines. Three (3) year warranty.

### C. Fluorescent Luminaires:

- 1. Luminaires designed to dissipate ballast and lamp heat.
- 2. Provide formed or ribbed backplates, endplates, reinforcing channels.
- 3. Prime coat and finish to be white thermosetting powder coating electrostatically applied and baked to form a smooth glossy durable finish of a minimum of 89% reflectance.

# E. <u>Acceptable Lighting Fixture Manufacturers:</u>

- 1. Refer to **Fixture Schedule**. Engineer has final decision on whether submitted fixture is equal.
- 2. Acceptable manufacturers as approved to submit fixtures equal to the fixture submitted are as follows:
- 3. Other fixture manufacturers who consider their products equal to those specified are required to request approval for bidding as base bid in accord with Instructions to Bidders section.
- 4. Approval of products will be considered subject to the following:
  - Equal manufacturers are required to nominally meet specifications of specified fixtures and lenses in regard to ceiling opening size and shape, housing, and trim/door appearance and construction, general overall appearance, efficiency, thickness, brightness control and lamp hiding characteristics.

### 2.09 OCCUPANCY SENSOR CONTROLS

- A. Occupancy Sensors shall be equal to System Sensor or approved equal. Refer to the Drawing Occupancy Sensor Schedules and Drawings for further requirements.
- B. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
- C. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
- D. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
- E. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.
- F. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
- G. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

- H. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
- I. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
- J. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
- K. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005% tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.
- L. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.
- M. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity.
   Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
- O. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

#### 2.10 MOTOR WIRING

- A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with the contractor that is furnishing the motor driven equipment.
- B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes. Verify all these requirements with contractor concerned and install accordingly under this contract.
- C. Install disconnect means where required by code for motors out of sight of controller. These shall be fusible safety switches, fusetron box cover unit, or non-fused switch as indicated on plans. All switches shall be horsepower rated.
- D. All motors will be furnished and installed by others, unless noted otherwise.
- E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise herein or on the plans. See Motor Schedule.
- F. All final connections to motors to be made by this Contractor.
- G. All motors to be connected using flexible metallic conduits extending from motor box to outlet box.

  Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit shall be stranded. Grounding wires shall be in all cases installed in flexible conduit and not wrapped around the outside of the conduit.

### 2.11 MOTOR STARTERS

### A. General:

- 1. Indoor NEMA Type 1.
- 2. Outdoors or where exposed to moisture NEMA Type 3R, raintight.

- 3. Units shall open all ungrounded conductors simultaneously.
- 4. All starters shall be from a single manufacturer.
- 5. Approved Manufacturers: Allen-Bradley, Cutler Hammer, Square D and General Electric.

# B. Manual Starters:

- 1. For single-phase starters, provide units of tumbler switch type that clearly indicate ON, OFF and TRIPPED positions.
- 2. For three-phase starters, provide pushbutton operated units with START, STOP-RESET button on the enclosure cover.

# C. <u>Magnetic Starters:</u>

- 1. Provide units with operating coils designed to operate on line voltage or any other auxiliary voltage indicated on the Drawings.
- 2. For starters with line voltage operating coils, provide built-in under-voltage release.
- 3. Provide units with the accessories and auxiliary contacts needed for automatic or remote operation as shown on the Drawings.
- 4. Provide "H-O-A" control switch and "green" run light on unit cover.
- 5. Provide thermal overload protection in each phase which if any phase trips causes the starter to drop out.

#### 2.12 SAFETY SWITCHES

- A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.
- B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:
  - 1. Indoor: NEMA type 1.
  - 2. Outdoor: NEMA type 3R, raintight.
- C. Approved Manufacturers: Square D, Cutler Hammer, General Electric or ITE.

### 2.13 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 Architect.

#### PART 3 - EXECUTION

### 3.01 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.

#### 3.02 PREPARATION

# A. Coordination:

- 1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- 2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total Work.

- 3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.
- B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.
- C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.
- D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.
- E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

### 3.03 TRENCHING AND BACKFILLING

- A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the providions of Division 2 of these Specifications.
- B. Cut bottom of trench to grade, make trench 12" wider than the widest dimension of the pipe.

#### C. Bedding and backfilling:

- 1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
- 2. *Under the building slab*: Install all pipes on a compacted bed of damp sand 6" deep. Do not lay piping on large stones, rocks or bricks.
- 3. Outside the building: Install all underground piping on a compacted bed of damp sand 6" deep. Backfill to within 12" of finish grade with damp sand. Backfill the remainder with native topsoil. Backfill in layers and compact sufficiently to prevent settlement.
- 4. Do not start backfill operations until underground plumbing work has been properly inspected and approved by governing authorities.

### 3.04 INSTALLATION OF RACEWAYS AND FITTINGS

- A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide rigid galvanized conduit or electrical metallic tubing with compression type fittings.
  - 1. Seal joints to prevent entrance of water.
  - 2. Provide ground wire of proper size per NEC 250.
  - 3. Use nylon (rather than steel) fish tape.
- B. Use flexible conduit only for short motor connections, or where subject to vibration.
- C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting in connection with the Work.
- D. Where conduit is exposed, run parallel to or at right angle with lines of the building.

E. Securely and rigidly support conduits throughout the work.

#### 3.05 INSTALLATION OF LIGHTING FIXTURES

- A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.
- B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.
- C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.
- D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the fixture is supported, either directly or indirectly, by a safe and sound structural member of the building, using adequate number and type of fastenings to assure safe installation.
  - 1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.
  - 2. Install T-bar hold-down clips on all light fixtures.

# 3.06 INSTALLATION OF POWER EQUIPMENT

A. Provide power and control wiring for motor starters and safety switches as shown on the Drawings.

#### 3.07 INSTALLATION OF CONDUCTORS

- A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100 feet, use larger wires to limit voltage drops.
- B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.
  - 1. Make splices electrically and mechanically secure with pressure-type connectors.
  - 2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6 AWG and smaller.
  - 3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a mechanical tool and die equipment for wire sizes 4 AWG and larger,.
  - 4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinylplastic electrical tape where insulation is required.

### 3.08 TESTING AND INSPECTION

- A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.
- B. Make written notice to the Architect adequately in advance of each of the following stages of construction:
  - 1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
  - 2. Immediately submit to the Architect a report of maximum and minimum voltages and a copy of the recording volt-meter chart.
  - 3. Also measure voltages between phases and between phase wires and neutrals and report these voltages to the Architect.

### 3.09 PROJECT COMPLETION

- A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.
- B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under Article 1.3 of this Section of these Specifications.

**END OF SECTION** 

#### SECTION 28 31 00 - FIRE ALARM SYSTEM

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION OF WORK

- A. Furnish all labor, equipment, materials, and performing all operations in connection with the installation of the Fire Alarm System as shown on the drawings, as hereinafter specified, and as directed by the Engineer.
  - 1. Expand the existing addressable multiplexing fire alarm system with new addressable devices. Existing Fire Alarm Control Panel is 'Silent Knight 5207'.
  - Maintain existing fire alarm coverage in place during remodeling per local MDF requirements.
  - 3. The Contractor shall visit and inspect existing facility to determine extent of fire alarm work and to meet requirements of this specification and existing conditions.
- B. The Fire Alarm System shall consist of all necessary software, field wiring and equipment to perform all fire alarm, detection, and annunciation operations.
  - 1. Partial smoke and heat detector coverage and annuciation per NFPA 72 and ADA.
  - 2. Central monitoring control panel with LED annunciator panel.
- C. Fire Alarm Equipment shall Include:
  - 1. Existing fire-alarm control panel.
  - 2. Smoke Detectors.
  - 3. Notification appliances.
  - 4. Addressable interface devices.
  - 5. NAC power panels
  - 6. Existing digital alarm communicator transmitter.
- D. The Fire Alarm Sub-contractor shall be responsible for advising the Engineer ten(10) days prior to the bidding date of any omissions required to meet the local, state and federal requirements for the fire alarm installation. After this date, the additional requirements for a complete installation of the fire alarm system shall become the responsibility of the Fire Alarm Sub-contractor.
- E. The Fire Alarm Sub-contractor shall provide final fire alarm design responsibility for the project and submit all plans, plan approval fees, calculations and related to the City of Madison Fire Department to provide required approvals necessary to obtain facility occupancy for the Owner.

#### 1.2 RELATED DOCUMENTS

- A. Applicable provisions of Division 1 shall govern work under this section.
- B. <u>Specified Elsewhere:</u>
  - 1. 26 00 00 Electrical Systems

#### 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. National Electric Code, Article 760.
  - 2. National Fire Protection Standards:
    - NFPA 71: Central Station Signaling Systems Protected Premises Unit.
    - b. NFPA 72A: Local Protective Signaling Systems.

- c. NFPA 72D: Protective Signaling Systems Protected Premises Unit.
- d. NFPA 72E: Automatic Fire Detectors.
- 3. Local and state building codes.
- 4. IBC.

i.

- 5. Wisconsin HFS 83.
- 6. All requirements of the local authority having jurisdiction.
- 7. <u>Underwriter's Laboratories:</u> The system and all components shall be listed by Underwriters Laboratories, Inc. for use in fire protective signaling systems under the following standards as applicable.
  - a. UL 864: Control Units for Fire Protective Signaling Systems.
  - b. <u>UL 268:</u> Smoke Detectors for Fire Protective Signaling Systems.
  - c. <u>UL 268A:</u> Smoke Detectors for Duct Applications.
  - d. <u>UL 217:</u> Smoke Detectors, Single and Multiple Station.
  - e. UL 521: Heat Detectors for Fire Protective Signaling Systems.
  - f. UL 228: Door Closers/Holders for Fire Protective Signaling Systems.
  - g. <u>UL 464:</u> Audible Signaling Appliances.
  - h. <u>UL 1638:</u> Visual Signaling Appliances.
    - UL 38: Manually Actuated Signaling Boxes.
  - j. UL 346: Waterflow Indicators for Fire Protective Signaling Systems.
  - k. <u>UL 1481:</u> Power Supplies for Fire Protective Signaling Systems.
- B. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.
- C. The equipment and installation supervision furnished under this specification is to be provided by a manufacturer (independent dealers and/or distributors will NOT be considered) who has been engaged in production of this type (software driven) of equipment for at least five (5) years, and has a fully-equipped service organization within one hundred and fifty (150) miles of the installation.
  - 1. All control equipment must have transient protection devices to comply with UL864 requirements.
- D. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- E. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
- F. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.
- H. NFPA Certification: Obtain certification according to NFPA72 in the form of a placard by an approved alarm company.

# 1.4 SUBMITTALS

- A. Submit in accordance with Section 16050.
- B. Submit complete documentation showing the type, size, rating, style, catalog number, manufacturer's names, photos and or catalog data sheets for all items to ensure compliance with these specifications.

- C. Submit complete point to point wiring diagrams.
- D. Submit point list for owner to complete custom label requirements.
- E. All references to manufacturer's or supplier's model numbers and other pertinent information herein is intended to establish minimum standards for performance, function and quality. Equivalent equipment (compatible UL listed) from other manufacturers may be substituted for that specified providing the submittal is performed as specified above.
- F. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
  - 1. Include voltage drop calculations for notification appliance circuits.
  - 2. Include battery-size calculations.
  - 3. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
  - 4. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
  - 5. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
- G. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data, include the following:
  - Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
  - 2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
  - 3. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
  - 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:
    - a. Frequency of testing of installed components.
    - b. Frequency of inspection of installed components.
    - c. Requirements and recommendations related to results of maintenance.
    - Manufacturer's user training manuals (hardcopy) and electronic on CD.
  - 5. Manufacturer's required maintenance related to system warranty requirements.
  - 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
- H. Software and Firmware Operational Documentation:
  - 1. Provide a list of global system settings
  - 2. Provide a list of the contents of each system cabinet and their settings
  - Provide a list of all addressable devices with their addresses and settings

#### 1.5 WARRANTY AGREEMENT

A. The contractor shall warranty all materials, installation and workmanship for three (3) years from date of acceptance, unless otherwise specified. A copy of the manufacturers' warranty shall be provided with closeout documentation and included with the operation and installation manuals.

- B. The System Supplier shall maintain a service organization with adequate spare parts stocked within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the Owner notifying the contractor.
- C. Technical Support: Beginning with Substantial Completion, provide software support for three (3) years, shall be included in this project.

## 1.6 DELIVER, STORAGE AND HANDLING

- A. Deliver equipment individually wrapped in factory fabricated fiberboard type containers.
- B. Store equipment in clean, dry space.
- C. Protect from dirt, fumes, water and physical damage.
- D. Do not install damaged equipment, remove from site.

#### 1.7 GENERAL

- A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition.
- B. The system shall use closed loop initiating device circuits with individual zone supervision, individual notification appliance circuit supervision, incoming and standby power supervision. Include a control panel, manual pull stations, automatic fire detectors, all wiring, connections to devices, outlet boxes, junction boxes, and all other necessary material for a complete operating system.

#### 1.8 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
  - 1. Manual stations.
  - 2. Heat detectors.
  - 3. Smoke detectors.
  - Sprinkler system flow detection.
- B. Fire-alarm signal shall initiate the following actions:
  - 1. Activate the audio (horn) and visual notification appliances.
  - 2. Identify alarm at fire-alarm control unit and remote annunciators.
  - 3. Transmit an alarm signal to the remote alarm receiving station.
  - 4. Unlock electric door locks in designated egress paths.
  - 5. Release fire and smoke doors held open by magnetic door holders.
  - 6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  - 7. Record events in the system memory.
  - 8. Record events by the system printer.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
  - 1. Valve supervisory switch.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
  - 1. Retain only those devices and actions in subparagraphs below that are applicable to Project.
  - 2. Coordinate with requirements in other Sections that specify listed devices and systems.

- 3. Open circuits, shorts, and grounds in designated circuits.
- 4. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
- 5. Loss of primary power at fire-alarm control unit.
- 6. Ground or a single break in fire-alarm control unit internal circuits.
- 7. Abnormal ac voltage at fire-alarm control unit.
- 8. Break in standby battery circuitry.
- 9. Failure of battery charging.
- 10. Abnormal position of any switch at fire-alarm control unit or annunciator.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.
- F. General Audio: Upon alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:
  - 1. The internal audible device shall sound at the control panel or command center.
  - 2. The LCD Display shall indicate all applicable information associated with the alarm condition including: zone, device type, device location and time/date.
  - 3. All system activity/events shall be documented on the system printer.
  - 4. Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.
  - 5. The following audio messages and actions shall occur simultaneously: An evacuation message shall be sounded for general alarm throughout the building. Owner to select tone and message for review by Dubuque Fire Marshall.
  - 6. Activate all visual strobes throughout the building. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
  - 7. Provide selective paging to each individual floor (zone). In addition to the message/channels detailed above, a dedicated page channel shall be capable of simultaneously providing live voice instructions without interrupting any of the messages listed above shall be provided.
  - 8. Transmit signal to the central station.
  - 9. Activate automatic smoke control sequences.
  - 10. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
  - 11. All electrically locked stairwell/exit doors shall unlock throughout the building.
  - 12. All self-closing fire/smoke doors held open shall be released.

#### 1.09 SUPERVISION

A. Each independently supervised circuit shall include a discrete panel readout to indicate disarrangement conditions per circuit.

#### 1.10 POWER REQUIREMENTS

- A. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24)] hours with 10 minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.
- B. All circuits requiring system operating power shall be 24VDC and shall be individually fused at the control panel.

#### 1.12 MULTIPLE ADDRESSABLE PERIPHERAL NETWORK

- A. Communication with addressable devices: The system must provide communication with all initiating and control devices individually. All of these devices are to be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:
  - 1. Alarm
  - Trouble
  - Open
  - 4. Short
  - 5. Ground
  - 6. Device Fail/or Incorrect Device
- B. All addressable devices are to have the capability of being disabled or enabled individually.
- C. Up to 127 addressable devices may be multi-dropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.
- E. Format: The communication format must be a poll/response protocol to allow t-tapping of the wire to addressable devices and be completely digital. A high degree of communication reliability must be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission protocol. Systems that do not utilize full digital transmission protocol (i.e. that may use time pulse width methods to transmit data etc.) will not be acceptable since they are considered unreliable and prone to errors.
- F. Identification of Addressable Devices: Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact.
- G. Wiring Type, Distances, Survivability and Configurations: Wiring types will be approved by the equipment manufacturer. Existing wiring will be utilized in retrofit applications. The system must allow up to 2,500 feet wire length to the furthest addressable device. Class A (Style 6 Signaling Line Circuit as defined by NFPA-72) communications will be provided where shown on the drawings. Wire will be so routed to maintain sufficient distance between the forward and return loop as called for by the Authority Having Jurisdiction (AHJ). To minimize wire routing and to facilitate future additions, t-tapping of the communications channel will be supported except where Class A wiring is required.

#### PART 2 - PRODUCTS

#### 2.1 APPROVED MANUFACTURERS

- A. EST by GE Security(Edwards).
- B. Simplex.
- C. Notifier.
- D. Radionics/Bosch 9000.

# 2.2 INTELLIGENT ANALOG SYSTEM SMOKE DETECTORS

- A. General Requirements for Intelligent Analog Detectors:
  - 1. Integral Microprocessor: All decision are made at the detector determining if the device is in the alarm or trouble condition.
  - 2. Non-Volatile Memory: Permanently stores serial number, and type of device.
  - 1. Automatically updates historic information including hours of operation, maintenance date, number of alarms and troubles, time of last alarm and analog signal patterns for each sensing element just before last alarm.

- 4. Electronic Addressing: Permanently stores programmable system address. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable.
- 5. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location and the device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
- 6. Sensitivity Range: Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. It shall be possible to program control panel activity to each level.
- 7. Pre-Alarm: Detector stores 20 pre-alarm sensitivity values to alert local personnel prior to the sensor reaching full evacuation sensitivity. Sensitivity values can be set in 5% increments.
- 8. Environmental Compensation: The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal when the detector reaches 75% (Dirty) to 99% (More Dirty) compensation has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.
- 9. Twin Status LEDs: Flashing Green LED shows normal; flashing RED shows alarm state; steady RED and steady GREEN show alarm state in stand-alone mode, visible from any direction.
- 10. UL Sensitivity Testing: The detector shall utilize a supervised microprocessor that is capable of monitoring the sensitivity of the detector. If the detector sensitivity shifts outside of the UL limits, a trouble signal is sent to the panel.
- 11. Device Replacement: The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

#### B. Intelligent 4D Multi-sensor Detector (Photo/Ion/Thermal and Time):

- 1. Provide intelligent analog addressable 4D multi-sensor smoke detectors at the locations shown on the drawings. The 4D Intelligent detector gathers analog information from each of its three fire sensing elements and converts it into digital signals. The detectors on-board microprocessor measures and analyzes these signals separately with respect to a fourth element Time. It compares the information to historical readings, time patterns and known fire characteristics to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
- Separately mounted combinations of photoelectric detectors, ionization detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is an acceptable alternative.

#### C. Intelligent 3D Multi-sensor Detector (Photo/Thermal and Time):

1. Provide intelligent analog addressable 3D multi-sensor smoke detectors at the locations shown on the drawings. The 3D Intelligent detector gathers analog information from each of its two fire sensing elements and converts it into digital signals. The detectors on-board microprocessor measures and analyzes these signals separately with respect to a third element – Time. It compares the information to historical readings, time patterns and known fire characteristics to

make an alarm decision. Digital filters remove signal patterns that are not typical of fires.

#### D. Intelligent Photoelectric Detector:

1. Provide intelligent analog addressable photoelectric smoke detectors at the locations shown on the drawings.

# E. Intelligent 135 Degree Fixed Temperature / Rate of Rise Heat Detector:

- 1. Provide intelligent combination fixed temperature/rate-of-rise heat detectors at the locations shown on the drawings.
- 2. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature and at a temperature rate-of-rise. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm.
- 3. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable.
- 4. The intelligent heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate-of-rise alarm point of 15°F (9°C) per minute.
- 5. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

#### D. Fixed Temperature Heat Detector.

- 1. Provide intelligent fixed temperature heat detectors at the locations shown on the drawings.
- 2. The heat detector shall have a low mass thermistor heat sensor and operate at a fixed temperature. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm. The integral microprocessor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data.
- 3. Systems using central intelligence for alarm decisions shall not be acceptable.
- 4. The heat detector shall have a nominal alarm point rating of 135°F (57°C).
- 5. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

#### E. Detector Base Types

- 1. Provide standard detector mounting bases suitable for mounting on 1-gang, or 4inch octagon box and 4 inch square box. The base shall, contain no electronics and support all series detector types. Bases with electronics or dip-switches are not acceptable.
- 2. Provide relay detector mounting bases suitable for mounting on 1-gang, or 4" octagon box and 4" square box. The relay base shall support all Signature Series detector types and have the following minimum requirements:
  - a. The relay shall be a bi-stable type and selectable for normally open or normally closed operation.
  - b. The position of the contact shall be supervised.
  - c. The relay shall automatically de-energize when a detector is removed.
  - d. The operation of the relay base shall be controlled by its respective detector processor or under program control as required by the application. Detector relays not capable of operational programming independent of the detector shall not be considered equal. Form "C" Relay contacts shall have a minimum rating of 1 amp @ 30 Vdc and be listed for "pilot duty".
  - e. Removal of the respective detector shall not affect communications with other detectors.

- 3. Provide audible detector mounting bases suitable for mounting on 4" x 4" octagonal concrete ring (mud box) and 4" square x 2-1/8" (54 mm) deep box.
  - a. The base shall support all Signature Series detector types and be capable of single or group operation. The audible base shall emit a temporal alarm tone and be selectable for low or high output.
  - b. The operation of the audible base shall be controlled by its respective detector processor or under program control as required by the application. Detector audible base not capable of operational programming independent of the detector shall not be considered equal.
  - c. The audible bases shall be UL268 and UL464 Listed, and provide a reverberant room sound output per UL464 of 81 dBA at 10ft (3m). and an average anechoic sound output of 90 dBA at 10 ft. (3m).
- F. Intelligent Duct Smoke Detector Photoelectric:
  - Provide intelligent photoelectric duct smoke detector at the locations shown on the drawings.
    - a. One form C auxiliary alarm relay rated at 2amps @ 30Vdc.
    - b. The operating range shall be 100ft/min to 4,000ft/min air velocity and temperature range of -20 to 158F.
    - c. Sample tube can be installed with or without the cover place and be rotated in 45- degree increments to ensure proper alignment with duct airflow.
    - d. Local magnet-activated test switch.
  - 2. Provide remote test station with Alarm LED and Key Switch.
  - 3. Relay Fan Shutdown: Rated to interrupt fan motor control circuit. Furnish and install separate device for each motor start. Connect to motor start as required for fan shutdown during alarm condition.

#### 2.3 INTELLIGENT MODULES

- A. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller.
  - 1. Integral Microprocessor: All decisions are made at the module determining if the device is alarm or trouble condition.
  - 2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, number of alarms and troubles, time of last alarm.
  - 3. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location. The device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
  - 4. Twin Status LEDs: The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status.
  - 5. Input and output circuit wiring shall be supervised for open and ground faults.
  - 6. Two styles of modules shall be available; those designed for gang box mounting, and where multiple modules are required in a single location, plug in modules shall be provided with a Universal Input/Output motherboard.
- B. Intelligent Input Module. The Input Module shall provide one or two supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:

- 1. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
- 2. Normally-Open Alarm Delayed Latching (Water flow Switches)
- 3. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
- 4. Normally-Open Active Latching (Supervisory, Tamper Switches)
- C. Intelligent Relay Module. Provide addressable control relay circuit modules shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
- D. NAC Control Module: Provide intelligent NAC control module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. The gang box -mounted version shall be suitable for mounting in North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The plug-In version shall plug into a universal multi-module motherboard. The NAC control module shall support the following operations:
  - 1. 24volt NAC circuit
  - 2. Audio notification circuit 25v or 70v
  - 3. Telephone Power Selector with Ring Tone (Firefighter's Telephone)
  - Visual Synchronized Output to Genesis appliances or to NAC Power Supply.

#### E. FA Elevator Interface Cabinet

- 1. Provide red metal cabinet enclosure with word FIRE in white letters on the cover. Inside will be four intelligent relays (Primary Recall, Alternate Recall, Fire Hat and Shunt Trip), one monitor input (Shunt Trip AC Power Supervision) and 120vac relay (Shunt Trip AC Power Super).
- 2. Label all the relays and input modules for the function.

#### 2.4 NOTIFICATION APPLIANCES

- A. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturers' instructions.
- B. Any appliances, which do not meet the above requirements, and are submitted, for use must show written proof of they're compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended. All appliances shall be UL listed Fire Protective Service, and shall be UL 1971.
- C. Notification Appliances Visual:
  - 1. Provide wall or ceiling mounted white strobes with in-out screw terminals shall be provided for wiring. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating.
  - 2. The strobe (15, 30, 75, 110) candela rating shall be view from the side window to verify the setting.
  - 3. All strobes shall be synchronization to within 10 milliseconds for an indefinite period shall not require the use of separately installed remote synch modules.
  - 4. The strobes shall mount to one-gang electrical box. The device shall have plastic protective cover for during installation.
  - 5. The actual candela setting on the visual shall be marked on the appliance.

#### D. Notification Appliance – Horn:

- 1. Provide low profile wall mount horns at the locations shown on the drawings. The horn shall provide an 95 dBA sound output at 10 ft. when measured in reverberation room per UL-464. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. The horn shall mount in a 1-gang box.
- 2. The device shall have plastic protective cover for during installation.

# E. Notification Appliance – Horn/Strobe:

- 1. Provide low profile wall mount horn/strobes at the locations shown on the drawings. The horn/strobe shall provide an audible output of 95 dBA at 10 ft. when measured in reverberation room per UL-464. Strobes shall provide synchronized flash outputs.
- 2. The strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd & 110cd devices. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring.
- 3. Low profile horn/strobes shall mount to one-gang box.
- 4. The device shall have plastic protective cover for during installation.

#### F. Notification Appliance – Harsh Environment Temporal Horn/Strobes:

- 1. Provide red electronic horn/strobes at the locations shown on the drawings. Horns shall be temporal output. At the high output setting, the horn shall provide a 85 dBA continuous sound output or a 95 dBA temporal sound output, when measured in reverberation room per UL-464. Strobes shall provide 15 cd, 75 cd, 110 cd synchronized flash outputs without the use of separate "synchronizing" modules. The strobe shall have lens markings oriented for wall or ceiling mounting.
- 2. In Out screw terminals shall be provided for wiring. Horns shall mount to a North American 4" electrical boxes (2-1/8" deep) or to a 2-gang (2-3/4" deep) electric box. Weatherproof wall boxes shall be provided for outdoor applications.
- 3. Provide GE-EST model 757 series.

#### 2.5 GUARDS FOR PHYSICAL PROTECTION

A. Provide welded mesh of size and shape for the manual pull stations, smoke detectors, notification appliances at location noted on the drawings.

#### 2.6 INSPECTION BAR CODES

- A. Inspection bar codes shall be installed on all initiating devices, annunciators, control panels and power supplies.
- B. Inspection bar codes used by the system must utilize Code 3 of 9 or other approved format, and contain a minimum of eight (8) digits that comprise a unique serial identifier within the Web-based Reporting System. There shall be no duplication of serial numbers. Serial number shall be printed below the bar code for identification purposes.
- C. Inspection bar codes shall be limited in size to no more than 2" (5cm) in width, and 3/8" (2 cm), in height and shall include a Mylar or other protective coating to protect the bar code from fading due to sunlight or exposure.
- D. Inspection bar codes shall be installed on each device in such a manner as to require that scanning of the bar code take place no further than 12" from the device during inspection.

#### 2.7 WIRE AND CABLE

- A. Signaling Line Circuits Network Data: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.
- B. Signaling Line Circuits Intelligent Loop: Twisted pair, not less than No. 18Awg or as recommended by the manufacturer.
  - Circuit Integrity Cable: Provide as required to meet NFPA or Local Code requirements.
  - 2. Cl Cable shall meet article 760, power limited fire alarm service.
- C. Notification Appliance Circuits -
  - 1. Horn and Visual. 12 AWG THHN or FPLP or as recommended by the manufacturer.
- D. All low voltage cable and wire shall be supplied and installed in accordance with the National Electrical Code and other provisions of Division 16000.
- E. Cable and wire selected for each application shall be in strict accordance with the original equipment manufacturers recommendations.
- F. All cables and wires shall be permanently tagged at both ends for ease in maintenance.

#### PART 3 - EXECUTION

# 3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.
- C. Smoke- or Heat-Detector Spacing:
  - 1. Comply with NFPA72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
  - 2. Comply with NFPA72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
  - 3. Smooth ceiling spacing shall not exceed 30 feet.
  - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
  - 5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
  - 6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- E. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- F. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
- G. Notification Appliance Devices: Install between 80 and 96 inches on the wall.
- H. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.

- I. Annunciator: Install with top of panel not more than 56 inches above the finished floor.
- J. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
- K. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

#### 3.2 CABLE WIRING

- A. Cable shall be the type listed for the use as specified under NEC Article 760-30 (bell wire, intercom, or telephone wire are not approved).
  - 1. All cable shall be installed as per NEC Article 760.
  - 2. Leave 8-inch wire tails at each device box and 36-inch wire tails at the Fire Alarm Control Panel.
  - 3. Cable for conventional initiating devices shall be looped by zone. Cable shall be installed from the Monitor Module to the first device, then to each succeeding device within each zone loop. An end-of-line resistor device shall be installed at or after the last device on the circuit.
  - 4. Cable for conventional indicating devices (audible or visual) shall be looped as stated above from the Control Module. An end-of-line resistor device shall be installed at or after the last device on the circuit. Wire may be 16 through 12 AWG.
  - 5. Cable for SLC loops shall be 18 to 12 AWG twisted pair with a shield jacket. Shield continuity must be maintained and connected to earth ground only at the control panel. Intelligent detector wiring must not be routed adjacent to, or in the same conduit with Audio/Visual power wiring, 120/240 VAC power wiring or other high current circuits.
  - T-Taps or branch circuit connections are allowed for all Style 4 intelligent loop circuits.
  - 7. Cable for RS-232c devices (CRT, Printer) shall be dual pair twisted-shielded.
  - 8. Power wiring shall be 12 AWG.

#### 3.3 DEVICE BOX MOUNTING

- A. <u>Device Box Mounting:</u> Unless otherwise noted on the drawings, plans, specification or by the Engineer; the recommended mounting heights, type of boxes required and other specific requirements are as follows:
  - 1. <u>Fire Alarm Control Panel(s):</u> Mount with center of panel at least 60 inches above floor level. Install 120 VAC wiring with green ground wiring on a dedicated separate circuit, maximum 20 amperes. Use only identified conduit entries, or request approval for other penetrations in cabinets, (certain areas require clear space for interior components). Cabinet shall be grounded to either a cold water pipe or grounding rod.
  - 2. <u>Magnet Door Holder(s):</u> Wall type require a 1-gang box. Note: See individual instruction sheet of particular device being used for the exact location of box or stub.
  - 3. <u>Signaling Device(s):</u> Standard semi-flush horns, bells and chimes require a 4 inch square, 2-1/8 inch deep, device box with a 2-gang ring (1/2" minimum depth). Install 6" below finished ceiling or 120" maximum height.
  - 4. Weatherproof horns, bells or chimes are generally surface mounted and require a 3/4" conduit nipple or fitting threads only to protrude 1/2" from finished wall surface. When entering the back of the box is not practical, then side entry may be accomplished by using 1/2" conduit.
  - 5. <u>Manual Stations:</u> Install a 4" square device box (2-1/8" minimum depth) at 48" center above finished floor. All Manual Stations shall be in unobstructed locations.
  - 6. Heat and Smoke Detector(s): The location of detectors shown on the plans is schematic only. The detectors must be located according to code requirements.

- 7. Detectors require a 4" square device box with a 3/0 ring. They should be located on the highest part of a smooth ceiling so that the edge of the detector is no closer than 4 inches from a sidewall. Ceilings with beams, joists or soffits that exceed 8" in depth require special planning and closer spacing. Install as instructed by manufacturer of device(s).
- 8. If it is necessary to mount a detector upon a sidewall, the top of the detector shall be located no closer than 4" from the ceiling and no further away than 12".
- 9. Smoke detectors should be installed to favor the airflow towards return openings and not located where air supply diffusers can dilute smoke before it reaches the detector.
- 10. Ideally, heat and smoke detectors should be located near the center of the open area which they are protecting, thus providing coverage generally for a 15 foot radius for smoke detectors and a 25 foot radius for heat detectors. Install as directed by Architect or Engineer.
- 11. <u>Duct Smoke Detectors:</u> Surface mounted housing which is normally installed upon the side or top of the composite return and/or supply air duct. Air sampling tubes protrude from the rear of the unit, one of which entirely spans the widest portion of the duct. Note: See individual instruction sheet of device being used for exact location and mounting.
- 12. <u>Sprinkler Waterflow and Gate-Valve Switch:</u> Install a 4" square device box on a wall accessibly and centrally located near the switch and use 1/2" flex to connect each device to the box. Exterior mounted devices on post-indicator valves and in pits, etc., require liquid-tight flex and weatherproof boxes and fittings for all wiring.
- 13. Where new devices are mounted at existing locations, provide painted back-up plates to provide a finished appearance.

#### 3.4 FIELD QUALITY CONTROL

- A. All intelligent analog addressable devices shall be tested for current address, sensitivity, and user defined message.
- B. All wiring shall be tested for continuity, shorts, and grounds before the system is activated.
- C. All test equipment, instruments, tools and labor required to conduct the tests shall be made available by the installing contractor.
- D. The system including all its sequence of operations shall be demonstrated to the Owner, his representative, and the local fire inspector. In the event the system does not operate properly, the test shall be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the Owner, his representatives and the fire inspector.
- E. At the final test and inspection, a factory trained representative of the system manufacturer shall demonstrate that the system functions properly in accordance with these specifications. The representative shall provide technical supervision, and participate during all of the testing for the system.
- F. All fire alarm testing shall be in accordance with National Fire Alarm Code, NFPA 72 1999, Chapter 7.
- G. A letter from the Contractor certifying that the system is installed entirely in accordance with the system manufacturer's recommendations and within the limitations of the required listings and approvals, that all system hardware and software has been visually inspected and functionally tested by a manufacturer's certified representative, and that the system is in proper working order.

#### 3.5 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 8 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
  - 1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Smoke dampers in air ducts of designated air-conditioning duct systems.
  - 2. Alarm-initiating connection to elevator recall system and components.
  - 3. Alarm-initiating connection to activate emergency lighting control.
  - 4. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
  - 5. Supervisory connections at valve supervisory switches.
  - Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
  - 7. Supervisory connections at elevator shunt trip breaker.

#### 3.6 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."
- B. Install framed instructions in a location visible from fire-alarm control unit.
- C. All initiating devices shall have bar code label installed visibly on the device. This bar code shall be used for digital inspection of the fire alarm system using Building Reports.Com.

#### 3.7 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

#### 3.8 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Architect, Engineer and authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

#### D. Tests and Inspections:

- 1. Visual Inspection: Conduct visual inspection prior to testing.
  - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
  - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72;

retain the "Initial/Reacceptance" column and list only the installed components.

2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.

3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.

- 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
- 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections. Prepare test and inspection reports.
- G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- H. Annual Test and Inspection: During the warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.
- I. Detector Sensitivity Testing: During the warranty period, each year the contractor is to perform detector sensitivity testing and provide report to the Owner. Unless, the system is UL Listed to perform automatic sensitivity testing without any manual intervention and should detector fall outside of sensitivity window, the system will automatically indicated a devices trouble. A copy of UL letter is to be provided as proof of system operation

#### 3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

#### 3.10 BASIC OPERATOR TRAINING

- A. Provide operator training for two (2) persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Training shall be performed at the project site provided by the Owner.
- B. Installation Contractor and equipment vendor shall provide all training materials, testing equipment, and demonstration aids required to provide operator, supervision, and maintenance personnel training. At completion of the training period, all training brochures, bulletins, manuals, handbooks, and diagnostic guidelines shall remain with the Owner.

#### **END OF SECTION**



# Department of Public Works **City Engineering Division**

Robert F. Phillips, P.E. City Engineer

City-County Building, Room 115 210 Martin Luther King, Jr. Boulevard Madison, Wisconsin 53703 608 264 9275 www.cityofmadison.com

#### 608 266 4751

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Operations Supervisor Kathleen M. Cryan

GIS Manager David A. Davis, R.L.S. Financial Officer

Steven B. Danner-Rivers Hydrogeologist

Brynn Bemis

#### ADDENDUM NO. 1

#### CONTRACT NO. 6902

#### **OLBRICH GARDENS RESTOOM ADDITION**

ISSUE DATE: February 15, 2013

**ARCHITECT:** 

**Destree Design Architects** 

**GENERAL** 

01-001:

See attached Pre-Bid site walk-through attendance list.

01-002:

See attached Phasing Requirements for Olbrich Botanical Gardens Roof Replacement project.

#### AFFECTING THE PROJECT MANUAL

SECTION 085000 - WINDOWS

01-003:

Omit "2.2.D - Triple Pane Insulating Glass"

Revise "2.5.B.1" to read: "Color: Enduraclad 'Brown' to match existing" 01-004:

#### AFFECTING THE DRAWINGS

**DRAWING T000** 

01-005: Omit sheet "S703 - Details" from the Sheet Index.

#### **DRAWING A900**

01-006:

Window Schedule to include the following notes:

- a. Window supplier to include aluminum frieze panel to match window clad color, GC to bend and install panel on site.
- b. Window supplier to include aluminum corner panel to match window clad color, GC to bend and install panel on site.
- c. Window supplier to provide new jamb extensions as required at relocated window.

Please acknowledge this addendum on page E1 of the contract documents.

Electronic version of these documents can be found on the City of Madison web site at:

http://www.cityofmadison.com/business/PW/contracts/openforBid.cfm

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

Robert F. Phillips, P.E., City Engineer

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# OLBRICH GARDENS REST ROOM ADDITION PRE-BID WALK-THRU 02.11.13



			D	architecture & design
Name	Organization	Trade	Phone	E-mail
Jeanine Zwart	City of Madison	City Project Manager	(608) 267-8749	jzwart@cityofmadison.com
Jim Maier	Olbrich Botanical Gardens	Maintenance	(608) 243-0157	jmaier@cityofmadison.com
Tyler Smith	Destree Design Architects, Inc.	Architect	(608) 268–1499	tyler@destreearchitects.com
Adam Harmeyer (Steve Knudson) Magill Construction	Magill Construction		(262) 723-2283	stevek@magillconstruction.com
Ed Smiley	Braun Electric	Electrical	(608) 221-4600	esmiley@braun-corp.com
Steve Connor	VerHalen Pella Windows	Windows	(608) 444-4375	sconnor@verhaleninc.com
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- Friday, May 10, 2013 through Sunday, May 12, 2013 (annual plant sale and Mother's Day weekend).
- Friday, May 24, 2013, through Monday, May 27, 2013 (Memorial Day weekend).
- Friday, June 14, 2013, through Sunday, June 16, 2013 (Rhapsody in Bloom event).
- Wednesday, July 17, 2013, through Sunday, August 11, 2013, (Blooming Butterflies event).

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After the initial schedule submittal, the Contractor shall update the schedule monthly by entering actual progress for the period and submit copies as part of the payment request.

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#### PHASING REQUIREMENTS

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- 1. Start Work Letter issued on Monday, March 11, 2013.
- 12 Pre-Construction Conference on Monday, March 11, 2013.
  - Skylight Replacement: Shop drawings prep and approval = 2 weeks (weeks of March 11 and March 18).
  - Skylight Replacement: Skylight fabrication = 2 weeks (weeks of March 25 and April 1)
    - Skylight Replacement: Skylight delivery, stockpiling, install safety protection = 1 week (week of April 8).
    - Skylight Replacement: Installation of skylight and removal of safety protection = 1 week (week of April 15).
      - 7. The Commons: Steel shop drawings prep and approval = weeks of March 11 and March 18.
- 18 The Commons: Steel fabrication = weeks of March 25 and April 1.
  - The Commons: Steel delivery, stockpiling = 1 week (week of April 8).
  - 10. The Commons: Installation of steel = 3 days (April 15, 16, and 17).
    - 11. The Commons: Installation of ceilings = 2 days (April 18 and 19).
  - 12. Exterior Work & Toilet Addition Shell & Core: Shop drawings prep and approvals = 6 weeks (March 11 through April
    - 13. Install fenced enclosure in ice skating pond: Week of April 15.
    - 14. Exterior Work & Toilet Addition: Partial product deliveries and stockpiling = 4 weeks (April 22 through May 17).
- 26 15. Exterior Work & Toilet Addition: Mobilize site and install phase 1A fencing = 1 week (May 13 through May 17).
  - 16. Exterior Work & Toilet Addition: Initial copper deliveries = 1 week (May 13 through May 17).
- 17. Exterior Work & Toilet Addition: Toilet rooms shell and core addition = 8 weeks (May 20 through July 12). 28
- 29 18. Exterior Work: Phase 1 Reroof HeadHouse = 2 weeks (May 20 through May 31).
  - 19. Exterior Work: Phase 2 Reroof Front Entry Area = ~2 weeks (June 3 through June 13).
  - 20. Exterior Work: Phase 3 Reroof Backside of The Commons, including enclosure of The Commons west wall clerestory windows, and Courtyard = 3 weeks (June 24 through July 12).
  - 21. Exterior Work & Toilet Addition Roof: Phase 4 Reroof The Commons, Main Building, and Toilets Addition = 3 weeks (July 15 through August 2).
  - 22. Exterior Work: Phase 5 Demobilize Site, Landscaping and Cleanup = 1 week (August 5 through 9).
- 36 23. Substantial Completion: August 9, 2013.

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## 14. DOCUMENTS

All electronic files used or created for this project become property of the City. All files have to be submitted to the City upon request and once each phase (design, construction) is completed. Only Microsoft Office, PDF, and AutoCAD version 2008 and lower documents are acceptable. All documents that once existed in Microsoft or AutoCAD version must be submitted in such. AutoCAD files have to be submitted in original drawing form for further use in future projects. Sheet-set files alone will not be sufficient. All AutoCAD files must be submitted as PDF in addition. The Contractor can use CAD files and other files necessary for this project upon request.

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The City or designee will provide the Contractor with a suitable set of Contract Documents on which daily records of changes and deviations from contract shall be recorded. Dimensions and elevations on the record drawings shall locate all buried or concealed piping, conduit, or similar items.

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The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted. During the first week of each month, the Contractor shall present, at the project site, the job copy showing variations and changes to date to the City for review.

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During first week of each month, the Contractor shall present at the project site all changes to architectural/engineering plans for review. At completion of the project, the Contractor shall submit the marked-up record drawings to the City prior to final payment.

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## **SECTION E: PROPOSAL**

# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

Bidder must state a Unit Price and Total Bld 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
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.	Accompanying this Proposal is Bld Bond or Certified Check in the amount of 5% of List Dollars (\$
5.	I hereby certify that all statements herein are made on behalf of Scherrer Construction Co. Inc.
	a corporation organized and existing under the laws of the State of Wisconsin a
• .	partnership consisting of ; an individual trading as ; of the City of Burlington ; State of WI; 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.
	100 B
SIGNATU	RE .
R	Erids 4/602
TITLE, IF	ANY (
35%	and subscribed to before me this  along the subscribed to be subscr
(Notary	Public or other officer authorized to administer oaths)
	imission Expires Que S, 2018
•	shall not add any conditions or qualifying statements to this Proposal.

# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

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 falling 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 falled 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 Cons	truction Business		
Name of Business	N/A		
Street Address or P O Box	City	State	Zip Code
Name of Business	- Netter		
Street Address or P O Box	City	State	Zip Code
Name of Business		<u> </u>	<u></u>
Street Address or P O Box	City	State	Zip Code
I hereby state under penalty of perjury that the info according to my knowledge and belief.	rmation, contained in this docume	nt, is true and	d accurate
Print the Name of Authorized Officer			
Signature of Authorized Officer	Date Signed	447	
Name of Corporation, Partnership or Sole Proprietorship	THE CONTRACTOR OF THE CONTRACT	A shows	4-1
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)

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

# **Best Value Contracting**

1,	The C	ontractor shall indicate the non-apprenticeable trades used on this contract.
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2.		Contractors are exempt due to the size of the work force. Apprenticeable trades are those considered apprenticeable by the State of Wisconsin.
		Check Here if the Contractor has a total skilled work force of four or less individuals in all apprenticeable trades combined. This contractor is exempt from Best Value Contracting.
3,	Contrac	ontractor shall indicate on page E-4 which apprenticeable trades are to be used on this ct and shall indicate by checking the appropriate box for the trades used, how the tor will comply with Madison General Ordinance 33.07(7).
		Legend
Numbe Journey W-ATI	yworkers	The Contractor shall indicated for trades to be used on this Contract only, the number of journeyworkers that the Contractor has employed company wide.  The Contractor is an active trade trainer in the State of Wisconsin for the trade indicated.
TA-8U	Т	The Contractor is an active trade trainer in an apprenticeship program approved by the U.S. Department of Labor or another state apprenticeship agency in the trade indicated.
SB-AT	T	The Contractor shall become an active trade trainer prior to beginning work on the Contract in the trade indicated.
	The Co this pro	ntractor has reviewed the list on page E-4 and shall not use any apprenticeable trades on ject.
		intractor has reviewed this list on E-4 and has checked the appropriate box by each iceable trade to be used on the project.

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

## **Apprenticeable Trades**

Check the box in the column "Trade Used on This Project" for each apprenticeable trades used on this project. For those trades used on the project indicated the number of journeyworkers that are employed company wide and check a box to the right of the trade as to how the Contractor will comply MGO 33.07(7). Refer to the legend on page E-3 for the meaning associated with each heading. The Contractor must check one of the boxes on the right for each apprenticeable trade used and checked on the left.

Trade	7		Γ	1	T
Used on		Number of			
Contract	Apprenticeable Trades	Journeyworkers	W-ATT	US-ATT	SB-ATT
	Bricklayer		X.		
Ø	Carpenter	5	12		
Ø.	Cement Mason / Concrete Finisher				
	Cement Mason (Heavy Highway)				
NA.	Construction Craft Laborer	1	Ø		
	Data Communication Installer				
Ø	Electrician				
×	Environmental Systems Technician / HVAC Service Tech/HVAC Install / Service				
Ø	Glazier				
	Heavy Equipment Operator / Operating Engineer				П
	Insulation Worker (Heat & Frost)				
	Iron Worker				
	Iron Worker (Assembler, Metal Bldgs)				
	Painter & Decorator				
	Plasterer				
XI.	Plumber				
<u>′</u> П	Residential Electrician				
	Roofer & Waterproofer				
X	Sheet Metal Worker				
	Sprinklerfitter				
	Steamfilter				
·□	Steamfilter (Refrigeration)				
	Steamfilter (Service)				
	Taper & Finisher				
	Telecommunications (Voice, Data & Video) Installer-Technician				
X	Tile Setter				

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# **PROPOSAL**

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58401-810714-53W1447
TOTAL BID
\$271,826.00

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Bid Date: 02-22-13

# SECTION F: BID BOND

(a corporation plathe State of CASTACT AND Composition of the State of Connecticut (hereinafter referred to as the "Principal of AND ANY OF AMERICAN AND ANY OF AMERICAN AND 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:

# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

- 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 SCHERRER CONSTRUCT	TON CO TNC	2/20/13		
Principal Principal	TON CO., INC.	Date		
Ву:				
TRAVELERS CASUA				
By:	J	February 22, 2013		
Dennis M. Barton,	Attorney-In-Fact	Date		
This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. 125401 for the year 2013, 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.  February 22, 2013				
Date	Agent			
	17035 West Wisconsin Av Address	zenue - Suite 135		
	Brookfield, Wisconsin	53005		
	City, State and Zip Code			
	262-792-2212	<b>\</b>		
	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.



#### POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company Travelers Casualty and Surety Company Travelers Casualty and Surety Company of America United States Fidelity and Guaranty Company

Marie C. Tetreault, Notary Public

Attorney-In Fact No.

219817

Certificate No. 004952818

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Elizabeth M. Fedyn, Joseph L. Vigna, Dennis M. Barton, Daniel G. Johnson, and Michael T. Burg

of the City of Brookfield	, State of Wisc	consin	their true and lawful Attorney(s)-in-Fact,
each in their separate capacity if more than one is named above, other writings obligatory in the nature thereof on behalf of the contracts and executing or guaranteeing bonds and undertakings	Companies in their busine	ss of guaranteeing the fidelity of	persons, guaranteeing the performance of
'N WITNESS WHEREOF, the Companies have caused this in	strument to be signed and	heir corporate seals to be hereto a	offixed, this
day of, 2012			
Farmington Casualty Comp Fidelity and Guaranty Insu Fidelity and Guaranty Insu St. Paul Fire and Marine In St. Paul Guardian Insurance	irance Company irance Underwriters, Inc. nsurance Company	Travelers Casualty	nsurance Company and Surety Company and Surety Company of America ity and Guaranty Company
1982 S 1977 S MCORPORATED S 1951	SEAL B	SEAL CONN.	HARTFORD S CONN ANSE
State of Connecticut City of Hartford ss.		By: George W Thor	npson, Senior Vice President
On this the 6th day of July himself to be the Senior Vice President of Farmington Casualty Inc., St. Paul Fire and Marine Insurance Company, St. Paul Company, Travelers Casualty and Surety Company of America, executed the foregoing instrument for the purposes therein contains	Company, Fidelity and Gu Guardian Insurance Compa , and United States Fidelity	naranty Insurance Company, Fide ny, St. Paul Mercury Insurance y and Guaranty Company, and th	Company, Travelers Casualty and Surety at he, as such, being authorized so to do,
In Witness Whereof. I hereunto set my hand and official seal	A COTARDA	Ma	nic c. Jetneault

58440-6-11Printed in U.S.A.

My Commission expires the 30th day of June, 2016.

#### WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, and Vi any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 22nd day of February, 20 13



















To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

#### **SECTION G: AGREEMENT**

THIS AGREEMENT made this Advantage of Morch in the year Two Thousand and Thirteen between SCHERRER CONSTRUCTION CO., INC. 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 \_\_\_\_\_MARCH 19\_, 2013, 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:

# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

- 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 <u>SEE SPECIAL PROVISIONS</u>, 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 <a href="TWO HUNDRED SEVENTY-ONE">TWO HUNDRED SEVENTY-ONE</a>
  THOUSAND, EIGHT HUNDRED TWENTY-SIX DOLLARS & NO
  CENTS (\$ 271,826.00) 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.

"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.

03/07/13-6902specs.doc G-1

"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 preapprentices, 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.

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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 Subjourneypersons.** Apprentices and subjourneypersons 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.

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**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 therefor; 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 therefor; 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.

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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 original 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.

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#### 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.

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# OLBRICH GARDENS RESTROOM ADDITION CONTRACT NO. 6902

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:		SCHERRER CONSTRUCTION C	O., INC.
Stylmur Day Witness	3 20 13 Date	President President	3 20 13 Date
	3/20/13	GP/DRC	3/20/13
Witness	Date	Secretary	Date
CITY OF MADISON, WISCONSIN			
Provisions have been made to pay the l that will accrue under this contract.	iability	Approved as to form:	
And I am edule		Anne Fellhoes for	•
Finance Director		City Attorney	
Signed this 29th day of _	MARO	h 1 20/3	j
Know Demotar	<u></u>	fail office	3-29-13
Witness		Mayor	Date
Elem Dec 3-2	18-13	Maiboth Witzel Behl City Clerk	<b>3</b> -28-13
Witness		City Clerk	Date

# **SECTION H: PAYMENT AND PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that we principal, and TRAVELERS CASUALTY AND SUR Company of Hartford, Connecticut and Madison, Wisconsin, in the sum of TWO HU HUNDRED TWENTY-SIX DOLLARS & NO CONTROL States, for the payment of which sum to the City of I executors and administrators firmly by these present	S surety, are held and firmly bound unto the City NDRED SEVENTY-ONE THOUSAND, EIGHT (\$ 271,826.00 ), lawful money of the Unimadison, we hereby bind ourselves and our respect	of HT ted
The condition of this Bond is such that if the abore perform all of the terms of the Contract entered into construction of:		
	RESTROOM ADDITION CT NO. 6902	
in Madison, Wisconsin, and shall pay all claims prosecution of said work, and save the City harmles in the prosecution of said work, and shall save harm (under Chapter 102, Wisconsin Statutes) of employed to be void, otherwise of full force, virtue and effect.	ss from all claims for damages because of negliger mless the said City from all claims for compensati	nce ion
Signed and sealed thisday	of	013
Countersigned:	SCHERRER CONSTRUCTION CO., INC.	· ·
Stephane R. Da	Company Name (Principal)	
Witness	President Se	eal
Secretary		
Approved as to form:	TRAVELERS CASUALTY AND SURETY COMPA	
City Attorney Award More Tillhout 100	Surety Sommission  By  Attorney-in-Fact Dennis M. Barto	eal
This certifies that I have been duly licensed as an	0 13, and appointed as attorney-in-fact w	ith
March 20, 2013	Agent Signature Signature	
Date	Agent Signature Dennis M. Barton	

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#### **POWER OF ATTORNEY**

**Farmington Casualty Company** Fidelity and Guaranty Insurance Company Fidelity and Guaranty Insurance Underwriters, Inc. St. Paul Fire and Marine Insurance Company St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company Travelers Casualty and Surety Company Travelers Casualty and Surety Company of America **United States Fidelity and Guaranty Company** 

Marie C. Tetreault, Notary Public

Attorney-In Fact No.

219817

Certificate No. 004952896

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Elizabeth M. Fedyn, Joseph L. Vigna, Dennis M. Barton, Daniel G. Johnson, and Michael T. Burg

| other writings ob                       | rate capacity if m<br>ligatory in the na                  | ore than one is name                                                                                     | alf of the Compar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | execute, seal and a                                          | acknowledge any<br>ess of guaranteeir                     | and all bonds, reco                                        | ognizances, conditi<br>ersons, guaranteeir                                | al Attorney(s)-in-Fact,<br>onal undertakings and<br>ng the performance of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| day of July                             |                                                           | Farmington Casua<br>Fidelity and Guara<br>Fidelity and Guara<br>St. Paul Fire and M<br>St. Paul Guardian | ulty Company<br>anty Insurance C<br>anty Insurance U<br>Marine Insurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Company<br>Inderwriters, Inc.<br>e Company                   | St.<br>Tra<br>Tra                                         | Paul Mercury Ins<br>velers Casualty a<br>velers Casualty a | surance Company<br>nd Surety Compa<br>nd Surety Compa<br>y and Guaranty C | ny<br>ny of America                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1982<br>1982<br>1982                    | 1977                                                      | WCORPORATED EN 1951                                                                                      | THE STATE OF THE S | SEAL S                                                       | SEAL S                                                    | CONN.                                                      | HARTORD C                                                                 | HEUTYANO (LEVEL) SERVICE SERVI |
| State of Connection City of Hartford s  |                                                           |                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                              | Ву:                                                       | George W Thom                                              | oson, Senior Vice Pres                                                    | sident                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Inc., St. Paul Fire<br>Company, Travele | Senior Vice Presi<br>e and Marine Ins<br>ers Casualty and | surance Company, S                                                                                       | St. Paul Guardian<br>America, and Ur                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | y, Fidelity and G<br>Insurance Compa<br>tited States Fidelit | uaranty Insurance<br>iny, St. Paul Me<br>y and Guaranty ( | Company, Fidelit<br>cury Insurance C<br>Company, and that  | y and Guaranty Insompany, Travelers the, as such, being                   | n, who acknowledged<br>surance Underwriters,<br>Casualty and Surety<br>g authorized so to do,<br>icer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| In Witness Wher                         | <b>eof,</b> I hereunto se                                 | et my hand and office                                                                                    | ial seal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TETRE                                                        |                                                           | Man                                                        | in c. J.                                                                  | etreault                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

58440-6-11Printed in U.S.A.

My Commission expires the 30th day of June, 2016.

#### WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, and Vi President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, and Vi any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 20th day of March, 20 13.



















To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

State of Wisconsin Department of Workforce Development Equal Rights Division

### **DEPARTMENTAL ORDER**

### **ISSUE DATE: 1/10/2013**

#### PROJECT:

ALL PUBLIC WORKS PROJECTS UNDER SEC 66.0903, STATS - CITY OF MADISON MADISON CITY, DANE COUNTY, WI Determination No. 201300080

| PROJECT OWNER:                                                                                                                              | REQUESTER:                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| ROBERT F. PHILLIPS, CITY ENGINEER<br>CITY OF MADISON-ENGINEERING<br>210 MARTIN L KING JR BLVD, RM 115<br>MADISON, WI 53703                  | ROBERT F. PHILLIPS, CITY ENGINEER CITY OF MADISON-ENGINEERING 210 MARTIN L KING JR BLVD, RM 115 MADISON, WI 53703 |
| ADDITIONAL CONTACT:                                                                                                                         |                                                                                                                   |
| NORMAN DAVIS, CONTRACT COMPLIANCE<br>CITY OF MADISON-DEPT OF CIVIL RTS-AA DIV<br>210 MARTIN L KING JR BLVD, RM 523<br>MADISON, WI 537033342 |                                                                                                                   |

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

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

#### **Enclosures**

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

ISSUED BY:

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

Web Site: http://dwd.wisconsin.gov/er/

PREVAILING WAGE RATE DETERMINATION
Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Wis. Stats.
Issued On: 1/10/2013

| DETERMINATION NUI | MBER: 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 AGEN  | ICY: CITY OF MADISON-ENGINEERING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CLASSIFICATION:   | 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: dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| OVERTIME:         | Time and one-half must be paid for all hours worked:  - over 10 hours per day on prevailing wage projects  - over 40 hours per calendar week  - Saturday and Sunday  - 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;  - The day before if January 1, July 4 or December 25 falls on a Saturday;  - The day following if January 1, July 4 or December 25 falls on a Sunday.  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.  A DOT Premium (discussed below) may supersede this time and one-half requirement. |
| FUTURE INCREASE:  | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| PREMIUM PAY:      | 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, whevenever such pay is applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| DOT PREMIUM:      | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| APPRENTICES:      | Pay apprentices a percentage of the applicable journeyperson's hourly basic rate of pay and hourly fringe benefit contributions specified in this determination. Obtain the appropriate percentage from each apprentice's contract or indenture.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SUBJOURNEY:       | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                     |

is document MUST BE POSTED by the CONTRACTING AGENCY in at least one conspicuous and easily accessible place on ...e 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 a 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
- 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                                                                                                                                                                                                                                                |                                      |                                    |             |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------------|
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION                                                                                                                                                                                | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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       |

| Detern | illiation No. 201300000                                                                                                                                                                                        |                                |                              | 1 490 1 012        |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|--------------------|
| ODE    | Fringe Benefits Must Be Paid On All Hours Worked  TRADE OR OCCUPATION                                                                                                                                          | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | TOTAL              |
| 119    | Marble Finisher                                                                                                                                                                                                | \$ 20.00                       | 0.00                         | <b>\$</b><br>20.00 |
| 120    | Marble Mason                                                                                                                                                                                                   | 32.01                          | 16.85                        | 48.86              |
|        |                                                                                                                                                                                                                | 18.05                          | 8.08                         | 26.13              |
| 121    | Metal Building Erector                                                                                                                                                                                         | 31.76                          | 15.36                        | 47.12              |
| 122    | Millwright  Overhead Dear Installer                                                                                                                                                                            |                                | and the state of the Marian  | 13.50              |
| 123    | Overhead Door Installer                                                                                                                                                                                        | 13.50                          | 0.00                         |                    |
| 24     | Painter                                                                                                                                                                                                        | 24.80                          | 14.78                        | 39.58              |
| 25     | Pavement Marking Operator                                                                                                                                                                                      | 30.00                          | 0.00                         | 30.00              |
| 26     | Piledriver                                                                                                                                                                                                     | 30.66                          | 15.31                        | 45.97              |
| 127    | Pipeline Fuser or Welder (Gas or Utility)                                                                                                                                                                      | 30.18                          | 19.29                        | 49.47              |
| 29     | Plasterer                                                                                                                                                                                                      | 30.03                          | 16.36                        | 46.39              |
| 30     | Plumber                                                                                                                                                                                                        | 36.17                          | 15.37                        | 51.54              |
| 32     | Refrigeration Mechanic                                                                                                                                                                                         | 42.45                          | 16.71                        | 59.16              |
| 33     | 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              |
| 38     | Temperature Control Installer                                                                                                                                                                                  | 41.20                          | 16.21                        | 57.41              |
| 139    | Terrazzo Finisher<br>Future Increase(s):<br>Add \$ .80 on 6/1/2013                                                                                                                                             | 26.57                          | 16.50                        | 43.07              |
| 40     | Terrazzo Mechanic                                                                                                                                                                                              | 29.51                          | 17.63                        | 47.14              |
| 41     | Tile Finisher Future Increase(s): Add \$ .80/hr on 6/1/2013.                                                                                                                                                   | 23.77                          | 16.50                        | 40.27              |
| 42     | 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                                                                                                                                     | 32.01                          | 17.35                        | 49.36              |

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.

|      | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                                                                                                | HOURLY<br>BASIC RATE           | HOURLY<br>FRINGE             |              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|--------------|
| CODE | TRADE OR OCCUPATION                                                                                                                                    | OF PAY<br>\$                   | BENEFITS<br>\$               | TOTAL (      |
| 144  | Underwater Diver (Except on Great Lakes)                                                                                                               | 34.16                          | 15.31                        | 49.47        |
| 146  | Well Driller or Pump Installer<br>Future Increase(s):<br>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                          | 17.79                        | 47.43        |
| 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                                                                                                                                          |                                |                              |              |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                           | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | <u>TOTAL</u> |
|      |                                                                                                                                                        | \$                             | \$                           | \$           |
| 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<br>Future Increase(s):<br>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                                                                                                                                               |                                |                              |              |
| CODE | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                       | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | TOTAL        |
| CODE | TRADE OR OCCUPATION                                                                                                                                    | \$                             | \$                           | \$           |
| 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        |

|      | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | HOURLY<br>BASIC RATE                 | HOURLY<br>FRINGE                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ODE  | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | OF PAY<br>\$                         | <u>BENEFITS</u><br>\$              | <u>TOTAL</u><br>\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 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<br>SITE PREPARATION, UTILITY OR LANDSCAPING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |                                    | a graph property and a second property and a |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 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 Mfgr's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfgr's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & 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. |                                      | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Determ | ination No. 201300080                                                                                                                                                                                                                                                                                                                                                                             |                                |                              | rage / 012  |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|-------------|
| 2005   | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                  | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | TOTAL       |
| ODE    | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                               | \$                             | \$                           | \$          |
| 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<br>EXCLUDING SITE PREPARATION, UTILITY, PAVING L                                                                                                                                                                                                                                                                                                                        | S<br>ANDSCAPING V              | VORK                         | W.1         |
|        | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                                                                                                                                                                                                                                                                                                                                           | HOURLY<br>BASIC RATE           | HOURLY<br>FRINGE             |             |
| CODE   | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                               | OF PAY<br>\$                   | BENEFITS<br>\$               | TOTAL<br>\$ |
| 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.                    | 35.12                          | 18.46                        | 53.58       |

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.

| <u> DDE</u> | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | <u>TOTAL</u> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|--------------|
| 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, Towe 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                | \$<br>18.46                  | \$<br>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).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                | 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 Bidwel 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. | I                              | 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.                                                                                                                                                                                                                                                                                                                                  |                                | 18.46                        | 48.78        |

|      | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE | TOTAL (<br>\$<br>48.15 |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|------------------------|
| CODE | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | OF PAY<br>\$         | BENEFITS<br>\$   |                        |
| 51.3 | 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. |                      | 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                  |

# SEWER, WATER OR TUNNEL CONSTRUCTION

cludes those projects that primarily involve public sewer or water distribution, transmission or collection systems and .elated tunnel work (excluding buildings).

|      | SKILLED TRADES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                    |             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------------|
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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       |

| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                     | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TOTAL (     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 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                                | 17.79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 47.43       |
| 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                                                                                                                                                                                                                                                                                                                                    |                                      | TO A PART OF THE P |             |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION                                                                                                                                                                                                                                                                   | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TOTAL<br>\$ |
| 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                                                                                                                                                                                                                                                                                                                                         |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                     | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TOTAL<br>\$ |
| 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       |

|      | ination No. 201300000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                       | age 12 01 2 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-------------|
| )ODE | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE      | TOTAL       |
| ODE  | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OF PAY<br>\$         | <u>BENEFITS</u><br>\$ | TOTAL<br>\$ |
| 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<br>SEWER, WATER OR TUNNEL WOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                      | min spots to          | .,          |
|      | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE      | TOTAL       |
| ODE  | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | OF PAY<br>\$         | BENEFITS<br>\$        | TOTAL<br>\$ |
| 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.                                                |                      | 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. |                      | 18.46                 | 50.85       |

|      | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE |         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|---------|
| CODE | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | OF PAY<br>\$         | BENEFITS<br>\$   | TOTAL ( |
| 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 Chair Type Having 8-Inch Bucket & Under); Winches & A-Frames. |                      | 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   |

# AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION

cludes all airport projects (excluding buildings) and all projects awarded by the Wisconsin Department of ansportation (excluding buildings).

|      | SKILLED TRADES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                    |             |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------------|
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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       |
| ,09  | 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 Waterproofer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 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       |
| ،51  | Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 35.50                                | 15.09                              | 50.59       |

| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                       | HOURLY<br>BASIC RATE<br><u>OF PAY</u><br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL (     |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------|-------------|
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                             |                                    | 300 00      |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                     | HOURLY<br>BASIC RATE<br>OF PAY<br>\$        | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm. | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                      |                                    |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------|
| CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL |
| 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 |
| ີ 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Asbestos Abatement Worker                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 18.00                                | 0.00                               | 18.00 |
| 303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 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 |
| \dagger \dagge | 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

| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------------|
| 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 Ove 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm. | 35.22<br>r                           | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 34.72                                | 19.90                              | 54.62       |

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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm.

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.

Premium Increase(s):

|             | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE |             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|-------------|
| <u> DDE</u> | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | OF PAY<br>\$         | BENEFITS<br>\$   | TOTAL<br>\$ |
| 533         | Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & 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 & 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; 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); 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 \$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: http://roadwaystandards.dot. wi.gov/hcci/lab |                      | 19.90            | 54.12       |
| 534         | Belting, Burlap, Texturing Machine; 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 Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine.  Future Increase(s):  Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 33.96                | 19.90            | 53.86       |

|      | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | HOURLY<br>BASIC RATE | HOURLY<br>FRINGE |         |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------|---------|
| CODE | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | OF PAY               | <u>BENEFITS</u>  | TOTAL ( |
|      | 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: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | \$                   | \$               | Ψ       |
| 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm. |                      | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | S<br>(               | 19.15            | 46.90   |

## LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION

cludes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or \_gricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

| SKILLED TRADES |                                                                                                                                                                                           |                                      |                                    |             |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|-------------|
| CODE           | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION                                                                                                            | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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 Waterproofer                                                                                                                                                                    | 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                                                                                                                               | 29.64                                | 17.79                              | 47.43       |
| 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                                                                                            |                                             |                                    |             |
|------|----------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------|-------------|
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                             | HOURLY<br>BASIC RATE<br><u>OF PAY</u><br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL       |
| 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<br>Future Increase(s):<br>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                                                                                                 |                                             |                                    |             |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                             | HOURLY<br>BASIC RATE<br>OF PAY<br>\$        | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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

| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br><u>BENEFITS</u><br>\$ | TOTAL<br>\$ |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------|-------------|
| 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm. | 35.22                                | 19.90                                     | 55.12       |
| 542  | Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. o 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                                                                                                                                                                                                                                                                                                 | •                                    | 19.90                                     | 54.62       |

(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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm.

|      | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              | HOURLY<br>FRINGE | TOTAL   |  |  |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------|---------|--|--|
| CODE | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | OF PAY<br>\$ | BENEFITS<br>\$   | TOTAL ( |  |  |
| 543  | Air Track, Rotary or Percussion Drilling Machine &/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. & 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 & 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; 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 & A-Frames.  Future Increase(s):  Add \$2/In 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm. | 34.22        | 19.90            | 54.12   |  |  |
| 544  | Backfiller; Belting, Burlap, Texturing Machine; 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 (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Jeep Digger; Joint Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine.  Future Increase(s):  Add \$2/hr on 6/1/13; 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: http://roadwaystandards.dot. wi.gov/hcci/labor-wages-eeo/index.shtm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |              | 19.90            | 53,86   |  |  |

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                | HOURLY HOURLY BASIC RATE FRINGE    |             |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------|-------------|
| <u>`ODE</u> | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | OF PAY                         | BENEFITS<br>\$                     | TOTAL<br>\$ |
| 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.                                                                 |                                | 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.                                                                                                                                                                                                                                                                                                                            |                                | 19.15                              | 46.90       |
| 46.         | HEAVY EQUIPMENT OPERATORS<br>ASPHALT PAVEMENT OR OTHER WO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                | van era (                          |             |
| CODE        | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
| 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 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 \$1/hr on 6/2/2013. |                                | 18.46                              | 51.38       |

|      | Fringe Benefits Must Be Paid On All Hours Worked                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | HOURLY                     | HOURLY                          |         |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|---------|
| CODE | TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | BASIC RATE<br>OF PAY<br>\$ | FRINGE<br><u>BENEFITS</u><br>\$ | TOTAL ( |
| 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 Mfgr.'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. | i<br>r                     | 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 Sawer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self-Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler.  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   |

120

121

123

124

125

Marble Mason

Painter

Metal Building Erector

Overhead Door Installer

Pavement Marking Operator

## RESIDENTIAL OR AGRICULTURAL CONSTRUCTION

cludes single family houses or apartment buildings of no more than four (4) stories in height and all buildings, cructures 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.

**SKILLED TRADES** 

| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION | HOURLY<br>BASIC RATE<br><u>OF PAY</u><br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$ |
|------|--------------------------------------------------------------------------------|---------------------------------------------|------------------------------------|-------------|
| 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       |
| 400  | NAI-I- NA                                                                      | 00.00                                       | 2.00                               | 00.00       |

23.00

16.52

17.00

23.00

28.10

0.00

1.82

0.00

11.27

15.00

23.00

18.34

17.00

34.27

43.10

|      | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked                        | HOURLY<br>BASIC RATE                 | HOURLY<br>FRINGE                   |                |
|------|--------------------------------------------------------------------------------|--------------------------------------|------------------------------------|----------------|
| CODE | TRADE OR OCCUPATION                                                            | <u>OF PAY</u><br>\$                  | <u>BENEFITS</u><br>\$              | TOTAL (        |
| 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 Waterproofer                                                         | 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                                                                  | 3                                    |                                    |                |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION | HOURLY<br>BASIC RATE<br>OF PAY       | HOURLY<br>FRINGE<br>BENEFITS       | <u>TOTAL</u>   |
|      | O. L.A.L. T. A.L.                                                              | \$ 29.05                             | <b>\$</b><br>4.18                  | \$<br>32.23    |
| 201  | Single Axle or Two Axle                                                        | 28.05                                |                                    | 24.37          |
| 203  | Three or More Axle                                                             | 20.00                                | 4.37                               |                |
| 205  | Pavement Marking Vehicle                                                       | 20.85                                | 11.02                              | 31.87<br>20.85 |
| 207  | Truck Mechanic                                                                 | 19.00                                | 1.85                               | 20.65          |
|      | LABORERS                                                                       |                                      |                                    |                |
| CODE | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked<br>TRADE OR OCCUPATION | HOURLY<br>BASIC RATE<br>OF PAY<br>\$ | HOURLY<br>FRINGE<br>BENEFITS<br>\$ | TOTAL<br>\$    |
| 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          |

| )DE    | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | TOTAL        |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|--------------|
|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | \$                             | \$                           | \$           |
| 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<br>RESIDENTIAL OR AGRICULTURAL CONST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RUCTION                        | -10-                         |              |
| CODE   | Fringe Benefits Must Be Paid On <u>All</u> Hours Worked  TRADE OR OCCUPATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | HOURLY<br>BASIC RATE<br>OF PAY | HOURLY<br>FRINGE<br>BENEFITS | <u>TOTAL</u> |
|        | THE STATISTICS OF A TION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | \$                             | \$                           | \$           |
| 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, Vlbratory/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, Tlmbco, 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); Wlnches & 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        |
| ****** | **************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ********                       | *******                      | ******       |

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