

EXHIBIT "B"

WARNER BEACH PARK SHELTER

1101 Woodward Drive Madison WI
CITY OF MADISON PARKS DIVISION
CITY OF MADISON CONTRACT # 8850/MUNIS # 11971

TECHNICAL SPECIFICATIONS

05.07.20

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DOCUMENT 00 01 10

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**SECTION 00 31 46
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11 **PART 1 – GENERAL**

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13 **1.1. SUMMARY**

- 14 A. Each project has varying requirements for permits, inspections, and fees based on the scope, size, and location of
15 the project.
16 B. The City of Madison (Owner) is subject to all permits, inspections and associated fees for construction,
17 demolition, utility connection, storm water management, and other similar requirements that may be required
18 to complete the scope of work associated with these contract documents.
19 C. The General Contractor (GC) shall be responsible for obtaining all permits, inspections and paying for all
20 associated fees unless specifically identified within this specification.
21

22 **1.2. REFERENCES**

- 23 A. The following references are not intended to be all inclusive. It shall be the GC’s responsibility to determine all
24 requirements based on the scope of work in the contract documents.
25 B. City of Madison Ordinances: Review all ordinances that may require a permit or fee that may be connected with
26 a required permit. Contact the following City Agencies to determine the exact requirements during bidding
27 1. Building Inspection
28 2. Zoning
29 3. Engineering
30 4. Water Utility
31 5. Traffic Engineering
32 6. Others as may be specified by the contract documents.
33 B. State Statutes
34 C. Other Regulatory Regulations
35 D. Other Agencies or companies that may have related requirements
36 1. Madison Metropolitan Sewerage District
37 2. Local gas and electric utility companies
38 3. Other utility companies
39

40 **1.3. GENERAL CONTRACTORS REQUIREMENTS**

- 41 A. The GC shall be responsible for all of the following:
42 1. Execute application for all required permits as may be required by the scope of work described within the
43 contract documents.
44 2. Scheduling all required inspections that may be conditions of any required permits.
45 3. Paying for other permits not explicitly stated as excluded in this section.
46 B. The GC is not responsible for paying for the City Building, City HVAC, City Electrical, and City Plumbing permits.
47 C. The GC shall provide high quality scanned images of all required permits and inspections and upload them to the
48 Contract Documents-Regulatory Documents Library on the Project Management Web Site.
49

50 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

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52 **PART 3 – EXECUTION – THIS SECTION NOT USED**

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56 **END OF SECTION**
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SECTION 00 43 25
SUBSTITUTION REQUEST FORM (DURING BIDDING)

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14 **PART 1 – GENERAL**

15
16 **1.1. SUMMARY**

- 17 A. The City of Madison uses a specific list of preferred products for various specification items to establish
18 standards of quality, utility, and appearance required.
19 B. The City of Madison will not allow substitutions for specified Products except as follows:
20 1. The Product is no longer produced or the product manufacturer is no longer in business.
21 2. The manufacturer has significantly changed performance data, product dimensions, or other such design
22 criteria for the specified Product(s).
23 3. Products specified by naming one or more Products or manufacturer’s and “or approved equal” or
24 “approved equivalent.”
25 C. The procedures in this specification shall apply to all proposals by Contractors, Suppliers, Vendors, and
26 Manufacturers when the conditions in item 1.1.B. above have been met during the bidding phase.
27

28 **1.2. RELATED SPECIFICATIONS**

- 29 A. 01 25 13 Product Substitution Procedures
30

31 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

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33 **PART 3 - EXECUTION**

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35 **3.1. REQUESTING A SUBSTITUTION DURING BIDDING**

- 36 A. In the event that a substitution is requested during the bidding phase the Contractor, Supplier, Vendor, or
37 Manufacturer shall do all of the following:
38 1. Submit a Substitution Request Form for each different product. Use a printed/scanned copy of the form
39 at the end of this specification as a cover sheet.
40 2. Support your request with complete data, drawings, specifications, performance data and samples as
41 appropriate. A complete submission shall include the following:
42 a. Substitution Request Form as a cover sheet
43 b. Comparison of qualities of the proposed substitutions with that specified.
44 c. Changes required in other elements of the Work because of the substitution.
45 d. Effect on the construction schedule.
46 e. Cost data comparing the proposed substitution with the Product specified.
47 f. Any required license fees or royalties.
48 g. Availability of maintenance service and source of replacement materials.
49 3. Submit the Substitution Request Form and all required supporting documentation to the City Project
50 Manager and Project Architect.
51 a. Submissions to be done as complete PDF files for each product, appropriately titled
52 b. Email submissions to the Project Architect and City Project Manager at the email addresses
53 provided on the last page of Section D of the contract documents.
54 i. The subject line shall include the contract number and “Request for Substitution”.
55 Example: Contract 1234 – Request for Substitution
56 4. Submissions must be received by the substitution request deadline specified in Section A of the Contract
57 Documents.
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3.2. SUBMISSION REVIEW

- A. The Project Architect, City Project Manager, members of the design team, and the Owners staff shall review all submissions for substitutions during the bidding phase.

3.3. SUBSTITUTION APPROVAL

- A. All requests for substitutions that have been approved shall be published by Addenda to the bid documents.

NOTE SEE NEXT PAGE FOR SAMPLE SUBSTITUTION REQUEST FORM.

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3.4. SUBSTITUTION REQUEST FORM

For Pre-bid Substitution Requests all text boxes on this form are required information for a complete request.

	<h1>Substitution Request</h1>
Today's Date:	<input type="text"/>
Project Title:	<input type="text"/>
Project Number:	<input type="text"/>
Contract Number:	<input type="text"/>
<p><i>By completing and submitting this form for review the General Contractor affirms that all of the following statements are correct:</i></p> <ol style="list-style-type: none"><i>The General Contractor affirms that this request is in compliance with the requirements described in Specification 01 25 13 Product Substitution Procedures.</i><i>The function, appearance, and quality of the proposed substitution are equal or superior to the specified item.</i><i>The proposed substitution does not affect dimensions shown on the drawings.</i><i>The proposed substitution will have no adverse affects on other trades, the construction schedule, or any specified warranty requirements.</i><i>Maintenance and service parts will be locally available for the proposed substitution. (GC shall provide supporting documentation in the attachments section below.)</i><i>The General Contractor shall be responsible for any and all costs associated with this substitution request if approved. This includes but is not to limited to fees for building design, engineering design fees, detailing fees, plan review fees, construction costs, and inspection fees.</i>	
<p style="text-align: center;"><u>GC Substitution Request:</u></p>	
General Title:	<input type="text"/>
Related Specification:	<input type="text"/> <input type="text"/> <input type="text"/>
Reason for Substitution:	<input type="text"/>
Proposed Substitution: (include Name, Model, etc.)	<input type="text"/>
Submitted By:	<input type="text"/>
Company:	<input type="text"/>
Phone:	<input type="text"/>
Email:	<input type="text"/>

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**SECTION 00 43 43
WAGE RATES FORM**

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PART 1 – GENERAL 1
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PART 1 – GENERAL

1.1. SUMMARY

- A. The Reimbursable Hourly Worksheet is a contractor provided document that indicates the basic rate of pay, fringe benefits, and each companies cost of required insurance for all Trades and Classifications that will be performing productive labor during the execution of this contract.
 - 1. Rates shall be similar to recognized rates published by the Bureau of Labor Statistics, Associated General Contractors (AGC), Associated Builders and Contractors (ABC), appropriate union contracts, and other similar organizations or documents.
- B. The Reimbursable Labor Rate Worksheet shall provide the basis for labor rates being used on Change Order Request forms.

1.2. RELATED SPECIFICATIONS

- A. Section 01 26 57 Change Order Request
- B. Section 01 29 76 Progress Payment Procedures
- C. Section 01 31 23 Project Management Web Site (SharePoint)
- D. Section 01 32 19 Submittals Schedule

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1. GENERAL REQUIREMENTS

- A. Prior to the Pre-Construction Meeting the City Project Manager (CPM) or the City Construction Manager (CCM) shall provide the GC a copy of the *Reimbursable Labor Rate Worksheet.xls*.
 - 1. See the last page of this specification for an example of the worksheet.
- B. The GC shall provide all subcontractors that will be performing productive labor during the execution of this contract with additional copies of the worksheet as needed.
- C. All contractors shall be required to fill out and submit completed worksheets for all Trades and Classifications of labor that will be performing productive labor during the execution of this contract.

3.2. GENERAL CONTRACTORS RESPONSIBILITIES

- A. The GC shall consolidate all Trades and Classifications into one master Excel Workbook of all trades.
- B. The GC shall provide the combined workbook as required by Section 1.6 of Specification 01 32 19 Submittals Schedule for review and approval by the Owners Representatives.
 - 1. Submittal shall be an Exported PDF of the completed Excel Workbook.
 - a. As an Exported PDF the individual worksheets will be bookmarked and the document will be word searchable for easy reference.
- C. The GC shall only use the rates posted in the approved submittal throughout the execution of this contract.

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Reimbursable Hourly Rate Worksheet

(see bottom of page for instructions)

Project Name: _____
 Project Location: _____
 Project Number: _____
 Contractor: _____
 Rates are based on the following documentation: _____

Enter TRADE Here:

Carpenter

Classification:		Foreman	Journeyman	Laborer	Apprt 1	Other	Other	Other
Base Rate (BR)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Vacation		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Health Insurance		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Pension		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Apprenticeship		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-total		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
BR Sub-total		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Work. Comp	% of BR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Gen Liability	% of BR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
WI Unemploy	% of BR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Fed Unemploy	% of BR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
FICA	% of BR	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sub-total		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TOTAL COST		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Enter YOUR percentage of base rate in the column below.

0	- Work. Comp
0	- Gen Liability
0	- WI Unemploy
0.6	- Fed Unemploy
7.65	- FICA

Form Instructions:

1. Provide a work sheet for ALL Trade Classifications that will be performing on site productive labor during the execution of this project.
2. Responsible contractor to complete only boxes that are shaded, all non-shaded boxes are formula driven.
3. Contractor shall provide the name of the source used for these rates. (union contract, Bureau of Labor and Statistics, AGC, ABC, etc.) and be prepared to provide copies if so requested.

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END OF SECTION

**SECTION 00 62 76.13
SALES TAX FORM**

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9 PART 3 – EXECUTION – THIS SECTION NOT USED 1

10
11 **PART 1 – GENERAL**

12
13 **1.1. SUMMARY**

- 14 A. The City of Madison is a qualifying tax exempt entity in the State of Wisconsin.
15 B. The Contractor shall refer to *Section 102.9 – Bidders Understanding of the City of Madison Standard*
16 *Specifications for Public Works Construction* for more information on Tax Exempt Status.
17 C. This project constructs or remodels facilities owned by the City of Madison in Madison, Wisconsin.
18

19 **1.2. RELATED SPECIFICATION SECTIONS**

- 20 A. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public
21 Works Construction”.
22 1. Use the following link to access the Standard Specifications web page:
23 <http://www.cityofmadison.com/business/pw/specs.cfm>
24 a. Click on the “Part” chapter identified in the specification text. For example if the specification
25 says “Refer to City of Madison Standard Specification 210.2” click the link for Part II, the Part II
26 PDF will open.
27 b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you
28 to the referenced text.
29

30 **1.3. TAX EXEMPT FORM**

- 31 A. The Contractor can access Wisconsin Sales and Use Tax Exemption Certificates (form S-211, Wisconsin
32 Department of Revenue) from the City of Madison Finance website.
33 1. City of Madison tax exempt information and signature by Purchasing Supervisor is already completed.
34 2. Website: <http://www.cityofmadison.com/employeeenet/finance/purchasing>
35 a. Under the title *Purchasing Forms*, scroll down to the form link titled *Sales Tax Exempt Form S-211*.
36

37 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

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39 **PART 3 – EXECUTION – THIS SECTION NOT USED**

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44 **END OF SECTION**
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SECTION 01 25 13
PRODUCT SUBSTITUTION PROCEDURES

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PART 1 – GENERAL

1.1. SUMMARY

- 17 A. The City of Madison uses a specific list of preferred products for various specification items to establish
18 standards of quality, utility, and appearance required.
19 B. The City of Madison will not allow substitutions for specified Products except as follows:
20 1. The Product is no longer produced or the product manufacturer is no longer in business.
21 2. The manufacturer has significantly changed performance data, product dimensions, or other such design
22 criteria for the specified Product(s).
23 3. Products specified by naming one or more Products or manufacturer’s and “or approved equal” or
24 “approved equivalent.”
25 C. The City of Madison will not allow substitutions for specified Products as follows:
26 1. For Products specified by naming only one Product and manufacturer, no substitute product will be
27 considered.
28 2. For Products specified by naming several Products or manufacturers select any one of the products or
29 manufacturers named, which complies with the specifications. No substitute product will be considered.
30 D. Request for substitutions from any party other than the General Contractor (GC) will not be accepted.
31

1.2. RELATED SPECIFICATIONS

- 33 A. Section 01 26 13 Request for Information (RFI)
34 B. Section 01 31 23 Project Management Web Site
35 C. Section 01 33 23 Submittals
36

PART 2 – PRODUCTS

2.1. SUBSTITUTION REQUEST FORM

- 40 A. During bidding all contractors (General and Sub-contractors) and suppliers of materials or products shall provide
41 hard copy of the Substitution Request form and all required attachments directly to the Project Architect.
42 1. Contractors and suppliers shall use the screen shot of the form located at the end of this specification to
43 print a hard copy for all pre-bid substitution requests.
44 B. After bidding only the GC shall submit a request and shall use the form located on the Project Management Web
45 Site.
46

PART 3 - EXECUTION

3.1. REQUESTING A SUBSTITUTION DURING BIDDING

- 50 A. In the event that a substitution is requested during the bidding phase the Contractor or Supplier shall meet the
51 substitution request deadline listed in the bidding documents. No substitution request will be considered during
52 the bidding period after the stated substitution request deadline. In general this procedure shall be as follows:
53 1. Submit a Substitution Request Form for each different product
54 2. Support your request with complete data, drawings, specifications, performance data and samples as
55 appropriate. A complete submission shall include the following:
56 i. Substitution Request Form as a cover sheet
57 ii. Comparison of qualities of the proposed substitutions with that specified.
58 iii. Changes required in other elements of the Work because of the substitution.

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- iv. Effect on the construction schedule.
 - v. Cost data comparing the proposed substitution with the Product specified.
 - vi. Any required license fees or royalties.
 - vii. Availability of maintenance service and source of replacement materials.
- 3. Submit the Substitution Request Form and all required supporting documentation to the City Project Manager and Project Architect.
 - i. Submissions to be done as complete PDF files for each product, appropriately titled
 - ii. Email submissions to the Project Architect and City Project Manager at the email addresses provided on the last page of Section D of the contract documents.
 - iii. Submissions must be received by the substitution request deadline specified in Section A of the Contract Documents.
 - B. Substitutions submitted and approved during the bidding phase shall be announced by the City of Madison by addenda prior to the bid due date.
 - C. The Owner and Architect may reject any substitution request without providing specific reasons.

3.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT

- A. A substitution request will only be considered after award of contract if it meets the qualifying provisions as described in 1.1.B.1 and .2 above.
- B. The GC shall submit a substitution request using the digital form on the Project Management Web Site located in the Construction Administration-Substitution Request library.
 - 1. Click on *Add document* to open a new digital form, fill out form, provide required attachments, then click the Submit button.
 - 2. Consulting Staff, Owner and Owners Representatives will review the request and provide the appropriate approvals and feed back to the GC.

3.3. UNAUTHORIZED SUBSTITUTIONS

- A. Any Contractor who substitutes products without proper authorization by the Owner and Architect will be required to immediately remove and replace the product and all costs required to conform to the Contract Documents shall be borne by the General Prime Contractor.

NOTE SEE NEXT PAGE FOR SAMPLE SUBSTITUTION REQUEST FORM.

1

For Pre-bid Substitution Requests all text boxes on this form are required information for a complete request.

	<h1>Substitution Request</h1>
Today's Date:	<input type="text"/>
Project Title:	<input type="text"/>
Project Number:	<input type="text"/>
Contract Number:	<input type="text"/>
<p>By completing and submitting this form for review the General Contractor affirms that all of the following statements are correct:</p> <ol style="list-style-type: none">1 The General Contractor affirms that this request is in compliance with the requirements described in <i>Specification 01 25 13 Product Substitution Procedures</i>.2 The function, appearance, and quality of the proposed substitution are equal or superior to the specified item.3 The proposed substitution does not affect dimensions shown on the drawings.4 The proposed substitution will have no adverse affects on other trades, the construction schedule, or any specified warranty requirements.5 Maintenance and service parts will be locally available for the proposed substitution. (GC shall provide supporting documentation in the attachments section below.)6 The General Contractor shall be responsible for any and all costs associated with this substitution request if approved. This includes but is not limited to fees for building design, engineering design fees, detailing fees, plan review fees, construction costs, and inspection fees.	
GC Substitution Request:	
General Title:	<input type="text"/>
Related Specification:	<input type="text"/> <input type="text"/> <input type="text"/>
Reason for Substitution:	<input type="text"/>
Proposed Substitution: (include Name, Model, etc.)	<input type="text"/>
Submitted By:	<input type="text"/>
Company:	<input type="text"/>
Phone:	<input type="text"/>
Email:	<input type="text"/>

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END OF SECTION

**SECTION 01 26 13
REQUEST FOR INFORMATION (RFI)**

1
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3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. PERFORMANCE REQUIREMENTS..... 1
8 1.4. QUALITY ASSURANCE 1
9 PART 2 – PRODUCTS..... 1
10 2.1. REQUEST FOR INFORMATION FORM 1
11 PART 3 - EXECUTION 1
12 3.1. CONTRACTOR INITIATED RFI 2
13 3.3. RFI RESPONSES 2
14 3.4. COMMENCEMENT OF WORK RELATED TO AN RFI 2
15

PART 1 – GENERAL

1.1. SUMMARY

- 19 A. Contractors shall use the RFI form/process to request additional information or clarification regarding the
20 construction documents.
21 B. All RFI documentation will be processed through the through the Construction Administration-Request for
22 Information Library on the Project Management Web Site (PMWS).
23

1.2. RELATED SPECIFICATIONS

- 24 A. Section 01 26 46 Construction Bulletin (CB)
25 B. Section 01 26 57 Change Order Request (COR)
26 C. Section 01 26 63 Change Order (CO)
27 D. Section 01 31 23 Project Management Web Site (PMWS)
28 E. Section 01 91 00 Commissioning
29
30

1.3. PERFORMANCE REQUIREMENTS

- 31 A. RFI issues initiated by any contractor shall be done through the General Contractor (GC).
32 1. RFIs submitted by any Sub-contractor under the GCs control shall be returned with no response.
33 B. Submit a new RFI for each issue. Only multiple questions that are of a similar nature may be combined into one
34 RFI shall be allowed and responded to.
35
36

1.4. QUALITY ASSURANCE

- 37 A. The GC shall be responsible for all of the following:
38 1. Ensure that any request for additional information is valid and the information being requested is not
39 addressed in the construction documents.
40 2. Ensure that all requests are clearly stated and the RFI form is completely filled out.
41 3. Ensure that all Work associated an RFI response is carried out as intended.
42 B. The PA shall be responsible for the following:
43 1. Ensure that all responses to contractor initiated RFIs are properly responded to in a timely fashion.
44 a. The CPM, Owner, consulting staff, and other City staff shall be responsible for the initial review of
45 the RFI. The PA shall be responsible for codifying all consultant and Owner/City staff comments
46 into a unified RFI response.
47
48

PART 2 – PRODUCTS

2.1. REQUEST FOR INFORMATION FORM

- 49 A. The RFI form is located on the Project Management Web Site. The GC, PA, or CPM as appropriate shall click the
50 link in the left margin of the project web site opening a new form. Project information is pre-loaded, provide
51 additional information as indicated below in the execution to complete the form.
52
53
54
55

PART 3 - EXECUTION

1 **3.1. CONTRACTOR INITIATED RFI**

- 2 A. Immediately on discovery of the need for additional information or interpretation of the Contract Documents
3 any contractor may initiate an RFI for additional information or clarification through the GC.
4 B. The GC shall select the "Submit an RFI" link on the Project Management Web Site and completely fill out the
5 form as follows:
6 1. Contract related information will be automatically populated on the form.
7 2. Thoroughly explain the issue at hand, provide backup information (photographs, sketches, drawings,
8 data, etc) as necessary, and clearly state the question or problem that requires a resolution. Combine
9 like or related issues but do not include multiple issues on one form.
10 a. Example. If a duct interferes with other critical piping and electrical work include all issues into
11 one RFI.
12 b. Example. If you have a question regarding the chiller and another regarding toilet partitions
13 create separate RFIs.
14 3. Check all relevant boxes for trades affected. This will assist the design team in determining who should
15 be reviewing the RFI.
16 C. Upon completing the RFI click the "Submit" button. The PMWS software will automatically route the RFI to the
17 appropriate reviewers.
18

19 **3.3. RFI RESPONSES**

- 20 A. Responses to simple RFI issues shall use the response section of the RFI form and shall be completed within five
21 (5) working days of the RFI form being submitted.
22 B. Responses to more complex issues may require additional time or may require a Construction Bulletin to be
23 published. The initial RFI shall be responded to within five (5) working days stating that the RFI is being
24 reviewed and provide an estimated date for the response.
25 C. The following GC generated RFIs will be returned without action:
26 1. Requests for approval of submittals
27 2. Requests for approval of substitutions
28 3. Requests for approval of Contractor's means and methods.
29 4. Requests for coordination information already indicated in the Contract Documents.
30 5. Requests for adjustments in the Contract Time or the Contract Sum.
31 6. Requests for interpretation of A/E's actions on submittals.
32 7. Incomplete RFI or inaccurately prepared RFI.
33

34 **3.4. COMMENCEMENT OF WORK RELATED TO AN RFI**

- 35 A. The GC shall only proceed with the Work of an RFI when additional information is not required.
36 B. The GC shall not proceed with any Work associated with an RFI while it is under review.
37 C. The GC shall not proceed with any Work associated with an RFI that clearly states a CB will be issued in response
38 to the RFI.
39 D. The GC will be required to immediately remove and replace unauthorized Work and all costs required to
40 conform to the Contract Documents shall be borne by the GC.
41
42
43

44 **END OF SECTION**
45
46

**SECTION 01 26 46
CONSTRUCTION BULLETIN (CB)**

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4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. PERFORMANCE REQUIREMENTS..... 1
8 1.4. QUALITY ASSURANCE 2
9 PART 2 – PRODUCTS..... 2
10 2.1. CONSTRUCTION BULLETIN FORM 2
11 PART 3 - EXECUTION 2
12 3.1. WRITING THE CONSTRUCTION BULLETIN 2
13 3.2. EXECUTING THE CONSTRUCTION BULLETIN..... 2
14

PART 1 – GENERAL

1.1. SUMMARY

- 18 A. Construction Bulletins (CB) are formal published construction documents that modify the original contract bid
19 documents after construction has commenced. CBs may be published for many reasons, including but not
20 limited to the following:
21 1. Clarification of existing construction documents including specifications, plans, and details
22 2. Change in product or equipment
23 3. A response to a Request for Information
24 4. Change in scope of the contract as either an add or a deduct of work
25 B. CBs provide a higher degree of detail in response to a Request for Information (RFI) through directives, revised
26 plans/details, and specifications as necessary.
27 C. The CB may change the original contract documents through additions or deletions to the Work.
28 D. Where the directives of a CB are significant enough to warrant a Change Order Request (COR) the GC shall use all
29 information provided in the CB to assemble all required back-up documentation for additions and deletions of
30 materials, labor and other related contract costs for the COR.
31 E. All CB documentation will be processed through the Construction Administration-Construction Bulletin Library
32 on the Project Management Web Site (PMWS).
33

1.2. RELATED SPECIFICATIONS

- 34 A. Section 01 26 13 Request for Information (RFI)
35 B. Section 01 26 57 Change Order Request (COR)
36 C. Section 01 26 63 Change Order (CO)
37 D. Section 01 31 23 Project Management Web Site
38 E. Section 01 91 00 Commissioning
39
40

1.3. PERFORMANCE REQUIREMENTS

- 41 A. Project Architect (PA): The PA shall be the only person authorized to publish a CB as needed for any reason
42 indicated in section 1.1.A above. The PA shall consult as necessary with any of the following while drafting the
43 CB and shall confirm final direction with the CPM prior to issuing a CB:
44 1. City Project manager (CPM)
45 2. Owner
46 3. Members of the consulting staff
47 4. Members of city staff
48 5. The General Contractor
49 6. Sub-contractors
50 7. Commissioning Agent (CxA)
51 B. General Contractor: The GC shall be responsible for the following as needed:
52 1. Executing the directives of the CB when he/she believes that no changes in labor, materials, equipment,
53 or contract duration will be required for additions or deletions.
54 2. Submit a COR when he/she believes that a change in labor, materials, equipment or contract duration
55 will be required for additions or deletions.
56
57

1 **1.4. QUALITY ASSURANCE**

- 2 A. The PA shall be responsible for ensuring the final CB sufficiently provides direction, details, specifications and
3 other information as necessary for the GC to perform the intended Work.
4 B. The PA shall be responsible for ensuring the final CB is published as expeditiously as practical based on the
5 complexity of the CB being written. CBs that may affect the GC critical path shall be given priority.
6

7 **PART 2 – PRODUCTS**

8
9 **2.1. CONSTRUCTION BULLETIN FORM**

- 10 A. The CB form is located on the Project Management Web Site. The PA shall click the link in the left margin of the
11 project web site opening a new form. Project information is pre-loaded, the PA only needs to enter information
12 and make attachments as needed to complete the form.
13

14 **PART 3 - EXECUTION**

15
16 **3.1. WRITING THE CONSTRUCTION BULLETIN**

- 17 A. The PA shall draft a CB as needed using the Construction Bulletin form on the Project Management Web Site.
18 1. The PA and/or consulting staff as necessary shall provide specifications, model numbers and performance
19 data, details and other such information necessary to clearly state the intentions of the CB.
20 2. The consulting staff, CPM, Owner, CxA and other City Staff shall review the draft and recommend
21 changes as needed.
22 3. The PA shall amend the draft as necessary into a final CB for review
23 B. Once the final CB has been approved the PA shall “Submit” the CB through the Project Management Web Site to
24 the GC.
25

26 **3.2. EXECUTING THE CONSTRUCTION BULLETIN**

- 27 A. The GC shall acknowledge receipt of the CB on the Project Management Web Site as instructed in the Tutorial
28 Manual provided to the awarded contractor.
29 B. The GC shall notify all Sub-contractors of the CB and publish the CB to all field sets of drawings and specifications
30 as appropriate.
31 C. The GC shall execute the directives of the CB or submit COR documentation as necessary during the execution
32 and implementation of the CB.
33 1. See Specification 01 26 57 Change Order Request (COR)
34
35
36

37 **END OF SECTION**
38

SECTION 01 26 57
CHANGE ORDER REQUESTS (COR)

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4 PART 1 – GENERAL 1
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8 1.4. CONTRACT EXTENSION 3
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15 3.1. ESTABLISHING A CHANGE ORDER REQUEST 4
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17 3.3. CHANGE ORDER REQUEST REVIEW, APPROVAL, AND PROCESSING 5
18 3.4. EMERGENCY CHANGE ORDER REQUEST 5
19

PART 1 – GENERAL

1.1. SUMMARY

- 20
21
22
23 A. Except in cases of emergency, no changes in the Work required by the Contract Documents may be made
24 by the General Contractor (GC) without having prior approval of the City Engineer or his representative.
25 B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in
26 the Work by written Change Order (CO). Such changes may include additions and/or deletions.
27 C. Where the City desires to make changes in the Work through use of written Change Order Request (COR), the
28 following procedures apply:
29 1. If requested by the City, the GC shall prepare and submit a detailed proposal, including all cost and time
30 adjustments to which the GC believes it will be entitled if the change proposed is incorporated into the
31 Contract. The City shall be under no legal obligation to issue a Change Order for such proposal.
32 2. The parties shall attempt in good faith to reach agreement on the adjustments needed to the Contract to
33 properly incorporate the proposed change(s) into the Work. In the event that the parties agree on such
34 adjustments, the City may issue a Change Order and incorporate such changes and agreed to
35 adjustments, if any.
36 3. In some instances, it may be necessary for the City to authorize Work or direct changes in Work for which
37 no final and binding agreement has been reached and for which unit prices are not applicable. In such
38 cases the following shall apply.
39 a. Upon written request by the City, the GC shall perform proposed Work
40 b. The cost of such change may be determined in accordance with this specification.
41 c. In the event agreement cannot be accomplished as contemplated herein, the City may authorize
42 the Work to be performed by City forces or to hire others to complete the Work. Such action on
43 the part of the City shall not be the basis of a claim by the GC for failure to allow it to perform the
44 changed Work.
45 D. Where changes in the Work are made by the City through use of a force account basis, the GC shall as soon as
46 practicable, and in no case later than ten (10) working days from the receipt of such order, unless another time
47 period has been agreed to by both parties, give the City written Notice, stating:
48 1. The date, circumstances and source of the extra work; and,
49 2. The cost of performing extra work described by such Order, if any; and,
50 3. Effect of the order on the required completion date of the Project, if any.
51 E. The giving of each Notice by the GC as prescribed by this specification, shall be a requirement to liability of the
52 City for payment of any additional costs incurred by the GC in implementing changes in the Work. Under this
53 specification, no order or statement of the City shall be treated as a Change Order, or shall entitle the GC to an
54 equitable adjustment of the terms of this Contract or damages for costs incurred by the GC on any activity for
55 which the Notice was not given.
56 F. In the event Work is required due to an emergency as described in this specification the GC must request an
57 equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the
58 commencement of such emergency.

- 1 G. All GC requests for equitable adjustment shall be submitted to the CPM per the specifications below. Such
- 2 requests shall set forth with specificity the amount of and reason(s) for the proposed adjustment and shall be
- 3 accompanied by supporting information and documents.
- 4 H. No adjustment of any kind shall be made to this Contract, if asserted by the GC for the first time, after the date
- 5 of final payment.
- 6 I. This specification shall be used by the GC when preparing documentation for any COR to ensure each has been
- 7 properly and completely filled out as required by the City of Madison.
- 8 J. All COR documentation will be processed through the Construction Administration-Change Order Request
- 9 Library on the Project Management Web Site (PMWS).

10
11 **1.2. RELATED SPECIFICATION SECTIONS**

- 12 A. Section 01 26 13 Request for Information (RFI)
- 13 B. Section 01 26 46 Construction Bulletins (CB)
- 14 C. Section 01 26 63 Change Order (CO)
- 15 D. Section 01 31 23 Project Management Web Site
- 16 E. Section 01 91 00 Commissioning
- 17 F. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public
- 18 Works Construction".
 - 19 1. Use the following link to access the Standard Specifications web page:
 - 20 <http://www.cityofmadison.com/business/pw/specs.cfm>
 - 21 a. Click on the "Part" chapter identified in the specification text. For example if the specification
 - 22 says "Refer to City of Madison Standard Specification 210.2" click the link for Part II, the Part II
 - 23 PDF will open.
 - 24 b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you
 - 25 to the referenced text.

26
27 **1.3. DEFINITIONS AND STANDARDS**

- 28 A. LABOR: The amount of time and cost associated with the performance of human effort for a defined scope of
- 29 Work. Labor is further defined as follows:
 - 30 1. Labor rate is the total hourly rate which includes the basic rate of pay, fringe benefits plus each
 - 31 company's cost of required insurance, also referred to as a reimbursable labor rate.
 - 32 2. Unit labor is the labor hours anticipated to install the corresponding unit of material.
 - 33 3. Labor cost is the labor hours multiplied by the hourly labor rates.
- 34 B. MATERIAL: Actual material cost is the amount paid, or to be paid, by the GC for materials, supplies and
- 35 equipment entering permanently into the Work, including cost of transportation and applicable taxes. The cost
- 36 shall not exceed the usual and customary cost for such items available in the geographical area of the project
- 37 C. LARGE TOOLS AND MAJOR EQUIPMENT: Large tools and major equipment are those with an initial cost greater
- 38 than \$1,500, whether from the GC or other sources.
 - 39 1. Tool and equipment use and time allowed is only for extra work associated with change orders.
 - 40 a. Rental Rate is the machine cost associated with operating a piece of equipment for a defined
 - 41 length of time (hour, day, week, or month) and shall not exceed the usual and customary amount
 - 42 for such items available in the geographical area of the project.
 - 43 b. Rental cost is the rental rate multiplied by the anticipated duration the equipment shall be
 - 44 required.
 - 45 2. The GC shall provide a breakdown of all rental rates to indicate what items and costs are associated with
 - 46 the rate. Examples of items to include in the breakdown would be fuel consumption, lubrication,
 - 47 maintenance and other similar expenses but not including profit and overhead.
 - 48 3. When large tools and equipment needed for Change Order work are not already at the job site, the
 - 49 actual cost to get the item there is also reimbursable.
- 50 D. BOND COST: The cost shall be calculated at 1% of the total proposed change order.
- 51 E. SUB-CONTRACTOR COSTS: Sub-contractor costs are for those labor, material, and equipment costs required by
- 52 subcontracted specialties to complete the Change Order work.
- 53 F. OVERHEAD AND PROFIT Markup: The allowable markup percentage to a COR by the GC and Sub-contractors for
- 54 overhead and profit. All of the following are expenses associated with overhead and profit and shall not be
- 55 reimbursable as individual items on any COR:
 - 56 1. CHANGE ORDER PREPARATION: All costs associated with the preparing and processing of the change
 - 57 order.

- 1 2. DESIGN, ESTIMATING, AND SUPERVISION: All such efforts, unless specifically requested by Owner as
- 2 additional Work to be documented as a COR or portion thereof.
- 3 3. INSTALLATION LAYOUT: The layout required for the installation of material and equipment, and the
- 4 installation design, is the responsibility of the GC.
- 5 4. SMALL TOOLS AND SUPPLIES: The cost of small hand tools with an initial cost of \$1,500 or less, along
- 6 with consumable supplies and expendable items such as drill bits, saw blades, gasoline, lubricating or
- 7 cutting oil, and similar items.
- 8 5. GENERAL EXPENSE: The general expense, which is those items that are a specific job cost not associated
- 9 with direct labor and material such as job trailers, foreman truck, and similar items.
- 10 6. RECORD DRAWINGS: The preparation of record or as-built drawings.
- 11 7. OTHER COSTS: Any miscellaneous cost not directly assessable to the execution of the Change Order
- 12 including but not limited to the following:
- 13 a. All association dues, assessments, and similar items.
- 14 b. All education, training, and similar items.
- 15 c. All drafting and/or engineering, unless specifically requested by Owner as additional Work to be
- 16 documented as a Change Order proposal or portion thereof.
- 17 d. All other items including but not limited to review, coordination, estimating and expediting, field
- 18 and office supervision, administrative work, etc.
- 19 G. Contract Extension: The necessary amount of time to be added to the contract deadlines for the completion of a
- 20 change order.
- 21

22 **1.4. CONTRACT EXTENSION**

- 23 A. The GC shall not assume that every COR will require a Contract Extension. If the GC feels a contract extension is
- 24 warranted he/she shall provide sufficient scheduling information that shows how the COR being requested
- 25 impacts the critical path of the project.
- 26 B. The City of Madison strongly encourages the GC to explore alternative methods and practices prior to submitting
- 27 a COR with a request for contract extension.
- 28

29 **1.5. OVERHEAD AND PROFIT MARKUP**

- 30 A. Pursuant to the City of Madison Standard Specifications for Public Works Construction, Section 104.7, Extra
- 31 Work, the following maximum allowable markups shall be strictly enforced on all change orders associated with
- 32 the execution of this contract.
- 33 1. The total maximum overhead and profit shall not exceed fifteen percent (15%) of the total costs.
- 34 2. The total maximum overhead and profit shall be distributed as follows:
- 35 a. For work performed and materials provided solely by the General Contractor, fifteen percent
- 36 (15%) of the total costs.
- 37 b. For work performed and materials provided solely by Sub-contractors and supervised by the
- 38 General Contractor:
- 39 i. Supervision of the GC, five percent (5%) of the total Sub-contractor cost.
- 40 ii. Sub-contractors work and materials ten percent (10%) of the total Sub-contractor cost.
- 41

42 **1.6. PERFORMANCE REQUIREMENTS**

- 43 A. The GC shall become thoroughly familiar with this specification as it will identify procedures and expenses that
- 44 are or are not allowed under the Change Order and Change Order Request process.
- 45 B. The GC shall be responsible for all of the following:
- 46 1. Carefully reviewing the CB that is associated with the COR.
- 47 2. Collecting required supporting documentation from all contractors that quantify the need for a COR.
- 48 a. Labor hours and wage rates
- 49 b. Material costs
- 50 c. Equipment costs
- 51 C. The following shall apply to establishing prices for labor, materials, and equipment costs:
- 52 1. Where Work to be completed has previously been established by individual bid items in the contract bid
- 53 proposal the GC shall use the unit bid prices previously established.
- 54 2. Where Work to be completed was bid as a Lump Sum without individual bid items the GC shall provide a
- 55 breakdown of all labor, materials, equipment including unit rates and quantities required.
- 56 D. The completion date is determined by Owner. The schedule, however, is the responsibility of the GC. Time
- 57 extensions for extra Work will be considered when a schedule analysis of the critical path shows that the Change
- 58 Order Request places the Work beyond the completion date stated in the Contract.

1
2 **1.7. QUALITY ASSURANCE**

- 3 A. The GC shall be responsible for ensuring that all COR supporting documentation meets the following
4 requirements prior to completing the COR form on the Project Management Web Site:
5 1. Sufficiently indicates labor, material, and other expenses related to completing the intent of the CB.
6 2. No costs exceed the usual and customary amount for such items available in the geographical area of the
7 project, and no costs exceed those established under the contract.
8 B. The Project Architect (PA), Commissioning Agent (CxA), City Project Manager (CPM), other members of the
9 consulting staff, and city staff shall review all COR requests to ensure that the intent of the CB will be met under
10 the proposal of the COR or request additional information as necessary.
11

12 **PART 2 – PRODUCTS**

13
14 **2.1. CHANGE ORDER REQUEST FORM**

- 15 A. The COR form is located on the Project Management Web Site. The GC shall click the link in the left margin of
16 the project web site opening a new form. Follow additional instructions below in the execution section for filling
17 out the form.
18

19 **PART 3 - EXECUTION**

20
21 **3.1. ESTABLISHING A CHANGE ORDER REQUEST**

- 22 A. Upon receipt of a Construction Bulletin (CB) where the GC believes a significant change in contract scope
23 warrants the submittal of a COR the GC shall do all of the following within ten (10) working days after receipt of
24 the CB:
25 1. Review the CB with all necessary trades and sub-contractors required by the change in scope.
26 a. Additions or deletions to the contract scope shall be as directed within the CB.
27 b. Additions or deletions of labor and materials shall be determined by the GC based on the
28 directives of the CB.
29 2. Assemble all required back-up documentation for additions and deletions of materials, labor and other
30 related contract costs as previously outlined in this specification.
31 3. Submit a COR request form on the Project Management Web Site.
32 B. Submitting a COR does not obligate the GC to complete the work associated with the COR nor does it obligate
33 the Owner to approve the COR as a change to the contract.
34

35 **3.2. SUBMIT A CHANGE ORDER REQUEST FORM**

- 36 A. This specification shall provide a subject overview only. In depth instructions shall be provided to the awarded
37 Contractor in a PDF Instructional Manual.
38 B. The GC shall select the "Submit a COR" link on the Project Management Web Site.
39 C. The software will open a new COR form and the GC shall provide all of the following information:
40 1. DO NOT perform any calculations on this worksheet, only provide the raw data as requested below. All
41 calculations, totals, and markups shall be computed as described within this specification.
42 2. Provide a summary description of the COR request, and justification for any requested time extension to
43 the contract, indicate the number of calendar days being requested for the extension and add any
44 attachments to the form as needed.
45 3. Provide all GC self performance data including all of the following:
46 a. Materials description, quantities, and unit costs.
47 b. Labor hours and rates for all Foremen, Journeymen, and Apprentices by trade.
48 c. Equipment descriptions, quantities, unit costs and rates.
49 4. Provide all Sub-contractor data including all of the following:
50 a. Materials description, quantities, and unit costs.
51 b. Labor hours and rates for all Foremen, Journeymen, and Apprentices by trade.
52 c. Equipment descriptions, quantities, unit costs and rates.
53 5. Ensure all calculations performed by the form have been completed correctly. Contact the CPM directly
54 if you suspect an error before hitting the save button.
55 C. At any time after creating a COR you must at a minimum click "Save as Draft" to save your work.
56 D. When all data has been entered and verified click on the "Submit COR" button. This will kick off the COR Review
57 and Approval process.
58

1 **3.3. CHANGE ORDER REQUEST REVIEW, APPROVAL, AND PROCESSING**

- 2 A. The PA and CPM shall review all CORs submitted by the GC.
3 1. Additional consulting staff and city staff having knowledge of the components of the COR shall review
4 and advise the PA and CPM as to the accuracy of the items, quantities, and associated costs of the COR as
5 directed by the CB.
6 2. The CPM shall review the COR with the Owner.
7 B. If required the PA and CPM, shall in good faith, further negotiate the COR with the GC as necessary. All
8 amendments to any COR shall be documented within the Project Management Web Site software.
9 C. After final review of the COR the CPM and Owner may accept the COR.
10 D. The CPM shall prepare the COR in the form of an official Board of Public Works Change Order for final review and
11 approval as outlined in Section 01 26 63 Change Order (CO).
12 E. The GC shall not act upon any accepted COR until it has received final approval through the Public Works process
13 as an official CO to the Work unless instructed to do so by the CPM. Proceeding without the final approval of a
14 fully authorized Change Order is at the GC's own risk.
15

16 **3.4. EMERGENCY CHANGE ORDER REQUEST**

- 17 A. In the event Work is required due to an emergency as described in the Contract Documents, the GC must
18 request an equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the
19 commencement of such emergency.
20 B. The GC shall provide full documentation of all labor, materials and equipment used during the period of
21 emergency as part of the COR submittal.
22
23
24

25 **END OF SECTION**
26

**SECTION 01 26 63
CHANGE ORDER (CO)**

1
2
3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATION SECTIONS 1
7 1.3. BOARD OF PUBLIC WORKS PROCEDURE 1
8 PART 2 – PRODUCTS..... 2
9 2.1. CHANGE ORDER FORM..... 2
10 PART 3 - EXECUTION 2
11 3.1. PREPARATION OF THE CHANGE ORDER 2
12 3.2. EXECUTION OF THE CHANGE ORDER 2
13

PART 1 – GENERAL

1.1. SUMMARY

- 17 A. Except in cases of emergency, no changes in the Work required by the Contract Documents may be made
18 by the General Contractor (GC) without having prior approval of the City Project Manager (CPM).
19 B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in
20 the Work by written Change Order. Such changes may include additions and/or deletions.
21 C. The Change Order (CO) is a Board of Public Works (BPW) form that is reviewed and approved by a specific
22 process.
23 D. The CO form is typically made up of multiple Change Order Requests (CORs) and/or Bid Items as appropriate
24 depending on the type of project and how the contract was bid.
25 E. All CO documentation shall be processed through the Construction Administration-Change Order Library and
26 digital workflow on the Project Management Web Site (PMWS).
27

1.2. RELATED SPECIFICATION SECTIONS

- 28
29 A. Section 01 26 13 Request for Information (RFI)
30 B. Section 01 26 46 Construction Bulletin (CB)
31 C. Section 01 26 63 Change Order Request (COR)
32 D. Section 01 31 23 Project Management Web Site
33 E. Section 01 91 00 Commissioning
34

1.3. BOARD OF PUBLIC WORKS PROCEDURE

- 35
36 A. The Board of Public Works has a very explicit procedure for the review and approval of all change orders
37 associated with any Public Works Contract as follows:
38 1. The Supervisory Chain of the CPM shall review and approve any CO under \$20,000 provided it does not
39 include either of the following:
40 a. The CO does not request a time extension to the contract.
41 b. The CO does not cause the contract contingency sum to be exceeded.
42 2. The Board of Public Works shall review and approve any CO that requires any of the following:
43 a. Any CO over \$20,000.
44 b. Any CO requesting a time extension to the contract regardless of the monetary value of the CO.
45 c. Any CO that that causes the contract contingency sum to be exceeded.
46 B. The Board of Public Works generally meets every other week and only once in August and December. The GC is
47 cautioned that, under normal scheduling, a CO requiring a BPW review will take a minimum of two (2) weeks to
48 achieve final approval.
49 1. The City shall not be responsible for additional delays to the Work caused by the scheduling constraints
50 of the Board of Public Works.
51 C. **SPECIAL NOTE:** The GC is cautioned to never proceed unless told to do so by the CPM. Only in rare instances
52 may the CPM give a written notice to proceed on a COR without an approved CO. Proceeding without the
53 written notice of the CPM or an approved CO is at the GC’s own risk.
54

1 **PART 2 – PRODUCTS**

2
3 **2.1. CHANGE ORDER FORM**

- 4 A. The CO form is located on the Project Management Web Site. The CPM shall click the link in the left margin of
5 the project web site opening a new form. Project information is pre-loaded, the CPM only needs to enter
6 information and make attachments as needed to complete the form.
7

8 **PART 3 - EXECUTION**

9
10 **3.1. PREPARATION OF THE CHANGE ORDER**

- 11 A. The CPM shall prepare the required CO forms in the Construction Administration-Change Order Library on the
12 Project Management Web Site as follows:
13 1. Provide information for all contract information.
14 2. Provide a general description of the items described within the change order.
15 3. Provide detailed information for each Item on the CO form. At the option of the CPM he/she may include
16 multiple Change Order Requests each as their own item.
17 4. Provide required pricing and accounting information as needed for the item.
18 5. Insert attachments of contractor/architect provided information that clarifies and quantifies the CO.
19 Attachments may include but not be limited to material lists, estimated labor, revised details or
20 specifications, and other documents that may be related to the requested change.
21 6. Save the final version of the completed CO.
22

23 **3.2. EXECUTION OF THE CHANGE ORDER**

- 24 A. Upon saving the CO as described in section 3.1 above the software associated with the Project Management
25 Web Site shall notify the GC that the CO has been drafted and is ready for review. The GC shall do the following:
26 1. Open the appropriate CO form in the Construction Administration-Change Order Library and review all
27 items on the form.
28 2. The GC shall notify the CPM immediately of any errors or discrepancies on the form and shall not sign or
29 save it.
30 a. The CPM shall make any corrections as needed, re-save the form, and notify the GC.
31 3. If/when the GC concurs with the CO form as drafted the GC shall digitally sign the form and click SAVE.
32 B. After the GC digitally signs/saves the CO it shall be routed through the Project Management Web Site for
33 additional review and/or approvals. The CPM shall do the following:
34 1. Monitor the review process to ensure the software is working properly at each review step.
35 2. Ensure that proper BPW procedures are executed as needed by the CO approval process.
36 a. Schedule the CO on the next available BPW agenda if required.
37 i. Attend the BPW meeting to speak on the CO to board members and answer questions.
38 ii. The GC and/or PA may be required to attend the BPW meeting to address specific
39 information as it relates to the Work and/or materials associated with the CO.
40 3. Monitor final approval and distribution of the CO.
41 4. Notify the GC that the CO has been completed.
42 5. Ensure that the CO is posted to the next Public Works payment schedule.
43 6. Verify that the GC's next Progress Payment-Schedule of Values show the CO as part of the contract sum.
44 C. Upon final approval of the CO the GC may proceed with executing the Work associated with the CO.
45
46
47
48
49

END OF SECTION

**SECTION 01 29 73
SCHEDULE OF VALUES**

1
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3
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5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. RELATED DOCUMENTS 1
8 1.4. BASIS OF VALUES 2
9 PART 2 – PRODUCTS – THIS SECTION NOT USED 2
10 PART 3 - EXECUTION 2
11 3.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT 2
12 3.2. AIA DOCUMENT G703 – CONTINUATION SHEET 2
13 3.3. INITIAL SCHEDULE OF VALUES SUBMITTAL 3
14 3.4. SOV FOR PROGRESS PAYMENT REQUESTS 3
15

PART 1 – GENERAL

1.1. SUMMARY

- 19 A. The Schedule of Values (SOV) is a Contractor provided statement that allocates portions of the total contract
20 sum to various portions of the contracted work and shall be the basis for reviewing the Contractors Progress
21 Payment Requests.
22 B. AIA Document G702 – Application and Certificate for Payment and AIA Document G703 Continuation Sheet shall
23 be filled out in sufficient detail to be used as a guideline in determining work completed and materials stored on
24 site when verifying Progress Payment Requests.
25 C. The General Contractor shall be responsible for filling out, updating, and providing these work sheets with each
26 Progress Payment Request.
27

1.2. RELATED SPECIFICATIONS

- 29 A. Section 01 26 63 Change Order (CO)
30 B. Section 01 29 76 Progress Payment Procedures
31 C. Section 01 31 23 Project Management Web Site
32 D. Section 01 32 26 Construction Progress Reporting
33 E. Section 01 33 23 Submittals
34 F. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public
35 Works Construction”.
36 1. Use the following link to access the Standard Specifications web page:
37 <http://www.cityofmadison.com/business/pw/specs.cfm>
38 a. Click on the “Part” chapter identified in the specification text. For example if the specification
39 says “Refer to City of Madison Standard Specification 210.2” click the link for Part II, the Part II
40 PDF will open.
41 b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you
42 to the referenced text.
43

1.3. RELATED DOCUMENTS

- 45 A. The following documents shall be used as the basis for initiating and maintaining the SOV worksheets throughout
46 the execution of this contract.
47 1. Drawing documents and specifications (including general provisions) as provided with the bid set
48 documents and any published addendums.
49 2. Documents associated with revisions or clarifications to number 1 above after awarding of the contract,
50 including but not limited to:
51 a. Construction Bulletins
52 b. Request for Information
53 c. Approved Change Orders
54 3. The latest daily/weekly Construction Progress Report
55 4. Other specifications as identified in Section 1.2 above

1
2 **1.4. BASIS OF VALUES**

- 3 A. The Contractor shall provide a breakdown of the Contract Sum in sufficient detail to assist the Architect and City
4 Project Manager in evaluating Progress Payment Requests. The breakdown detail may require a labor and
5 material breakdown for each division of work or trade or as directed by the CPM.
6 B. The total sum of all items shall equal the Contract Sum.
7

8 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

9
10 **PART 3 - EXECUTION**

11
12 **3.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT**

- 13 A. The Contractor shall use AIA Document G-702 Application and Certificate for Payment with each Progress
14 Payment Request.
15 B. Completely fill out the Project Information section as follows:
16 1. TO OWNER; provide all owner related information as provided in the contract documents.
17 2. PROJECT; provide all contract information including contract number, title and address.
18 3. FROM CONTRACTOR; provide all contractor related information.
19 4. VIA ARCHITECT; provide all the architect's related information including the architect's project reference
20 number if different from the owners.
21 5. Indicate the current APPLICATION NO., PERIOD TO date, and CONTRACT DATE.
22 C. Completely fill out the Contractors Application for Payment section.
23 1. Fill out lines 1 through 9 to reflect the current status of the contract through the payment date being
24 requested.
25 2. The City of Madison calculates retainage on Public Works Contracts as follows:
26 a. In general, across the duration of the contract, 2.5% of the total contract sum, including change
27 orders, is withheld for retainage as referenced from the City of Madison Standard Specification
28 110.2:
29 i. Beginning with Progress Payment 1, 5% retainage will be withheld until such time that 50%
30 of the total contract sum has been paid out.
31 ii. No additional retainage will be withheld after 50% of the total contract sum has been paid,
32 unless additional change orders have been approved after the 50% milestone has been
33 reached. Per City of Madison Standard Specification 110.2, additional retainage up to 10%,
34 may be held in the event there are holds placed by Affirmative Action or liquidated
35 damages by BPW.
36 iii. Retainage for additional change orders after the 50% milestone will be withheld at the rate
37 of 2.5% of the total cost of the change order.
38 iv. Retainage is based on the change orders posted to the City's contract worksheet at the
39 time the progress payment is processed.
40 D. Completely fill out the Change Order Summary section. Only change orders that have been finalized and posted
41 to the City of Madison's Application for Partial Payment worksheet may be itemized into the SOV documents.
42 E. The Contractor shall sign and date the application and it shall be properly notarized.
43 F. The Contractor shall not fill in any information in the Architects Certificate for Payment section.
44

45 **3.2. AIA DOCUMENT G703 – CONTINUATION SHEET**

- 46 A. The Contractor shall use AIA Document G-703 Continuation Sheet to itemize his/her SOV for this contract.
47 Provide additional sheets as necessary.
48 B. Provide information in Column A (Item No.), Column B (Description of Work), and Column C (Scheduled Value) by
49 any method that allocates portions of the total contract sum to various portions of the contracted work.
50 Possible methods include combinations of the following:
51 1. By division of work
52 2. By contractor, sub-contractor, sub sub-contractor
53 3. By specialty item or group
54 4. Other methods of breakdown as may be requested by the City Project Manager or City Construction
55 Manager at the pre-construction meeting.
56 C. Provide total cost of the item/description of work including proportionate shares of profit and overhead related
57 to the item.
58

1 **3.3. INITIAL SCHEDULE OF VALUES SUBMITTAL**

- 2 A. The Contractor shall upload his/her initial SOV to the Project Management Web Site, Submittals Library, no later
3 than five (5) working days after the Pre-construction Meeting.
4 1. The initial SOV shall provide information in Column A (Item No.), Column B (Description of Work), and
5 Column C (Scheduled Value) only.
6 2. The level of detail shall be as described in section 3.2 above.
7 B. The Project Architect (PA) and the City Project Manager (CPM) shall review the SOV as any other submittal and
8 may require modifications to reflect additional detail as necessary.
9 C. The Contractor shall resubmit the SOV as necessary until such time as the PPA and CPM have sufficient detail for
10 assessing and approving future Progress Payment Applications.
11 D. Progress Payment Application 1 will not be processed until such time as the Contractor has met this requirement
12 regardless of the amount of work completed per the application.
13

14 **3.4. SOV FOR PROGRESS PAYMENT REQUESTS**

- 15 A. The Contractor shall update the initial SOV with each Progress Payment Application as follows:
16 1. Initial items and values as part of Section 3.3 above will not be adjusted once the original Schedule of
17 Values submittal has been approved.
18 2. Change orders shall be added as additional items and values at the bottom of the SOV as they become
19 approved and posted to the City's contract worksheet. The value for each change order shall be the
20 value indicated on the SOV and shall stand alone. Values shall not be split out or combined with other
21 existing items with similar work descriptions on the original SOV.
22 3. Fill out Columns D, E, F and G to properly reflect the work completed and materials received since the last
23 Progress Payment Application.
24 4. Only materials delivered and stored on the project site may be reflected on SOV progress updates.
25 B. Provide updated G702 and G703 sheets with each Progress Payment application.
26 C. See Specification 01 29 76 Progress Payment Procedures for additional information on submitting Progress
27 Payment Applications.
28
29
30

31 **END OF SECTION**
32

SECTION 01 29 76
PROGRESS PAYMENT PROCEDURES

1
2
3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
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7 1.3. RELATED DOCUMENTS 1
8 1.4. PROGRESS PAYMENT MILESTONES 1
9 1.5. PROGRESS PAYMENT SUBMITTAL 4
10 PART 2 - PRODUCTS - THIS SECTION NOT USED 4
11 PART 3 - EXECUTION 4
12 3.1. GENERAL CONTRACTOR PROCEDURE 4
13 3.2. PROJECT ARCHITECT PROCEDURE 5
14 3.3. CITY PROJECT MANAGER PROCEDURE 5
15

PART 1 – GENERAL

1.1. SUMMARY

- 19 A. The General Contractor (GC) shall review this and all related specifications prior to submitting progress payment
20 requests.
21 B. Progress payment requests (Partial Payment-PP) for this contract shall be uploaded digitally by the GC to the
22 Project Management Web Site
23 C. The Project Architect (PA) and City Project Manager (CPM) shall review and amend or approve the PP on the
24 Project Management Web Site.
25 D. After approval of the PP by the CPM, he/she shall forward the PP to the appropriate agencies for BPW
26 contractual review and payment processing.
27

1.2. RELATED SPECIFICATIONS

- 29 A. Section 01 26 63 Change Order (CO)
30 B. Section 01 29 73 Schedule of Values
31 C. Section 01 31 19 Progress Meetings
32 D. Section 01 31 23 Project Management Web Site
33 E. Section 01 32 16 Construction Progress Schedules
34 F. Section 01 32 26 Construction Progress Reporting
35 G. Section 01 33 23 Submittals
36 H. Section 01 45 16 Field Quality Control Procedures
37 I. Section 01 77 00 Closeout Procedures
38 J. Section 01 78 13 Completion and Correction List
39 K. Section 01 78 23 Operation and Maintenance Data
40 L. Section 01 78 36 Warranties
41 M. Section 01 78 39 As-Built Drawings
42 N. Section 01 78 43 Spare Parts and Extra Materials
43 O. Section 01 79 00 Demonstration and Training
44

1.3. RELATED DOCUMENTS

- 46 A. The following documents shall be used when evaluating PP requests.
47 1. Daily and weekly construction progress reports filed since the last payment request.
48 2. Contractors Schedule of Values as updated from the last payment request. See Specification 01 29 73.
49 3. Any document that may be required to be submitted for review and approval, as noted by the
50 specifications listed in Section 1.2 above, or the Progress Payment Milestone Schedule in Section 1.4
51 below, to achieve a required bench mark of contract progression or contract requirement.
52

1.4. PROGRESS PAYMENT MILESTONES

- 54 A. City Engineering-Facility Management has developed the Project Payment Milestone Schedule (Section 1.4
55 below) to assist the GC in providing required construction specific documentation and general contractual
56 documentation in a timely manner.
57 B. The Progress Payment Milestone Schedule is not an all inclusive list. Multiple agencies review progress payment
58 requests and contract closeout requests. Missing, incomplete, or incorrect documentation for any agency may

- 1 be a cause for not processing progress payments. It shall be the sole responsibility of the Contractor for
2 providing documentation as required or requested to the appropriate agencies.
3 C. The milestone schedule is based on the contract total sum and shall be valid for most contracts. Milestone
4 submittals will be required with whatever progress payment hits the percentage of contract total indicated in
5 the schedule.
6 D. The CPM shall review the milestone schedule with each progress payment request and at his/her option may
7 elect to hold processing the progress payment until such time as the contractor has met the requirements for
8 providing construction specific documentation.
9 E. It shall be the General Contractors responsibility to comply with all BPW Contract Administration requirements
10 and related deadlines as outlined in the Award Letter, Award Checklist, and Start Work Letter.
11

Progress Payment (PP) Milestone Schedule		
Milestone Description	Due Before	Remarks
BPW Contract Administration Documentation <ul style="list-style-type: none"> • Workforce profiles • Best Value Contracting Documentation • Sub-contractors prequalification approval & Affirmative Action plans • Other as may be required 	PP-1, or start work as applicable	<ul style="list-style-type: none"> • For GC and Sub-contractors before PP-1 regardless of scheduling • Sub-contractors (if applicable), due 10 days before they may start work • Sub-contractors (if applicable), due 10 days before they may start work
Required Construction Submittals/Administrative Documents <ul style="list-style-type: none"> • Contractors Project Directory • Schedule of Values • Submittals Schedule • Waste Management Plan • Closeout Requirement Checklist • Warranty Checklist 	PP-1	References <ul style="list-style-type: none"> • Specification 01 31 23 • Specification 01 29 73 • Specification 01 32 19 • Specification 01 74 19 • Specification 01 77 00 • Specification 01 78 36 • Various specifications.
Construction Progress Milestones <ul style="list-style-type: none"> • Early submittals, per submittal schedule • Detailed Contract Schedules 	PP-1	See specifications for specific requirements <ul style="list-style-type: none"> • Specification 01 32 19, Examples: concrete mix, structural steel, products with long lead times • See Specification 01 32 16
General Construction Progress Requirements are all up to date <ul style="list-style-type: none"> • Progress Schedules • Submittals/Re-submittals (ongoing) • Schedule of Values • Progress Reporting • LEED Documentation • Waste Management documentation • QMOs are being addressed and closed • Progress Cleaning • As-Built Drawings 	Each future PP	Verified with each Progress Payment Request <ul style="list-style-type: none"> • Specification 01 32 16 • Specification 01 33 23 • Specification 01 29 73 • Specification 01 32 26 • All specifications with LEED documentation requirements • Specification 01 74 19 • Specification 01 45 16 • Specification 01 74 13 • Specification 01 78 39
* All of the above are being updated on the Project Management Web Site as required		
BPW Contract Administration Documentation <ul style="list-style-type: none"> • Weekly payroll reports • Best Value Contracting Reports 	25% CT or PP 2	See 1.4.E above. <i>This progress payment will be withheld by BPW for any missing contractual documentation.</i>

Progress Payment (PP) Milestone Schedule		
Milestone Description	Due Before	Remarks
<ul style="list-style-type: none"> SBE Reports 		
Construction Progress Milestones <ul style="list-style-type: none"> Construction/Contract Closeout Meeting #1 Submittals/Re-submittals complete 	50% CT	<ul style="list-style-type: none"> Specification 01 31 19 Specification 01 33 23
Operation and Maintenance (O & M) drafts	60% CT	<ul style="list-style-type: none"> Specification 01 78 23
Construction/Contract Closeout Meeting #2 <ul style="list-style-type: none"> Construction closeout checklist 	70% CT	<ul style="list-style-type: none"> Specification 01 31 19 Specification 01 77 00
BPW Contract Administration Documentation <ul style="list-style-type: none"> Request Finalization Review from BPW 	80% CT	This is a recommendation to the GC and is not a requirement of this PP. <ul style="list-style-type: none"> Specification 01 77 00
Construction Progress Milestones <ul style="list-style-type: none"> Operation and Maintenance (O & M) finals, accepted All major QMO issues resolved As-Built Drawings, Division Trades ready for GC review 	80% CT	<ul style="list-style-type: none"> Specification 01 78 23 Specification 01 45 16; Items that could prevent occupancy Specification 01 78 39
All of the following shall be completed for this PP: <ul style="list-style-type: none"> Regulatory Inspections completed All QMO reports closed Demonstration and Training completed Attic Stock completed Final Cleaning 	90% CT	Contractor to determine the proper order of completion: <ul style="list-style-type: none"> Governing ordinances and statutes Specification 01 45 16 Specification 01 79 00 Specification 01 78 43 Specification 01 74 13
Construction Closeout Procedures: <ul style="list-style-type: none"> Letter of Substantial Compliance sent to BI and DHS as needed Certificate of Occupancy issued As-Built Drawings, finals, accepted City Letter of Substantial Completion Warranty letters dated and issued 	100% CT	<ul style="list-style-type: none"> Specification 01 77 00 Generated/Signed by the Architect Building Inspection Specification 01 78 39 Signed by the City Engineer Specification 01 78 36
* Completion of this begins the one year warranty.		
BPW Contract Administration Documentation Contract Closeout Procedures <ul style="list-style-type: none"> Construction Closeout has been completed Contractor requests final payment of retainage upon receiving City Letter of Substantial Completion All BPW contractual requirements are verified 	Final	<ul style="list-style-type: none"> Specification 01 77 00 Contractor must provide any missing BPW Contractual Documentation
* Completion of this closes the contract but not the warranty period/bond.		

Progress Payment (PP) Milestone Schedule		
Milestone Description	Due Before	Remarks
NOTE: CT = Contract Total less held retainage		

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1.5. PROGRESS PAYMENT SUBMITTAL

- A. Each progress payment submittal shall be:
 - 1. Digital in PDF format
 - 2. PDF shall be in color
 - 3. Uploaded to the appropriate Project Management library and properly named per the tutorial instructions provided to the awarded contractor.
- B. Submit all required construction progress documentation to the appropriate Project Management Web Site library.
- C. In general the following shall apply to all PP requests:
 - 1. Materials or products:
 - a. On order, being shipped, etc. may not be invoiced.
 - b. Received and stored on the project site may be invoiced.
 - c. Being manufactured off site at any location may not be invoiced (example: cabinetry, ductwork, etc.)
 - d. Completed products stored off site locally waiting for delivery to the project site may be invoiced with prior approval by the CPM. All of the following conditions must be met to be allowed:
 - i. Items must be visually inspected by CPM to verify product is complete.
 - ii. Item must be stored inside a compatible structure and the structure and contents must be insured.
 - iii. Contractor is responsible for condition until installation is completed.
 - 2. All labor and equipment, including rental time for the current progress period may be invoiced.
 - 3. Only completed installations may be invoiced to 100% based on the Schedule of Values.
- D. DO NOT submit BPW Contract Administration Documentation for review with Progress Payment Requests, submit them directly to the correct agency and in the correct format as instructed from information in your BPW Contract Award Packet instructions.

PART 2 - PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. GENERAL CONTRACTOR PROCEDURE

- A. The GC shall provide an updated version of his/her schedule of values (AIA documents G702 & G 703) with each PP request.
 - 1. The AIA - Application and Certificate for Payment (G702) shall be properly filled out and prepared for the Architects review. See specification 01 29 73, Schedule of Values for more information.
 - 2. The AIA - Continuation sheets (G703) shall be properly filled out and indicate the dollar value of the completed work to date for each item on the form. See specification 01 29 73, Schedule of Values for more information.
 - a. The GC shall subtotal the work completed to date for all of the original Schedule of Value items.
 - b. Divide the sub total of work completed by the Original Contract Total to obtain a percentage complete of the original Lump Sum Bid. This percentage may be taken out to five (5) decimal places (round fifth place up or down as needed).
 - i. Example: \$5,192.55 of completed work divided by \$10,000 original Contract Total = 0.519255, round this to 0.51926
 - c. Write the percentage in Column 10 on the City Tabular Sheet for the original lump sum bid item in RED ink.
 - 3. Ensure that any newly posted change orders from the City of Madison provided tabulation sheet have been entered on the G703 continuation sheets. Repeat steps a thru c above for each change order on the schedule of values and the City Tabular Sheet.
- B. The GC shall fill out the City of Madison Application and Certificate of Payment cover sheet as follows:
 - 1. The GC shall not change any pre-printed information and shall not write in the box that indicates previous progress payments.
 - 2. The GC shall sign and date the form where indicated.
 - 3. The GC shall provide the dates from and to for the PP being requested.

**SECTION 01 31 13
PROJECT COORDINATION**

1
2
3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. GENERAL REQUIREMENTS..... 1
8 1.4. GENERAL CONTRACTOR PERFORMANCE REQUIREMENTS 2
9 1.5. SUB-CONTRACTOR PERFORMANCE REQUIREMENTS..... 2
10 PART 2 – PRODUCTS – THIS SECTION NOT USED 3
11 PART 3 – EXECUTION – THIS SECTION NOT USED 3
12

PART 1 – GENERAL

1.1. SUMMARY

- 16 A. Project Coordination covers many areas within the execution of the Contract Documents and the requirements
17 of proper coordination are the applicable to all contractors executing the Work of this contract.
18 B. This specification provides general information regarding project coordination for the General Contractor and all
19 Sub-contractors. All contractors shall be familiar with project coordination requirements and responsibilities
20 that may be defined in other specification within these Contract Documents.
21 C. The General Contractor shall at all times be responsible for the project, project site, and execution of the
22 Contract Documents.
23

1.2. RELATED SPECIFICATIONS

- 24 A. Section 01 29 76 Progress Payment Procedures
25 B. Section 01 31 19 Progress Meetings
26 C. Section 01 31 23 Project Management Web Site
27 D. Section 01 32 16 Construction Progress Schedules
28 E. Section 01 32 19 Submittals Schedule
29 F. Section 01 33 23 Submittals
30 G. Section 01 43 39 Mockups
31 H. Section 01 45 16 Field Quality Control Procedures
32 I. Section 01 60 00 Product Requirements
33 J. Section 01 77 00 Closeout Procedures, including all specifications referenced therein
34 K. Section 01 91 00 Commissioning
35
36

1.3. GENERAL REQUIREMENTS

- 37 A. The following general requirements shall applicable to all contractors:
38 1. Cooperate with the Owner, all authorized Owner Representatives, Project Architect and all consultants of
39 the Owner.
40 2. Materials, products, and equipment shall be new, as specified and to industry standards except where
41 otherwise noted.
42 3. Labor and workmanship shall be of a high quality and to industry standards.
43 B. Existing conditions:
44 1. Verify all existing conditions noted in the contract documents with actual filed locations. Verify
45 dimensions, sizes and locations, of structural, equipment, mechanical and utility components.
46 2. Report any inconsistencies, errors, omissions, or code violations in writing to the General Contractor (GC)
47 immediately.
48 3. Annotate any inconsistencies, errors, omissions on the GC As-Built record drawings immediately for
49 future reference.
50 C. Contract Documents:
51 1. The Contract Documents are intended to include everything necessary to perform the work. Every item
52 required may not be specifically mentioned, shown, or detailed.
53 a. Except where specifically stated all systems and equipment shall be complete, installed, and fully
54 operable.
55 b. If a conflict exists within the contract documents the contractor shall furnish the item, system, or
56 workmanship of the highest quality, largest, largest quantity, or most closely fits the intent of the
57 contract documents.
58

- 1 c. Manufacturers recommended installation details shall be verified and used prior to installation of
- 2 products and equipment so as to not void warranties.
- 3 D. Errors and Omissions
- 4 1. No Contractor shall take any advantage of any apparent error or omission in the construction documents.
- 5 2. The City of Madison shall be permitted to make such corrections and interpretations as may be deemed
- 6 necessary for the fulfillment of the intent of the construction documents.
- 7 E. Owners Representatives
- 8 1. All contractors shall be familiar with various Owner Representatives having Quality Management
- 9 responsibilities for the duration of this project including but not limited to the following:
- 10 a. Project Architect, responsible for all decisions affecting the code compliance and design intent of
- 11 the construction documents.
- 12 b. Consulting Architects and Engineers, responsible for providing consulting services to the Project
- 13 Architect, Owner, and City Project Manager, also responsible for Quality Management of the
- 14 construction documents.
- 15 c. Owner, the designated representative of the City Agency that will occupy the project upon
- 16 completion.
- 17 d. City Project Manager, responsible for all day to day decisions regarding the execution and
- 18 performance of this Public Works Contract.
- 19 e. Consulting City Staff, responsible for providing consulting services to the Project Architect, Owner,
- 20 and City Project Manager, also responsible for Quality Management of the construction
- 21 documents.
- 22 f. Commissioning Agent (CxA), responsible for ensuring that the project is meeting the Owner's
- 23 Project Requirements and related quality assurance procedures.
- 24 2. Owner Representatives shall be attending progress meetings, pre-installation meetings, performing or
- 25 being present for final testing and acceptance and quality management reporting during the execution of
- 26 the contract documents as outlined in other specifications.
- 27

28 **1.4. GENERAL CONTRACTOR PERFORMANCE REQUIREMENTS**

- 29 A. Assume the responsibility for all Work specified in the Contract Documents except where specifically identified
- 30 to be performed by the Owner or other contractor separately hired by the Owner.
- 31 1. Coordinate all work by Owner, equipment provided Owner, or contractor hired by the Owner into the
- 32 project schedule.
- 33 B. Provide all construction management responsibilities as specified in other Division 1 specifications including but
- 34 not limited to:
- 35 1. Scheduling of work
- 36 2. Coordination of work between other Trades and Sub-contractors
- 37 3. Construction administration and management
- 38 4. Site layout, cleanliness, and protection of completed work/stored materials
- 39 5. Waste Management
- 40 6. Quality Assurance and Quality Control
- 41 C. Use Diggers Hotline and private utility locating companies to accurately locate all public and private utilities on
- 42 the property as needed. The GC is responsible for any repair or replacement to any public or private utility
- 43 damaged during the execution of the Work
- 44 D. Report any inconsistencies, errors, omissions, or code violations in writing to the Project Architect immediately.
- 45 Failure to report inconsistencies prior to beginning work shall indicate that the GC accepted all existing
- 46 conditions.
- 47 E. The GC shall be responsible for assigning work and related responsibilities where the Contract Documents may
- 48 not clearly state who is responsible for providing the work, material, or product.
- 49 F. Provide construction management oversight of all items described in Section 1.5 below.
- 50 G. Coordinate and assist CxA as outlined within 01 91 00 and as directed by Owner.
- 51

52 **1.5. SUB-CONTRACTOR PERFORMANCE REQUIREMENTS**

- 53 A. Be familiar with all of the contract documents as they pertain to your Work, adjacent work and the overall
- 54 progress of the project.
- 55 1. All Sub-contractors shall be familiar with all Division 1 specifications as they may apply to progress,
- 56 progress payments, quality control construction management, and closeout of the contract.
- 57 B. Coordinate your Work with all adjacent work and existing conditions.

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1. Perform your work in proper sequence according to the GC's project schedule and in relation to the work of other trades.
 2. Notify other sub-contractors and trades whose work may be connected to, combined with, or influenced by your work and allow them reasonable time and access to complete their work.
 3. Join your work to the work of others in accordance with the intent of the Contract Documents.
 4. Order materials and schedule deliveries to facilitate the general progress of the Work.
- C. Cooperate with all other trades to facilitate the general progress of the work. This shall include providing every reasonable opportunity for the installation of work by others and the storage of their materials and equipment.
1. In no case shall any contractor exclude from the premises or work any Sub-contractor or their employees.
 2. In no case shall any contractor interfere with the execution or installation of Work by any other Sub-contractor or their employees.
- D. Arrange your work, equipment, and materials and dispose of your construction waste so as to not interfere with the work or storage of materials of others.
- E. Coordinate all work as indicated during pre-installation meetings with Owner Representatives, the GC and other trades. Any work improperly coordinated shall be relocated as designated by the Owner Representative at no additional cost to the City.
- F. Coordinate and assist CxA as outlined within 01 91 00 and as directed by Owner.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 – EXECUTION – THIS SECTION NOT USED

END OF SECTION

**SECTION 01 31 19
PROJECT MEETINGS**

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4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. PROJECT MEETING TYPES 1
8 1.4. GENERAL REQUIREMENTS 1
9 PART 2 – PRODUCTS – NOT USED IN THIS SECTION 1
10 PART 3 - EXECUTION 1
11 3.1. PRECONSTRUCTION MEETING 1
12 3.2. PROJECT MANAGEMENT WEB SITE – TUTORIAL MEETING 2
13 3.3. CONSTRUCTION PROGRESS MEETINGS 2
14 3.4. PRE-INSTALLATION MEETINGS 3
15 3.6 PRE-CONTRACT CLOSEOUT MEETINGS 3
16 3.7 OTHER SPECIAL MEETINGS 3
17

PART 1 – GENERAL

1.1. SUMMARY

- 21 A. The purpose of this specification is to identify various project related meetings and the responsible parties for
22 scheduling, agendas, minutes, and required attendance.
23 B. This specification is not intended to be inclusive of all meeting types or a complete list of required meetings.
24 C. This specification is not intended to cover planning and execution meetings between the General Contractor
25 (GC) and his/her sub-contractors.
26

1.2. RELATED SPECIFICATIONS

- 28 A. 01 31 23 Project Management Web Site
29 B. 01 32 16 Construction Progress Schedules
30 C. 01 43 39 Mockups
31 D. 01 91 00 Commissioning
32

1.3. PROJECT MEETING TYPES

- 34 A. The following project meeting types may be used but not limited to the following
35 1. Preconstruction Meeting
36 2. Project Management Web Site – Tutorial Meeting
37 3. Construction Progress Meetings
38 4. Pre-installation Meetings (including mock-up review meetings)
39 5. Weekly Trade Meetings
40 6. Special Meetings
41 7. Commissioning Meetings
42

1.4. GENERAL REQUIREMENTS

- 44 A. Representatives of Contractors, Subcontractors, and suppliers attending meetings shall be qualified and
45 authorized to act on behalf of the entity each represents.
46

PART 2 – PRODUCTS – NOT USED IN THIS SECTION

PART 3 - EXECUTION

3.1. PRECONSTRUCTION MEETING

- 52 A. After execution of the Contract the City Project Manager (CPM) shall schedule and conduct the Preconstruction
53 Meeting at the Owner’s facilities. The CPM shall coordinate the meeting agenda with the Project Architect and
54 the GC Project Manager.
55 B. The CPM shall be responsible for the final agenda.
56 C. The CPM and Project Architect shall take notes on the meeting and post completed meeting minutes.
57 D. Attendance shall be required by all of the following:
58 1. Owner Representative(s)

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2. Architect and applicable sub consultant(s)
 3. General Contractor and applicable subcontractors and suppliers
 4. City Quality Management Staff
 5. Commissioning Agent
 6. Others, as may be invited for particular agenda items.
- E. Topics of the Preconstruction Meeting shall include but not be limited to the following:
1. Staff and contractor introductions
 2. Completion Date
 3. BPW Administrative requirements and due outs
 - a. Small Business Enterprise (SBE) (if applicable)
 - b. Certified payroll forms
 - c. Workforce profiles
 - d. Best Value Contracting (BVC)
 4. General Facility Management Division 1 Specifications, including:
 - a. Section 01 29 76 Progress Payment Procedures
 - b. Section 01 31 23 Project Management Web Site (overview)
 - c. Section 01 45 16 Field Quality Control Procedures
 - d. Section 01 77 00 Closeout Procedures
 - e. Section 01 91 00 Commissioning
 5. Project Meeting scheduling
 - a. Section 01 31 19 Project Meetings
 6. Construction Schedule
 7. Commissioning Process

3.2. PROJECT MANAGEMENT WEB SITE – TUTORIAL MEETING

- A. The CPM shall schedule and conduct a tutorial presentation of the PMWS prior to the beginning of construction.
- B. The CPM shall be responsible for the final agenda, there will be no minutes.
- C. The required attendance list in 3.1.D. above shall apply except for City Staff in items 1 and 4 who are already familiar with the PMWS system.
- D. It is recommended that all contractors bring their lap top, tablet or other internet capable device with them including a fully charged battery and internet connection devices as necessary.

3.3. CONSTRUCTION PROGRESS MEETINGS

- A. In general all of the following shall apply:
 1. Representatives of Contractors, Subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
 2. The attendance shall be from the required attendance list in 3.1.D. above.
- B. The General Contractor Project Manager (GCPM) shall:
 1. Schedule and conduct all construction progress meetings biweekly or more frequently as required.
 2. Prepare agenda for meetings including, but not limited to the following:
 - a. Safety
 - b. Current Schedule, including review of the critical path and 6-week look ahead schedule
 - c. Status of project related documentation (Submittals, RFIs, CBs, etc.)
 - d. Quality Observation Log and status of correction of deficient items
 - e. Project questions and issues from meeting attendees
 - f. BPW Administration Check
 - g. Other as needed
 - h. Status of CORs and COs to be reviewed outside the standard progress meeting time.
 3. Make physical arrangements for meetings.
 4. GCPM to post meeting agendas to the appropriate libraries on the Project Management Web Site (PMWS) no less than two (2) working days prior to the scheduled meeting. Notify all required attendees, applicable parties to the contract, and others affected of the posted meeting agenda.
 5. Preside at meetings.
 6. Route a meeting attendance roster for attendees to sign-in on.
 7. GCPM to record the minutes of the meeting; include significant proceedings and decisions. Post meeting minutes to the PMWS no more than two (2) working days after the completed meeting. Meeting minutes shall include a scanned copy of the attendance sign-in sheet. Notify all required meeting attendees, applicable parties to the contract, and others affected by decisions made at the meetings.

**SECTION 01 31 23
 PROJECT MANAGEMENT WEB SITE**

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PART 1 – GENERAL 1
 1.1. GENERAL DESCRIPTION 1
 1.2. SHAREPOINT PROCEDURE OVERVIEW 1
 1.3. RELATED SPECIFICATIONS 2
 PART 2 - PRODUCTS 2
 2.1. SHAREPOINT SYSTEM RELATED PRODUCTS 2
 PART 3 - EXECUTION 2
 3.1. POST BID-OPENING 2
 3.2. POST PRE-CONSTRUCTION MEETING 3

PART 1 – GENERAL

1.1. GENERAL DESCRIPTION

- A. The City of Madison (CoM) has established a web based Project Management Tool (PMT) using a Microsoft product called SharePoint (SP).
- B. The software is used throughout the design, construction and warranty process of major remodels and new construction projects executed as a City of Madison, Board of Public Works project.
- C. Initially deployed in mid-2013, the PMT software has been successfully deployed on several projects, and we continue to modify/update/enhance the PMT on a regular basis.

1.2. SHAREPOINT PROCEDURE OVERVIEW

- A. The CoM PMT is a system of consolidated Document & Form Libraries and Data Lists that assist in performing day to day functions of design/construction management while reducing the use of surface mail, email and email attachments.
 - 1. Document libraries store a wide variety of documents in many different formats including but not limited to Word, Excel, PDF, photographs (all popular formats), etc.
 - 2. Data Lists contain consolidated data information that can be generated and stored for further use. Punch Lists and Warranty issues will be examples of Data Lists.
 - 3. Form Libraries are primarily used when a specific work flow process is needed. The form acts as the cover letter. An example of this would be the Submittal Review Process.
 - 4. Libraries are controlled by Permission Groups and Permission Levels.
- B. The following libraries and sub-libraries on the PMWS are provided for specific workflows and contract documentation. Related specification numbers are in "()" if applicable.

Contract Documents	Construction Administration	Construction Progress	LEED Documentation	Quality Control	Construction Closeout
<i>GC Partial Pay Apps (01 29 76)</i>	<i>Change Order Requests (COR Form) (01 26 57)</i>	<i>Schedules (01 32 16)</i>	<i>LEED Documents</i>	<i>Regulatory Inspections</i>	<i>Misc Closeout Documents</i>
<i>Construction Documents</i>	<i>Change Orders (CO Form) (01 26 63)</i>	<i>Progress Meetings (01 31 19)</i>	<i>Waste Management (01 74 19)</i>	<i>Commissioning Checklists</i>	<i>O & M Manuals (01 78 23)</i>
<i>Regulatory Documents</i>	<i>Construction Bulletins (CB Form) (01 26 46)</i>	<i>Daily Journal (DJ Form) (01 32 26)</i>		<i>System Performance Tests</i>	<i>Product Warranties /Guarantees (01 78 36)</i>
<i>Testing Contract</i>	<i>Request for Information (RFI Form) (01 26 13)</i>			<i>Quality Management Observation (QMO Form) (01 45 16)</i>	<i>As-Builts (01 78 39)</i>
	<i>Submittals (SUB Form) (01 33 23)</i>			<i>Safety and Incident Reports</i>	<i>Attic Stock (01 78 23)</i>
	<i>Substitution Request (SR Form) (01 25 13)</i>			<i>Material Testing & Field Reports</i>	<i>Demonstration and Training (01 79 00)</i>

Contract Documents	Construction Administration	Construction Progress	LEED Documentation	Quality Control	Construction Closeout
					Warranty Issues (WI Form) (01 78 23)

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- C. A tutorial document on the web based PMT will be provided to the General Contractor (GC) who is awarded the contract. Additional training will be provided as needed for the GC and Sub-Contractors (SC) by the CoM.
- D. The PMT has predefined work flows that channel automated alerts as documents are uploaded, reviewed, and completed. These workflows are designed for inbound information from the contractor as well as outbound information from the Architectural/Engineer consultant and the Owner.
- E. The GC will be required to receive email notifications, access the internet to review related documentation and be able to upload/download documentation to the various project libraries.
- F. The SC's will be required (at a minimum) to receive email notifications and access the internet to review related documentation. Prior to setting up the final PMT the GC and CPM shall meet to review all SP workflows, the GC will determine to what level over the minimum requirements the SC's will be involved.

1.3. RELATED SPECIFICATIONS

- A. The following specification sections are directly related to the CoM PMT system.
 - 1. 01 25 13 Product Substitution Procedures
 - 2. 01 26 13 Request for Information (RFI)
 - 3. 01 26 46 Construction Bulletins (CB)
 - 4. 01 26 57 Change Order Request (COR)
 - 5. 01 26 63 Change Order (CO)
 - 6. 01 29 76 Progress Payment Procedures
 - 7. 01 31 19 Project Meetings
 - 8. 01 32 16 Construction Progress Schedules
 - 9. 01 32 26 Construction Progress Reporting
 - 10. 01 32 33 Photographic Documentation
 - 11. 01 33 23 Submittals
 - 12. 01 45 16 Field Quality Control Procedures (Owner)

PART 2 - PRODUCTS

2.1. SHAREPOINT SYSTEM RELATED PRODUCTS

- A. SharePoint is a Microsoft Windows based software that requires no additional software installation, hardware or other special requirements/applications for the users. There are no costs associated with the use of this system.
- B. Currently the CoM is using SharePoint 2010.
 - 1. SharePoint works best if the user's computer is running Windows versions 7 through 8.1.
 - 2. SharePoint works best when used with Internet Explorer versions 9 - 11 (32 bit).
 - a. At this time SharePoint is not compatible with other internet browsers such as Fire Fox, Google Chrome, and Safari.

PART 3 - EXECUTION

3.1. POST BID-OPENING

- A. After bids have been opened, a successful bidder has been determined, and bid acceptance procedures have been initiated the City Project Manager (CPM) will contact the GC to provide the following information.
 - 1. Project Management Software Tutorial. This tutorial is in a PDF printable format with screen shots and associated instructions on how to access and use the PMT.
 - a. Tutorial instructions will include but not be limited to the following:
 - i. Descriptions of various libraries, documents, and forms that will be used throughout the construction project.
 - ii. Uploading procedures for various types of documents including standardized naming conventions.

- 1 2. A blank Project Directory in an Excel spread sheet format. The contractor shall provide the following
2 information for GC and SC staffs as indicated on the spreadsheet. This will generally be the Project
3 Manager for the GC as well as the Sub-contractors and the GC Site Supervisor.
4 a. Last Name, First Name
5 b. Company Name
6 c. Email address (valid, work related)
7 d. Work Phone Number (required, include area code)
8 e. Cell Phone Number (not required, include area code)
9 3. The GC shall provide the above information for all SC's where the GC is not self-performing the work.
10 4. The GC may provide project foreperson information for work being self-performed if he/she so desires.
11

12 **3.2. POST PRE-CONSTRUCTION MEETING**

- 13 A. The GCPM will return the completed Project Directory spread sheet to the CPM no later than the Pre-
14 construction meeting.
15 B. The CPM is responsible for uploading all project directory data into SharePoint and coordinating with CoM
16 Information Technology (CoM-IT) for creating the logins and passwords of non-city staff (GC/SC staffs).
17 C. All GC/SC staff will be notified through an automated email from CoM IT that logins and passwords are available.
18 It is the responsibility of each GC/SC to call the CoM-IT number provided in the email to receive his/her
19 login/password over the phone. Logins and passwords will not be released via email.
20 D. Once the GCPM has received his/her login/password uploading of contract related documents can begin. This
21 would include but not be limited to project schedules, submittals, RFI's, and other documents as needed.
22 E. All workflows, review of documentation, and general archiving of construction related documentation will be
23 conducted on the PMWS. These documents will generally not be emailed.
24 F. The following documents related to the execution of the contract will not be part of the PMWS:
25 1. All documentation related to executing the contract, such as:
26 a. Sub Contractors list
27 b. Affirmative Action documentation
28 c. Bonding documentation
29 d. Documentation associated with payroll verification
30 e. Final documentation associated with closing out the contract
31 2. Any documentation required/generated by ordinance, code or statute, such as;
32 a. Erosion Control inspections
33 b. Building Inspection Department inspections
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END OF SECTION

**SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULES**

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4 PART 1 – GENERAL 1
5 1.1. SCOPE 1
6 1.2. RELATED SPECIFICATIONS 1
7 PART 2 – PRODUCTS – THIS SECTION NOT USED 1
8 PART 3 - EXECUTION 1
9 3.1. OVERALL PROJECT SCHEDULE (OPS) 1
10 3.2. 6 WEEK LOOK-OUT SCHEDULES (LOS) 1
11 3.3. PROJECT MANAGEMENT WEB SITE (PMWS) 2
12

PART 1 – GENERAL

1.1. SCOPE

- 16 A. This specification is to identify various project related schedules associated with indicating construction progress
17 and outlook. The following schedules are the responsibility of the General Contractor (GC).
18 1. Overall Project Schedule
19 2. 6 Week Look-out Schedule
20 B. This specification is not intended to include internal schedules generated by the contractors during their
21 planning and execution of the contract.
22

1.2. RELATED SPECIFICATIONS

- 23 A. Section 01 29 76 Progress Payment Procedures
24 B. Section 01 31 23 Project Management Web Site
25 C. Section 01 31 19 Progress Meetings
26 D. Section 01 74 13 Progress Cleaning
27 E. Section 01 77 00 Closeout Procedures
28 F. Section 01 78 23 Operation and Maintenance Data
29 G. Section 01 78 36 Warranties
30 H. Section 01 78 39 As-Built Drawings
31 I. Section 01 78 43 Spare Parts and Extra Materials
32 J. Section 01 79 00 Demonstration and Training
33 K. Section 01 91 00 Commissioning
34 L. Other specification within the construction documents that may indicate the need for scheduling any event with
35 Owner, Project Architect, Owner Representatives, including any owner provided equipment.
36
37

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. OVERALL PROJECT SCHEDULE (OPS)

- 43 A. The GC shall prepare an OPS that covers the duration of the contract from the pre-construction meeting through
44 the end of construction to final contract closeout.
45 1. The GC shall review Specification 01 77 00 Closeout Procedures to become familiar with definitions,
46 differences, and requirements for closing out the construction and contract including the association with
47 progress payments.
48 B. The GC shall provide copies and lead a discussion on the OPS during the pre-construction meeting.
49 C. The OPS shall indicate start and end dates of each task associated with the project.
50 D. The OPS shall clearly indicate the critical path of the project.
51 E. The GC shall update the OPS as often as necessary during the duration of the project. Updates will be briefed as
52 needed during bi-weekly progress meetings.
53

3.2. 6 WEEK LOOK-OUT SCHEDULES (LOS)

- 54 A. The GC shall prepare the initial LOS to include detail of daily tasks for the first six (6) weeks of construction in
55 depth for the Pre-construction meeting. The LOS shall be compatible and complimentary to the OPS.
56 B. The GC shall provide copies and lead a discussion on the LOS during the pre-construction meeting.
57

- 1 C. The LOS shall indicate start and end dates of each major task, associated related sub-tasks, and required parallel
- 2 or pre-requisite tasks required to complete the major task on time.
- 3 D. The LOS shall also include identifying and scheduling such events as:
- 4 1. Pre-installation meetings and mock-up review meetings.
- 5 2. Quality management reviews of installations before they are covered.
- 6 3. Owner provided equipment as designated by the contract documents.
- 7 4. Work by others as designated by the contract documents.
- 8 5. Critical submittal dates.
- 9 E. The GC shall update the LOS prior to each bi-weekly progress meeting to indicate the next 6 weeks of scheduled
- 10 work. Updates will be briefed during each bi-weekly progress meeting.
- 11

12 **3.3. PROJECT MANAGEMENT WEB SITE (PMWS)**

- 13 A. The GC shall upload all project schedules and updates to the PMWS in an original PDF version of the scheduling
- 14 document. Scans will not be permitted.
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END OF SECTION

**SECTION 01 32 19
SUBMITTALS SCHEDULE**

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4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. RELATED DOCUMENTS 1
8 1.4. SUBMITTAL DEFINITIONS 1
9 1.5. SUBMITTAL REQUIREMENTS 2
10 1.6. ADMINISTRATIVE SUBMITTALS 2
11 PART 2 – PRODUCTS – THIS SECTION NOT USED 2
12 PART 3 - EXECUTION 2
13 3.1. OVERALL RESPONSIBILITIES OF ALL CONTRACTORS 2
14 3.2. GENERAL CONTRACTORS RESPONSIBILITIES 2
15 3.3. STAFF REVIEW RESPONSIBILITIES 3
16

PART 1 – GENERAL

1.1. SUMMARY

- 20 A. The General Contractor shall submit a complete and comprehensive list of all submittals anticipated during the
21 execution of this contract.
22 B. The GC shall include the Administrative submittals identified in item 1.5 below and shall be required to up load
23 them to the Project Management Web Site.
24 C. The initial Submittals Schedule shall be based on the original contract documents used at the time of bidding and
25 any posted addenda through awarding of the contract.
26 D. The Submittal Schedule may be appended during the execution of the contract based on amendments to the
27 contract in the form of Change Orders, Construction Bulletins, and other related documents that add, or change
28 the scope of the work.
29

1.2. RELATED SPECIFICATIONS

- 30 A. Section 01 29 76 Progress Payment Procedures
31 B. Section 01 31 23 Project Management Web Site
32 C. Section 01 33 23 Submittals
33 D. Section 01 91 00 Commissioning
34
35

1.3. RELATED DOCUMENTS

- 36 A. The following documents shall be used as the basis for initiating the original Submittals Schedule.
37 1. Drawing documents and specifications (including general provisions) as provided with the bid set
38 documents and any published addenda.
39 B. The following documents shall be used to amend the submittals schedule as needed during the execution of this
40 contract.
41 1. Documents associated with revisions or clarifications to number A.1 above after awarding of the
42 contract, including but not limited to:
43 a. Construction Bulletins
44 b. Approved Change Orders
45
46

1.4. SUBMITTAL DEFINITIONS

- 47 A. Administrative Submittal: Any submittal that may be required by a Division 1 Specification and as noted in
48 Section 1.5 below.
49 B. Critical Path Submittal: Any early submittal that needs a priority review due to early construction use or long
50 lead times where a delay could affect the critical path of the construction schedule
51 C. Submittal: Any material, product, equipment, or general requirement as outlined in this and other specifications
52 that require a favorable review or acceptance prior to proceeding with procuring the item or proceeding with
53 the Work.
54
55

1.5. SUBMITTAL REQUIREMENTS

- A. The GC and all Sub-contractors shall review the construction documents including the specifications of their individual Division or Trade to compile a complete list of all materials, products, or equipment that will require a positively reviewed submittal to be completed prior to procurement and installation.
 - 1. Submittals shall include but not be limited to any of the following that may apply:
 - a. Shop Drawings
 - b. Product Data
 - c. Assembly Drawings
 - d. Engineered Drawings
 - e. Product Samples
- B. The following items will require an approved submittal, verify with specifications for specific needs and requirements:
 - 1. Contractor certifications for specialized work such as asbestos removal, well drilling, controls, AV, etc.

1.6. ADMINISTRATIVE SUBMITTALS

- A. The GC shall upload the following submittals within 15 working days of receipt of the City of Madison Start Work Letter. All Administrative Submittals shall be approved prior to requesting Progress Payment Number 1.
 - 1. Contractors Project Directory, see specification 01 31 23, discuss requirements with CPM
 - 2. Schedule of Values, see Specification 01 29 73
 - 3. Submittals Schedule, see Specification 01 32 19
 - 4. Waste Management Plan, see Specification 01 74 19
 - 5. Closeout Requirement Checklist, see Specification 01 77 00
 - 6. Warranty Checklist, see Specification 01 78 36

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. OVERALL RESPONSIBILITIES OF ALL CONTRACTORS

- A. All contractors shall be responsible for reviewing the drawings and specifications within their Divisions of Work to provide a complete and comprehensive list of submittals to the General Contractor.
- B. Each list shall indicate the title of the submittal, the associated specification of the submittal, whether the submittal can be considered an early/middle/late submittal, the anticipated date the submittal will be provided and the anticipated date the submittal needs to be approved.
- C. Contractors shall be aware that the goals for submittal review by the Architect staff and City staff will be as follows:
 - 1. For items on the Critical Path as identified by the GC, five (5) working days
 - 2. For most other submittals ten (10) working days
 - 3. Additional time may be needed for complex submittals or if re-submittals are required.
- D. The general format of the Submittal Schedule shall be tabular as per this example:

<u>Title</u>	<u>Specification</u>	<u>Critical Path (Y or N)</u>	<u>Date provided</u>	<u>Date required</u>	<u>Remarks</u>
Concrete Mix Design	03 30 00	Y	Oct 1, 2014	Oct 15, 2014	
Paint Draw Downs	09 90 00	N	Jan 2, 2015	Jan 20, 2015	

3.2. GENERAL CONTRACTORS RESPONSIBILITIES

- A. The General Contractor shall be responsible for all of the following:
 - 1. Consolidating all submittal lists from individual contractors into one master list.
 - 2. Reviewing all submitted lists for completeness, timing with the overall contract, etc. The GC shall meet with individual contractors to make changes as necessary.
 - 3. Upload the completed Submittals Schedule to the Submittal Library on the Project Management Web Site for review as SD 003.0. See Specification 01 33 23 Submittals for more information on this procedure.
 - 4. Resubmit the schedule as needed after initial reviews have been completed.
- B. The GC shall work with other contractors to amend the Submittals Schedule throughout the execution of the project based on changes and modifications as needed.
- C. The GC and Project Architect shall be responsible for reviewing and briefing the submittal schedule and submittals status at each bi-weekly construction meeting.

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3.3. STAFF REVIEW RESPONSIBILITIES

- A. The Project Architect, consulting staff, Commissioning Agent (CxA), Owner, and city staff will review the Submittal Schedule for completeness per the plans and specifications within their divisions of work. The reviewing staff may provide comments as needed. Some examples might include the following:
 - 1. Submittal not required
 - 2. Provide photos of samples with digital submittal
 - 3. Insure one submittal for complete system
 - 4. Append the schedule to include...
 - 5. See Specification <xyz> for additional requirements
- B. The Project Architect and City Project Manager will finalize review comments regarding the Submittal Schedule. Re-submittal of the submittal schedule may be required.

END OF SECTION

SECTION 01 32 23
SURVEY AND LAYOUT DATA

1
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3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. SURVEYOR QUALIFICATIONS 1
8 1.4. QUALITY ASSURANCE 1
9 1.5. SUBMITTALS 2
10 1.6. EXAMINATION 2
11 PART 2 – PRODUCTS – NOT USED 2
12 PART 3 - EXECUTION 2
13 3.1. PRE-CONSTRUCTION OWNER SUPPORT 2
14 3.2. UTILITY LOCATING 2
15 3.3. SURVEY CONTROL AND LAYOUT DATA 2
16 3.4. TOPOGRAPHIC SURVEYING 2
17 3.5. SITE SURVEY AS-BUILT 3
18

PART 1 – GENERAL

1.1. SUMMARY

- 22 A. The purpose of this specification is to set forth the minimal required guide lines to be followed by the General
23 Contractor (GC) and the Land Surveyor (Surveyor) including but not limited to the following:
24 1. Surveyor Professional Requirements
25 2. Horizontal and Vertical Datum Control
26 3. Local Control (if any)
27 4. Electronic File and Data Requirements
28 5. As-Built Documentation Requirements
29 B. When working on any City of Madison project, OSHA standards must be complied with. The Surveyor shall
30 provide appropriate traffic control in accordance to the Manual on Uniform Traffic Control Devices (MUTCD).
31 C. The Surveyor shall be responsible for notifying Diggers Hotline in advance of beginning the field work for this
32 contract.
33

1.2. RELATED SPECIFICATIONS

- 34 A. Section 01 29 76 Progress Payment Procedures
35 B. Section 01 31 23 Project Management Web Site (SharePoint)
36 C. Section 01 33 23 Submittals
37 D. Section 01 78 39 As-Built Drawings
38 E. Section 105.9, Survey Points and Instructions, of the City of Madison Standard Specifications for Public Works
39
40

1.3. SURVEYOR QUALIFICATIONS

- 41 A. The General Contractors, Land Surveyor Sub-Contractor shall meet or exceed the following:
42 1. The Principal Land Surveyor (PLS) shall be licensed to practice in the State of Wisconsin.
43 a. The PLS's license shall be current at the beginning of the contract and the PLS shall maintain an
44 active license throughout the execution of this contract.
45 2. The PLS shall have a minimum of minimum of ten (10) years of field experience on similar projects of
46 scope and size.
47 a. Land Surveyors working under the direction of the PLS shall have a minimum of five (5) years of field
48 experience on similar projects of scope and size.
49 B. The PLS shall be responsible for checking and verifying all work being performed under the PLS's direction during
50 the execution of this contract. This shall include but not be limited to periodic field checks of equipment and
51 survey data for accuracy and compliance with the contract documents.
52
53

1.4. QUALITY ASSURANCE

- 54 A. The PLS shall do all surveying in City of Madison Datum's as follows:
55 1. All Horizontal Control shall be in the Dane County Coordinates (WISCRS), NAD 83(1997) datum, US
56 Survey foot).
57 2. All Vertical Control shall be in NAVD88(1991).
58

3. Information on PLSS Section Corner Monuments and Tie Sheets can be found on the City Engineering Mapping website http://gis.cityofmadison.com/Madison_PLSS/PLSS_TieSheets.html.

1.5. SUBMITTALS

- A. After initial project setup the PLS shall provide the following information as a Survey Data Submittal for review by the CPM/CCM, and Owner. See Specification 01 33 23 – Submittals for more information.
1. Copy of the PLS (and any supporting staff) current State of Wisconsin registration certificate/licenses.
 2. Digital Survey Submittal on a thumb drive delivered to the CPM/CCM. Submittal Survey shall be on a thumb drive or CD in Auto CAD 2017, MicroStation V8i, or DXF format. Digital Submittal shall be of the project site setup showing all of the following:
 - a. Key features not scheduled for demolition, including but not limited to building corners, roof overhangs, and door locations.
 - b. Location of construction limits fencing.
 - c. Locations of PLSS and/or project control points provided by the Owner.
 - d. Locations of project based control points.
 3. Printed Survey Submittal shall be the same as item 1 above in PDF format. PDF file shall be formatted to print to scale on 24"x36" sheets as required to show all features with text neatly organized for each item identified. When multiple sheets are used a match line and sheet references shall be required.
 4. PDF file of the complete level/layer scheme. Scheme shall be in tabular form formatted to 8.5 by 11 paper and shall include all of the following:
 - a. Level/layer designation (abbreviation).
 - b. Level/layer designation (full title).
 - c. Feature attribute characteristics (line weight, line style, font, etc.).
 - d. Cell attribute information
 - e. Samples of line styles and cells.

1.6. EXAMINATION

- A. The PLS shall be responsible for verifying all site data including the owner provided local control points (see Section 3.1 below) prior to starting the Work.
- B. Notify the Project Architect and CPM/CCM immediately if any discrepancies are discovered.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1. PRE-CONSTRUCTION OWNER SUPPORT

- A. The CPM/CCM shall provide the GC/PLS with a digital CAD seed file on or before the Pre-construction meeting.
1. Seed file shall be a MicroStation 3D seed file using the datum indicated above. Seed file shall be delivered as a MicroStation V8i or DXF format as requested by the PLS.
 - a. Seed file shall be used as the PLS's initial base file for all future work on this contract.

3.2. UTILITY LOCATING

- A. The GC and/or PLS shall be responsible for notifying Diggers Hotline for all utility locate requests.

3.3. SURVEY CONTROL AND LAYOUT DATA

- A. The GC and PLS are responsible for all other survey control and layout data required to perform the work in this contract.

3.4. TOPOGRAPHIC SURVEYING

- A. The Surveyor may perform the topographic survey with properly calibrated equipment as follows:
1. Total station, achieving minimum accuracy for well-defined features of +/- 0.1 feet horizontal and +/-0.04 feet vertical at 95% confidence relative to control. "Well defined features" shall include but not be limited to property irons, pavements, trees, landscaping features, buildings, utility locations, and other permanent features.
 2. RTK GPS shall be permitted in large open areas, along tree lines, and in brushy areas.

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3.5. SITE SURVEY AS-BUILT

- A. See Specification 01 78 39 As-Built Drawings, Section 3.2 for more information on required record site information to be provided prior to contract closeout.
- B. The GC shall be responsible for scheduling the PLS to capture locations and depths of all buried utilities prior to any contractor back filing trenches. The Owner may require missing information to be located and surveyed at the GC's expense.

END OF SECTION

**SECTION 01 32 26
CONSTRUCTION PROGRESS REPORTING**

1
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3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATION SECTIONS 1
7 1.3. PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS 1
8 PART 2 – PRODUCTS - THIS SECTION NOT USED 1
9 PART 3 - EXECUTION 1
10 3.1. CONTRACTOR JOURNAL 1
11 3.2. CONSTRUCTION PROGRESS MEETINGS 2
12

PART 1 – GENERAL

1.1. SUMMARY

- 16 A. Daily records of project activities, resources used, weather conditions, and other information related to the
17 ongoing progress of the project are extremely important at all levels of Construction Management.
18 B. Daily records provide the base for weekly progress reports and updating progress schedules.

1.2. RELATED SPECIFICATION SECTIONS

- 21 A. Section 01 31 19 Project Meetings
22 B. Section 01 31 23 Project Management Web Site
23 C. Section 01 32 23 Photographic Documentation
24

1.3. PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS

- 26 A. The General Contractor (GC) shall be responsible for all Construction Progress Reporting as outlined in this and
27 other specifications as noted.
28 B. The GC shall maintain daily progress journals in a format of his/her choosing provided it is legible and contains
29 the information as outlined in Section 3.1 below.
30 C. The journal shall be located in the job trailer and shall be reviewable by the Project Architect or City Project
31 Manager if so requested.
32

PART 2 – PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. CONTRACTOR JOURNAL

- 38 A. The GC shall maintain a journal of daily progress on which Work is performed by any employee or entity for
39 which the GC is responsible. Such reports shall include all relevant data concerning the progress of Work
40 activities the GC and Subcontractors are responsible for and the effect of that activity on the time of
41 performance of the Contract.
42 1. Some projects may not require weekly journals be kept instead of daily journals. This is at the sole
43 discretion of the City Project Manager. A daily journal will generally be required when the contract has a
44 significant amount of site work. A weekly journal will generally be used when a contract is interior work
45 only.
46 B. Journal entries shall be made on the Contractor Daily/Weekly Report Form located in the Construction Progress-
47 Daily Journal Library on the Project Management Web Site. The form consists of the following areas:
48 1. Weather; include temperature, humidity, precipitation, wind and other related information such as
49 significant storm events, times, and details.
50 2. Work completed by trade
51 3. Delays encountered
52 4. Deliveries received or delayed
53 5. Hot issues that need to be addressed
54 6. Safety issues
55 7. Photograph progress and upload to the Photo Library on the Project Management Web Site.
56 8. Other including inspections, testing, etc.
57 9. Space for attaching documents

- 1 C. Contractor Daily/Weekly Report Forms shall be completed and signed by the GC's Job Superintendent or other
2 on-site representative authorized by the GC confirming each such report is current, accurate and complete.
3 D. If applicable the GC shall include schedules of quantities and costs, progress schedules, wage rates, reports,
4 estimates, invoices, records and other data as requested by the CPM concerning Work performed or to be
5 performed under this Contract if the CPM determines such information is needed to substantiate Change Order
6 proposals, claims, or to resolve disputes.
7

8 **3.2. CONSTRUCTION PROGRESS MEETINGS**

- 9 A. The GC shall provide a verbal summary of the previous two (2) weeks progress reports at each bi-weekly
10 construction progress meeting.
11

12 **END OF SECTION**
13
14

**SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION**

1
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4 PART 1 – GENERAL 1
5 1.1. SCOPE 1
6 1.2. RELATED SPECIFICATION SECTIONS 1
7 1.3. SUBMITTALS 1
8 PART 2 – PRODUCTS 1
9 2.1. DIGITAL CAMERA 1
10 2.1. TIME LAPSE CONSTRUCTION CAMERA (TLCC) 1
11 PART 3 – EXECUTION 2
12 3.1. REQUIREMENTS FOR DIGITAL PHOTOGRAPHS 2
13 3.2. REQUIREMENTS FOR TIME LAPSE PHOTOGRAPHS 2
14 3.3. PROJECT MANAGEMENT WEB SITE (SHAREPOINT) 2
15

16 **PART 1 – GENERAL**

17
18 **1.1. SCOPE**

- 19 A. The General Contractor (GC) shall be required to take weekly digital photographs of interior and exterior
20 construction progress and upload the photos directly to the Project Management Web Site (SharePoint).
21 B. The GC shall be required to provide digital time-lapse photo service of the project exterior construction progress.
22

23 **1.2. RELATED SPECIFICATION SECTIONS**

- 24 A. Section 01 29 76 Progress Payment Procedures
25 B. Section 01 31 23 Project Management Web Site (SharePoint)
26 C. Section 01 32 19 Submittals Schedule
27 D. Section 01 32 33 Submittals
28 E. Section 01 77 00 Closeout Procedures
29

30 **1.3. SUBMITTALS**

- 31 A. The GC shall provide general information on the type of camera being used for interior and exterior digital
32 photographs.
33 1. Information may be written on Contractor’s transmittal sheet.
34 a. Include camera name/type, aspect ratio setting, and average file size
35 b. Provide sample project pictures as part of PDF submittal.
36 B. The GC shall provide sufficient information on the type of time lapse system being used that meets the
37 requirements identified in section 2.2 below.
38

39 **PART 2 – PRODUCTS**

40
41 **2.1. DIGITAL CAMERA**

- 42 A. All digital photographs shall be taken with a good quality digital camera, cell phone, tablet, and other such digital
43 device.
44 B. Digital photographs shall be formatted to achieve a good, clear, and detailed image where the final file size is
45 between 600 KB and 3.0 MB (3000KB).
46

47 **2.1. TIME LAPSE CONSTRUCTION CAMERA (TLCC)**

- 48 A. The TLCC shall be a high quality weather proof camera owned and operated, or leased, by the GC for the
49 duration of this contract with the following minimum capabilities:
50 1. Pan-Tilt-Zoom (PTZ) capable.
51 2. Wireless internet or built in cellular technology capable.
52 a. The use of memory cards will not be permitted.
53 3. Widescreen, high resolution (5-30 MP rating).
54 4. Powered by 120V AC.
55 a. The use of battery packs will not be permitted.
56 5. Web/cloud hosted access to archived photos and video.
57 6. Provides complete time lapse video capability.
58 7. 24/7 service and support for equipment, software, and hosting services.

- 1 B. Approved equipment/services include but are not limited to the following:
2 1. OxBBlue Corporation, www.oxblue.com
3 2. EarthCam, www.earthcam.net
4 3. TrueLook, www.truelook.com
5

6 **PART 3 – EXECUTION**
7

8 **3.1. REQUIREMENTS FOR DIGITAL PHOTOGRAPHS**

- 9 A. The GC shall take a minimum of two (2) exterior photographs each week. Exterior photographs will not be
10 required on projects that do not include any exterior work.
11 1. Exterior photos shall be taken from approximately the same location each week for the duration of the
12 project.
13 2. When applicable this requirement shall begin prior to commencing any site work.
14 3. This requirement shall only be applicable when there is exterior work actively being conducted with the
15 project. Periods of inactivity due to weather (winter conditions) do not require a photograph.
16 4. This requirement shall end when the exterior work has been substantially completed.
17 5. This requirement may be suspended due to weather conditions or substantial delays in exterior progress.
18 B. The GC shall take interior photographs each week that document interior construction progress.
19 1. This requirement will begin when exterior wall framing begins.
20 a. When an interior remodeling project includes demolition work interior photos shall be taken
21 during the demolition process.
22 2. Pictures do not need to be taken from the same location each week.
23 3. This requirement shall end when the interior work has been substantially completed.
24 C. Digital photographs shall be properly zoomed in/out, and flash used as needed, to capture a level of detail
25 required to properly show the progress being captured by the photograph.
26 1. Blurry and dark pictures will not be accepted.
27 D. The camera default naming convention is acceptable. The GC does not need to rename or specifically identify
28 pictures with a title.
29 E. All digital photographs shall be saved in a JPEG (.jpg) format and uploaded directly to the SharePoint Project
30 Images Library.
31 1. The GC shall upload the photos to the folder that designates the appropriate construction week and date
32 (beginning Monday date). If no folder exists, contact the CPM/CCM prior to uploading photos.
33

34 **3.2. REQUIREMENTS FOR TIME LAPSE PHOTOGRAPHS**

- 35 A. The GC shall be responsible for all of the following:
36 1. Verify with the CPM/CCM a suitable place for mounting the camera and related equipment prior to
37 installation.
38 2. The complete installation, setup, maintenance, and removal of the camera and related equipment.
39 3. The hosting and access of all photographs and videos taken by the camera during the project.
40 4. Production of a final time lapse video (minimum of 3 minutes in length) of the project provided in a
41 viewable format to the Owner on a thumb drive or CD.
42 B. Time lapse photos shall be taken from the same fixed position at approximately ten (10) minute intervals.
43 1. Time lapse shall start before normal daily activities begin and end after normal daily activities have been
44 completed.
45 a. The GC shall adjust the camera time lapse schedule as needed to accommodate any periods of
46 overtime or weekend work.
47 b. Time lapse shall not be taken during major periods of no activity including night hours, holidays,
48 weather related (winter) inactivity, etc.
49 C. All photos taken during the execution of this contract shall be accessible from a web based service. Archived
50 photos shall be organized by date and time so that they can be easily retrieved and viewed as needed.
51 1. If necessary the GC shall coordinate usernames and passwords for access to the photos. The City of
52 Madison would prefer that the access be generic to accommodate a wide audience.
53

54 **3.3. PROJECT MANAGEMENT WEB SITE (SHAREPOINT)**

- 55 A. The CPM/CCM shall provide weekly progress folders in the Project Images Library on SharePoint.
56 1. Progress folders are labeled with the Construction Week Number and the date for Monday of that week.
57 2. The GC shall notify the CPM/CCM if additional weekly progress folders need to be created.

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- B. The GC shall upload the weekly digital photographs to the appropriate progress folder in the Project Images Library.
- C. Copies of Time Lapse video shall be uploaded to a separate project folder in the Project Images Library prior to Construction Closeout.

END OF SECTION

SECTION 01 33 23
SUBMITTALS

1
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3
4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED REFERENCES 1
7 1.3. SUBMITTAL REQUIREMENTS 1
8 PART 2 – PRODUCTS – THIS SECTION NOT USED 2
9 PART 3 - EXECUTION 2
10 3.1. GENERAL CONTRACTORS PROCEDURES 2
11 3.2. SUBMITTAL REVIEW 3
12 3.3. PROJECT ARCHITECTS REVIEW 3
13

PART 1 – GENERAL

1.1. SUMMARY

- 17 A. The General Contractor (GC) shall be responsible for providing submittals for review of all contractors and sub-
18 contractors as designated in the construction documents. Submittals shall include but not be limited to all of the
19 following:
20 1. Equipment specified and pre-approved in the specification; to ensure quality, construction, and
21 performance specifications have not changed since final design.
22 2. Equipment specified by performance in the specification; to ensure that the intended quality,
23 construction, and performance specified is met by the selected material or product.
24 3. Shop, piece, erection, and other such drawings as indicated in the specifications to ensure all structural,
25 dimensional, and assembly requirements are being met.
26 4. Submittals indicating installation sequencing
27 5. Submittals indicating control sequencing
28 6. Contractor licensing, certification, and other such regulatory documentation when required by a
29 specification.
30 7. Other submittals as may be required by individual specifications.
31 B. The submittal process shall not be used to determine alternates to specified products or equipment. All
32 considerations shall be reviewed during the bidding process and acceptable alternates shall be acknowledged by
33 addendum prior to the closing of bidding. See bidding instructions for the information on submitting alternates
34 for consideration.
35 D. In the event that a manufacturer has significantly changed a product (discontinued a model, changed dimension
36 or performance data changed available colors, etc.) since bid opening the GC shall submit a Request for
37 Information (RFI) to the Project Architect requesting other approved alternates prior to uploading a digital
38 submittal.
39 E. Contractors and sub-contractors shall be responsible for knowing the submittal requirements of ALL sections
40 within their scope of work under the contract. The Owner reserves the right to request documentation on any
41 materials, equipment, or product being installed where a submittal is not on file. If the material, equipment, or
42 product installed is determined not to meet the intent of the specification the contractor/sub-contractor shall be
43 required to remove and replace the items involved. The GC shall be solely responsible for all costs associated
44 with the removal and replacement.
45

1.2. RELATED REFERENCES

- 46 A. Section 01 29 76 Progress Payment Procedures
47 B. Section 01 31 23 Project Management Web Site
48 C. Section 01 32 19 Submittals Schedule
49 D. Section 01 32 26 Construction Progress Reporting
50 E. Section 01 91 00 Commissioning
51 F. All Technical Specifications, contract documents, construction drawings, and any published addendums during
52 the bidding process.
53 G. All contract documents generated during the execution of the contract including but not limited to Requests for
54 Information (RFI) and Construction Bulletins (CB).
55
56

1.3. SUBMITTAL REQUIREMENTS

- 57 A. A completed submittal shall meet the following requirements:
58

- 1 1. Digital submittal shall be original PDF of manufacturer's data sheets or high quality color scan of the
- 2 same.
- 3 a. Submittals shall not include sales fliers or other similar documents that typically do not provide
- 4 complete manufacturers data.
- 5 2. Documents within the PDF submittal shall be printable to a sized sheet no less than 8-1/2 by 11 inches
- 6 and no larger than 24 by 36 inches.
- 7 3. At the beginning of each submittal the contractor shall identify the plan reference (WC-1, EF-3, etc.) in
- 8 RED block letters that the submittal is for.
- 9 4. Where multiple model numbers appear in a table the contractor shall identify the specific model being
- 10 submitted by using a RED square, box, or other designation to distinguish the correct model from others
- 11 on the page.
- 12 B. A complete submittal will include all information associated with the product or equipment as presented in
- 13 plans, equipment tables, and specifications. Information shall include but not be limited to the following:
- 14 1. Dimensional data
- 15 2. Performance data
- 16 3. Resource requirements, power, water, waste, etc
- 17 4. Clearance and maintenance requirements
- 18 5. Finish information, colors, textures, etc.
- 19 6. Warranty information
- 20 C. Where a submittal includes material samples (carpet, tile, paint draw downs, etc.) the contractor shall do the
- 21 following:
- 22 1. The Contractor shall submit the sample(s) as indicated in the specification.
- 23 2. The Contractor shall include a quality photograph(s) of the product with the digital submittal.
- 24 Photographs shall meet the following requirements:
- 25 a. Formatted to be between 500Kb and 1.0 Mb in file size
- 26 b. Have no glare or flash reflection on the sample
- 27 c. Sample fills the frame of the photo and shows detail as needed. Include multiple photos from
- 28 other angles as needed.
- 29 d. Scanned copies of products or photos are not acceptable.
- 30 D. Uploaded submittals should be relative and related to a specific written specification.
- 31 1. Do not upload submittals under a broad category or division (I.E. HVAC 23 00 00). Always upload by the
- 32 specific specification that identifies a required product or performance to be met.
- 33 2. Group related items together if the specification is written that way. (I.E. all of the plumbing fixtures and
- 34 trim relative to one specific specification should be submitted together).
- 35 3. Submittals shall be grouped and adhere to the divisions in the submittal schedule. Submittals that do not
- 36 conform to the submittal schedule and/or specification divisions will be rejected for re-submittal.

37
38 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

39
40 **PART 3 - EXECUTION**

41
42 **3.1. GENERAL CONTRACTORS PROCEDURES**

- 43 A. All required submittals will be uploaded to the Construction Administration-Submittal Drawings Library on the
- 44 Project Management Web Site (PMWS) by the GC.
- 45 1. The GC shall open a new Submittal Form in the Submittals Drawings Library for each required submittal
- 46 from the Submittals schedule.
- 47 2. Fill in required information on the form that will be used for routing the review and comments.
- 48 3. Attach all documentation as described in Section 1.3 above.
- 49 a. Submit samples under separate cover to the Project Architect when necessary.
- 50 B. Uploading the submittal indicates that the GC has reviewed and approved the submittal against the contract
- 51 document requirements.
- 52 C. The GC shall discuss submittal status at all progress meetings and shall monitor submittal review/approval/re-
- 53 submittal so as to not incur delays in the project schedule.
- 54 D. A completed upload of the submittal to the PMWS initiates the review process workflow.
- 55 E. The GC and sub-contractors shall provide re-submittals as required.
- 56

**SECTION 01 43 39
MOCKUPS**

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4 PART 1 – GENERAL 1
5 1.1. SUMMARY 1
6 1.2. RELATED SPECIFICATIONS 1
7 1.3. RELATED DOCUMENTS 1
8 1.4. PERFORMANCE REQUIREMENTS 1
9 1.5. QUALITY ASSURANCE 1
10 PART 2 - PRODUCTS 2
11 2.1. MATERIALS 2
12 PART 3 - EXECUTION 2
13 3.1. REVIEW THE PLANS AND SPECIFICATIONS 2
14 3.2. MOCKUP CONSTRUCTION 2
15 3.3. MOCKUP REVIEW 2
16 3.4. FINAL SUBMITTAL 3
17

PART 1 – GENERAL

1.1. SUMMARY

A. Definition

1. Mockups are field samples constructed, applied, or assembled at the project site for review by the Owner, Owners Representative, Architect and Consultants.
2. Mockups are three dimensional, true scale models that illustrate materials and methods, equipment, workmanship, or location; based on plans, details, and assemblies.

B. Approved mockups establish the standard of quality by which the final work will be judged.

C. Approved mockups shall be properly documented and entered into the Submittal Library on the Project Management Web Site like any other required submittal. See section 3.4 below for more information.

1.2. RELATED SPECIFICATIONS

- | | | |
|----|------------------|---------------------------------|
| A. | Section 01 26 13 | Request for Information (RFI) |
| B. | Section 01 26 46 | Change Bulletin (CB) |
| C. | Section 01 26 63 | Change Order (CO) |
| D. | Section 01 31 19 | Project Meetings |
| E. | Section 01 32 16 | Construction Progress Schedules |
| F. | Section 01 33 23 | Submittals |
| G. | Section 01 45 00 | Quality Control |

1.3. RELATED DOCUMENTS

- A. The following documents shall be used for preparing mockups.
1. All plans, specifications, and details including those derived as revisions (RFI, CB, CO).
 2. Construction Progress Schedules. Mockups shall be done and completed in a timely fashion for review and approval so as to not impact the Contractors project schedule.
 3. Any Manufacturers installation/assembly instructions.

1.4. PERFORMANCE REQUIREMENTS

- A. All Contractors shall be responsible for providing and constructing mockups as specified in their Division of Work in the plans and specifications.
- B. Materials to be used shall be as specified in the construction documents, full sized and properly assembled.
- C. Completed mockups shall be of sufficient size to provide visible detail of all components as needed for the sample.

1.5. QUALITY ASSURANCE

- A. The General Contractor (GC) shall be responsible for coordinating all of the following as needed:
1. Designating the location for the mockup construction
 2. Coordinating the work of all contractors and materials required to complete the mockup
 3. Ensuring that the mockup meets the intent of the construction documents before scheduling the mockup review meeting.

1
2 **PART 2 - PRODUCTS**

3
4 **2.1. MATERIALS**

- 5 A. The materials used in mockups shall be only those materials indicated in the plans, specifications, and favorably
6 reviewed submittals.
7 B. Mockups shall be made of full scale materials as delivered to the project site.
8 C. All materials associated with a particular detail, construction method, manufacturer's installation instructions
9 shall be properly represented and visible in the mockup. This includes but is not limited to finished mortar joints,
10 sealants, backer rods, tie bars, rebar, etc.
11

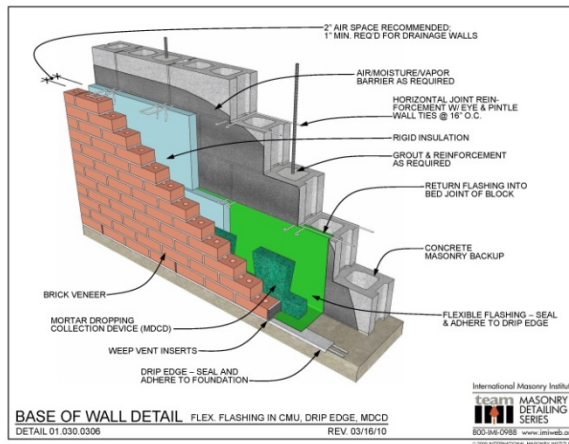
12 **PART 3 - EXECUTION**

13
14 **3.1. REVIEW THE PLANS AND SPECIFICATIONS**

- 15 A. The GC shall review the plans and specifications with all required contractors prior to constructing the mockup.
16 1. Mockups that will be built and remain in place, if favorably reviewed, will be installed in an area easily
17 accessible for review.
18 2. Mockups that will not be built in place or will not remain will be constructed in a space on the project site
19 protected from weather, construction traffic, and other such disturbances until such time as the
20 associated work has been completed.
21 3. Insure all products being represented in the mockup meet the plans, specifications, and any published
22 changes.
23

24 **3.2. MOCKUP CONSTRUCTION**

- 25 A. Mockups shall be of sufficient size to show various material adjacencies, connectivity, patterns, and other such
26 related features.
27 B. Mockups shall be constructed in a layered fashion so that all products being used can be seen and evaluated.
28 C. The construction detail below is an example of a properly layered mockup.
29



- 30
31 d. Required Mockups: CMU and Stone Masonry
32

33 **3.3. MOCKUP REVIEW**

- 34 A. The General Contractor and all associated Sub-contractors (Contracting Team) shall meet with the Owner,
35 Owners Representative, Architect and Consultants (Design Team) as necessary to review the mock-up.
36 Contractors shall be prepared to answer questions on materials and methods as necessary.
37 B. The Contracting and Design Teams shall review the mockup in detail for materials, methods, and workmanship
38 with respect to the intent of the contract documents. Improvements or adjustments shall be discussed as
39 needed.
40 C. If the mockup is incomplete or does not show sufficient detail of products and workmanship the General
41 Contractor shall resubmit a new mockup.

- 1 D. Re-submittal of mockups to meet the intent of the contract documents shall be the responsibility of the General
2 Contractor. No Change Orders will be processed for additional time or materials associated with re-submitting a
3 mockup for approval.
4 1. In the event that a submitted mockup meets the criteria of the contract documents but does not meet
5 the expectations of the design team and alternative methods or materials are discussed the following
6 procedure shall be used:
7 a. Project Architect shall publish a Construction Bulletin (CB) to detail the required/recommended
8 changes.
9 b. The GC shall prepare and submit a new mockup.

10

11 **3.4. FINAL SUBMITTAL**

- 12 A. The field approved mockup shall be submitted by the General Contractor as any other submittal for project
13 documentation purposes. The mockup submittal shall consist of the following:
14 1. Digitally photograph the field approved mockup. Take as many detailed photos as necessary to capture
15 the complexity of the mockup.
16 2. Provide a written summary of the approved mockup. Include all recommended adjustments, level of
17 expected workmanship, and other such detail as discussed during the mockup review.
18 3. Submit the mockup to the Project Management Web Site. See Specification 01 33 23 Submittals for
19 additional information.
20
21
22

23

24

END OF SECTION

SECTION 01 45 16
FIELD QUALITY CONTROL PROCEDURES

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17

PART 1 – GENERAL

1.1. SUMMARY

- 21 A. The City of Madison has developed a multi-faceted Quality Management Program that begins with contract
22 signing and runs through contract closeout to ensure the best quality materials, workmanship, and product are
23 delivered for the contracted Work.
24 1. The Progress Management Web Site is a Construction Management tool that provides contractors and
25 staff a single on-line location for the daily operations and progression of the Work.
26 2. The Quality Management Observation (QMO) is an ongoing observation of the construction process as it
27 progresses. The City of Madison does not use a “Punch List” or “Corrections List” as it is typically known
28 throughout the construction industry. The QMO process acts as an “in progress punch list”.
29 a. By using the QMO process the City of Madison’s goal is to have a zero item punch list prior to the
30 90% progress payment and owner occupancy.
31 B. All contractors shall be required to review the specifications identified in Section 1.2 below, and other related
32 specifications identified therein to become familiar with the terminology and expectations of this City of
33 Madison Public Works contract.
34 C. It is the intent of this specification to outline the requirements, expectations, and responsibilities of the General
35 Contractor (GC), Project Architect, and other representatives of the Owner for items of Quality Assurance and
36 Quality Control.
37 1. This specification is not intended to conflict with Specification 01 40 00 Quality Requirements or other
38 specifications requiring testing and inspecting services.
39 2. This specification does not relieve the GC from any requirements associated with regulatory inspections
40 performed by the City of Madison Building Inspection Unit, or inspectors from other agencies as required
41 by code.
42 3. Any testing performed by an Owner’s Representative does not relieve the GC from performing any
43 testing that may be required by the construction documents.
44

1.2. RELATED SPECIFICATION SECTIONS

- 46 A. Section 01 26 13 Request for Information (RFI)
47 B. Section 01 29 76 Progress Payment Procedures
48 C. Section 01 31 13 Project Coordination
49 D. Section 01 31 23 Project Management Web Site
50 E. Section 01 40 00 Quality Requirements
51 F. Section 01 77 00 Closeout Procedures
52 G. Section 01 78 13 Completion and Correction List
53 H. Section 01 91 00 Commissioning
54

1.3. PERFORMANCE REQUIREMENTS

- 56 A. All contractors shall be responsible for a proper quality assurance/quality control (QA/QC) program throughout
57 the execution of the Work defined within the construction documents, including all recognized construction
58 industry standards and all applicable regulatory codes.

- 1 B. The GC shall be responsible for all of the following:
 - 2 1. Monitor the quality of all workmanship, supplies, materials, and products being installed by all
 - 3 contractors and installers to ensure they meet or exceed the minimum requirements set forth by the
 - 4 construction documents.
 - 5 2. Submit a Request for Information (RFI) whenever manufacturers' instructions or referenced standards
 - 6 conflict with the construction documents before proceeding with the Work.
 - 7 3. Ensure that Work requiring special certifications or licensing is being performed by is being performed
 - 8 and supervised by personnel that meet the appropriate requirements.
 - 9 a. Ensure that all certificates and licenses are current throughout the execution of the project.
- 10 C. The CoM and its representatives shall perform quality assurance and quality control activities throughout the
- 11 execution of this project. This in no way relieves the GC of maintaining an acceptable QA/QC program. =
- 12

13 **1.4. QUALITY ASSURANCE**

- 14 A. The GC shall be responsible for the following:
 - 15 1. All materials, equipment, and products shall be new, clean, undamaged, and meet the performance
 - 16 specifications defined within the construction documents including favorably reviewed submittals.
 - 17 a. Any material, equipment, or product that does not meet the requirements of the construction
 - 18 documents shall be removed and replaced, including any adjacent and related work, at the GCs
 - 19 expense.
 - 20 2. All Work shall be performed by persons properly trained and/or qualified to produce workmanship of the
 - 21 quality specified in the construction documents.
 - 22 3. Providing access to updated as-builts, addenda, submittals, bulletins and other related construction
 - 23 documents at the project site.
- 24 B. The CoM and its representatives may be responsible for any of the following:
 - 25 1. Attend pre-installation meetings
 - 26 2. Attend construction progress meetings
 - 27 3. Review all submittals
 - 28 4. Conduct field visits for QA/QC purposes, provide feedback to the GC and sub-contractors using Quality
 - 29 Management Observation (QMO) reports.
 - 30 5. Review delivered equipment
 - 31 6. Witness equipment installations, startups, testing as specified in other specifications
 - 32

33 **1.5. QUALITY MANAGEMENT OBSERVATION REPORT**

- 34 A. The Quality Management Observation report or QMO is used as a QA/QC tool by those entities responsible for
- 35 QA/QC activities, including but not limited to, the GC, CoM, PA, CX agent, etc.
- 36 B. QMOs are designed to be an early observation of non-conforming construction work before it becomes buried
- 37 by follow on work. As such it is most often used as an "in progress punch list".
- 38 C. QMO forms are part of the Quality Control Library on the Project Management Web Site.
- 39

40 **PART 2 – PRODUCTS - THIS SECTION NOT USED**

41

42 **PART 3 - EXECUTION**

43

44 **3.1. QUALITY MANAGEMENT RESPONSIBILITIES**

- 45 A. While making routine progress visits to the construction project the GC, CPM, CxA and A/E, and applicable others
- 46 shall observe the details of the construction and installations to ensure that the intent of the construction
- 47 documents is being followed.
- 48 B. If during the progress visit there is a determination of contract non-conformance a QMO report shall be initiated
- 49 to begin the documentation process.
 - 50 1. The GC field superintendent shall be informed immediately of any issue that may cause harm, damage to
 - 51 finished work, or be buried prior to properly filing a QMO report.
- 52 C. The following information when filing a QMO report:
 - 53 1. Open a QMO report in the Quality Control Library on the Project Management Web Site
 - 54 2. Enter the date and time of the field visit
 - 55 2. Provide references to construction documents if any (examples; specification, drawing page, details,
 - 56 approved submittals, RFI, CB, etc)
 - 57 3. Provide a short title for the observation being made
 - 58 4. Provide a detailed description of the observation being made

- 1 5. Select all categories (Sitework, Structure, Enclosure, Interior, etc) from the given list that may apply to
- 2 the observation being reported.
- 3 a. For each category selected additional boxes shall open with contractor names associated with
- 4 each category.
- 5 6. Select all contractors from the lists provided that may need to be aware of the observation.
- 6 7. Provide any attachments that may help provide reference to the observation.
- 7 8. Click the SAVE button before closing the form.
- 8 D. The software for the Project Management Website will email notifications that a QMO report has been initiated.
- 9 The software will automatically select and notify the following:
- 10 1. The GC, PA, and CPM for all observation reports being filed.
- 11 2. Others depending on the observation categories selected.
- 12 3. Contractors based on the selections made in the sub-contractors lists.

13
14 **3.2. RESPONDING TO A QMO**

- 15 A. All contractors receiving email notification of a QMO Observation shall review the details of the observation.
- 16 B. The GC shall be responsible for determining the course of action required to remedy the non-conforming issue
- 17 and shall coordinate and direct the contractor(s) responsible for any work related to the observation.
- 18 C. All contractors assigned to remedy the observation by the GC shall provide follow-up responses on the QMO
- 19 report as follows:
- 20 1. Open the QMO report in the Quality Control Library on the Project Management Web Site.
- 21 2. In the "Follow-Up Response" area enter a description of your follow-up response in the box provided.
- 22 a. Click "Insert Item" if additional boxes are required.
- 23 3. Add attachments (pictures) if needed to show the work has been completed.
- 24 4. Click the SAVE button before closing the form.

25
26 **3.3. GENERAL CONTRACTORS FOLLOW-UP**

- 27 A. The GC shall inspect the work to ensure that all assigned contractors have remedied the observation to the
- 28 intent of the construction documents.
- 29 B. The GC shall respond with any additional comments in his/her response box.
- 30 1. If no comments are to be made the GC at a minimum must date the response box to trigger the next
- 31 work flow.
- 32 C. Click the SAVE button before closing the form.
- 33 D. The software will email a notification to the CPM and the person who initiated the QMO that the issue has been
- 34 remedied.

35
36 **3.4. QMO CLOSEOUT PROCEDURE**

- 37 A. The person who initiated the QMO shall review the remedied work and if properly corrected shall close and date
- 38 the QMO form.
- 39 1. Click SAVE and the software will email a notification to the CPM that final review of the Observation is
- 40 required.
- 41 2. In the event there are still issues the Quality Manager can add additional comments in the response area,
- 42 click SAVE and re-issue the QMO for additional review as needed.
- 43 B. Once the person who initiated the QMO has closed the item the CPM shall review and verify with the PA that the
- 44 Observation has been properly remedied and provide final closure on the QMO.

45
46 **3.5. CONSTRUCTION CLOSEOUT**

- 47 A. The GC shall note that successful close out QMOs are required for construction closeout as follows:
- 48 1. Certain progress payments as identified in Specification 01 29 76 are contingent QMO reports being properly
- 49 closed out.
- 50 2. Specification 01 77 00 defines all construction closeout requirements.

51
52
53
54 **END OF SECTION**

SECTION 01 45 29
TESTING LABORATORY SERVICES

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PART 1 – GENERAL

1.1. REQUIREMENTS INCLUDED

- 18 A. The Contractor shall employ and pay for the services of an independent testing laboratory to perform specified
19 services and testing.
20 B. Testing Laboratory inspection, sampling and testing is required for:
21 1. Section 03 30 00: Cast-In-Place Concrete
22 2. Section 05 12 00: Structural Steel Framing
23 3. Section 05 40 00: Cold-Formed Steel Framing
24 4. Section 31 20 00: Earthwork
25

1.2. RELATED REQUIREMENTS

- 27 A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or
28 approvals of public authorities.
29 B. Related Requirements Specified in Other Sections:
30 1. Division 22 and 23: Testing of Mechanical Systems
31 2. Division 26: Testing of Electrical Systems
32

1.3. QUALIFICATION OF LABORATORY

- 34 A. Meet “Recommended Requirements of Independent Laboratory Qualification” published by American Council of
35 Independent Laboratories.
36 B. Meet basic requirements of ASTM E 329, “Standards of Recommended Practice for Inspection and Testing
37 Agencies for Concrete and Steel as Used in Construction.”
38 C. Authorized to operate in State in which the Project is located.
39

1.4. LABORATORY DUTIES

- 41 A. Cooperate with Owner, A/E and Contractor; provide qualified personnel after due notice.
42 B. Perform specified inspections, sampling and testing of materials and methods of construction:
43 1. Comply with specified standards.
44 2. Ascertain compliance of materials with requirements of Contract Documents.
45 C. Promptly notify the Owner, A/E and Contractor of observed irregularities or deficiencies of work or products.
46 D. Promptly submit written report of each test and inspection; one copy each to A/E, Consulting Engineer, Owner
47 and Contractor. Each report shall include:
48 1. Date issued.
49 2. Project Title and number.
50 3. Testing laboratory name, address and telephone number.
51 4. Name and signature of laboratory inspector.
52 5. Date and time of sampling or inspection.
53 6. Record of temperature and weather conditions.
54 7. Date of test.
55 8. Identification of product and specification section.
56 9. Location of sample or test in the Project.
57 10. Type of inspection or test.
58 11. Results of tests and compliance with Contract Documents.

- 1 12. Interpretation of test results, when requested by A/E or the Contractor.
2 E. Perform additional tests as required by Owner, A/E or the Contractor.
3
4 **1.5. LIMITATIONS OF AUTHORITY OF TESTING LABORATORY**
5 A. Laboratory is not authorized to:
6 1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
7 2. Approve or accept any portions of the Work other than those portions of the Work scheduled for testing.
8 3. Perform any duties of the Contractor.
9
10 **1.6. CONTRACTOR'S RESPONSIBILITIES**
11 A. Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.
12 B. Secure and deliver to the laboratory, adequate quantities of representative samples of materials proposed to be
13 used and which require testing. Submit concrete mix designs to A/E for approval prior to pouring concrete.
14 C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes
15 that require control by the testing laboratory.
16 D. Furnish copies of Product test reports as required.
17 E. Furnish incidental labor and facilities:
18 1. To provide access to Work to be tested.
19 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
20 3. To facilitate inspections and tests.
21 4. For storage and curing of test samples.
22 F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and
23 scheduling of tests.
24 G. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's
25 convenience.
26 H. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform
27 additional inspections, sampling and testing required when initial tests indicate work does not comply with
28 Contract Documents.
29 I. Temporarily halt the progress of the Work when tested materials do not comply with Contract Documents and
30 promptly notify the Owner or his designated representative and A/E.
31 J. Remove and replace at no cost to the Owner, all defective materials discovered upon testing not to comply with
32 Contract Documents, including cost for retesting and re-inspecting replaced Work that failed to comply with the
33 Contract Documents.
34
35 **1.7. SPECIFIC TEST, INSPECTIONS, AND METHODS REQUIRED**
36 A. **Section 03 30 00: Cast-In-Place Concrete**
37 1. Secure sample of aggregates Contractor proposes to use and test for compliance with Specifications.
38 2. Certify compliance with Specifications of cement proposed for use by the Contractor.
39 3. Review and approve the Contractor's proposed concrete mix proportions for the required concrete
40 strengths using materials Contractor proposed to use on the project. Incorporate specified admixtures
41 and not less than amounts of cement specified.
42 4. Perform appropriate laboratory tests, including compression tests of cylinders and slump test to
43 substantiate mix designs.
44 5. Inspect and test materials during concrete work to substantiate compliance with Specifications and mix
45 requirements.
46 a. Testing:
47 i. Sample and test concrete in accordance with ASTM C 31, ASTM C 143, ASTM C 172, and
48 ASTM C 231.
49 ii. Perform slump tests in accord with ASTM C 143 from same concrete batch used for test
50 cylinders and record results and comments on compression test reports.
51 iii. Perform compression tests in accordance with ASTM C39.
52 iv. When air-entrained concrete is used, a minimum of one (1) air content test shall be
53 performed in accordance with ASTM C 231 for each set of test cylinders taken.
54 v. Identify all test cylinders with symbols to indicate location on the job where concrete test
55 was made. Record on project record drawings.
56 vi. Strength tests shall be made for: each day's pour; each class of concrete; each change of
57 supplies or sources; and for each 100 cubic yards of concrete or fraction thereof.

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

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27

PART 1 – GENERAL

1.1. SUMMARY

- A. This Section includes general procedural requirements for temporary facilities and controls including, but not limited to the following:
1. Temporary Utilities
 2. Telecommunications Services
 3. Temporary Sanitary Facilities
 4. Barriers
 5. Fencing
 6. Exterior Enclosures
 7. Security
 8. Vehicular Access and Parking
 6. Waste Removal
 7. Project Identification
 8. Field Offices

1.2. RELATED SPECIFICATION SECTIONS

- A. Section 01 31 19 Progress Meetings
B. Section 01 31 23 Project Management Web Site
C. Section 01 74 19 Construction Waste Management and Disposal

1.3. QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
1. Building Code requirements
 2. Health and safety regulations
 3. Utility company regulations
 4. Police, Fire Department and Rescue Squad rules
 5. Environmental protection regulations
 6. Joint Commission - Hospital Accreditation Standards

- 1 B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition
- 2 Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA
- 3 Electrical Design Library "Temporary Electrical Facilities".
- 4 C. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service.
- 5 Install service in compliance with NFPA 70 "National Electric Code".
- 6

7 **1.4. TEMPORARY UTILITIES**

- 8 A. Contractor will provide and pay for (both the installation cost and consumption costs) the following:
 - 9 1. Electrical power and metering.
 - 10 2. Water supply and metering.
- 11 B. General:
 - 12 1. No existing facilities on the property.
 - 13 2. New permanent facilities may be used.
- 14 C. Water Service: Hydrant with backflow preventer and temporary heat (if needed) to be provided by contractor.
 - 15 1. Use trigger-operated nozzles for water hoses, to avoid waste of water.
- 16 D. Temporary Electric Power Service: Electrical Contractor to provide.
- 17 E. Temporary Lighting: Electrical Contractor shall provide temporary lighting with local switching
 - 18 1. Install and operate temporary lighting, minimum of 30 fc, to fulfill security and protection requirements,
 - 19 without operating the entire system, and will provide adequate illumination for all areas of work,
 - 20 including construction operations and traffic conditions.
- 21 F. Temporary Heat: General Contractor shall provide temporary heat required by construction activities, for curing
- 22 or drying of completed installations or protection of installed construction from adverse effects of low
- 23 temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed
- 24 installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition
- 25 required and minimize consumption of energy.
 - 26 1. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-
 - 27 contained LP gas or fuel oil heaters with individual space thermostatic control.
 - 28 a. Use of gasoline-burning space heaters, open flame, or salamander type heating units is
 - 29 prohibited.
- 30

31 **1.5. TELECOMMUNICATIONS SERVICES AND WI-FI**

- 32 A. Not required.
- 33

34 **1.6. TEMPORARY SANITARY FACILITIES**

- 35 A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- 36 B. Temporary toilets: Comply with regulations and health codes for the type, number, location, operation, and
- 37 maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
 - 38 1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide
 - 39 covered waste containers for used material.
 - 40 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
- 41 C. Maintain daily in clean and sanitary condition
- 42 D. Water: Provide potable water approved by local health authorities
- 43

44 **1.7. BARRIERS**

- 45 A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be
- 46 hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from
- 47 construction operations and demolition.
- 48

49 **1.8. FENCING**

- 50 A. Construction: Refer to Plan Documents and Specification Section 01 76 00: Fencing Materials and Barricades
- 51

52 **1.9. EXTERIOR ENCLOSURES**

- 53 A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions
- 54 and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures
- 55 identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors
- 56 with self-closing hardware and locks.
- 57

1 **1.10. SECURITY**

- 2 A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized
3 entry, vandalism, or theft.
4

5 **1.11. VEHICULAR ACCESS AND PARKING**

- 6 A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for
7 emergency vehicles.
8 B. Coordinate access and haul routes with governing authorities and Owner.
9 C. Provide and maintain access to fire hydrants, free of obstructions.
10 D. Existing parking areas located at 1101 Woodward Drive may be used for construction parking until Warner Beach
11 Park Shelter is occupied by Owner.
12

13 **1.12. WASTE REMOVAL**

- 14 A. See Section 01 74 19 - Waste Management, for additional requirements.
15 B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
16 C. Provide containers with lids. Remove trash from site periodically.
17 D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible
18 containers; locate containers holding flammable material outside the structure unless otherwise approved by the
19 authorities having jurisdiction.
20 E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
21

22 **1.13. PROJECT IDENTIFICATION**

- 23 A. Provide project identification sign of design and construction indicated in Section 01 58 13.
24 B. Erect on site at location determined by Owner .
25 C. No other signs are allowed without Owner permission except those required by law.
26

27 **1.14. FIELD OFFICES**

- 28 A. Not Required.
29 B. If Contractor desires a Field Office, location on site shall be determined at the Pre-Construction meeting.
30

31 **PART 2 - PRODUCTS**

32
33 **2.1. TEMPORARY PARTITIONS**

- 34 A. Provide dustproof partitions to limit dust and dirt migration and to separate occupied areas from fumes and
35 noise.
36 1. Non-fire rated partitions, standard
37 a. Wood stud framing, 6-mil polyethylene
38

39 **2.2. EQUIPMENT**

- 40 A. Temporary Lifts and Hoists: Contractors requiring temporary lifts and hoists shall provide facilities for hoisting
41 materials and employees.
42 B. Electrical Outlets: Electrical Contractor shall provide properly configured NEMA polarized outlets to prevent
43 insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault
44 circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
45 C. Electrical Power Cords: Contractors requiring power cords shall provide grounded extension cords; use "hard-
46 service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate
47 lengths of electric cords, if single lengths will not reach areas where construction activities are in progress. Do
48 not exceed safe length-voltage ratio.
49 D. Lamps and Light Fixtures: Electrical Contractor shall provide general service incandescent lamps of wattage
50 required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to
51 breakage. Provide exterior fixtures where exposed to moisture.
52 E. Heating Units: General Contractor shall provide temporary heating units that have been tested and labeled by
53 UL, FM or another recognized trade association related to the type of fuel being consumed.
54 F. First Aid Supplies: General Contractor shall provide first aid supplies complying with governing regulations.
55 G. Fire Extinguishers: General Contractor shall provide hand-carried, portable UL-rated, fire extinguishers of NFPA
56 recommended classes for the exposures, extinguishing agent and size required by location and class of fire
57 exposure.
58

1 **PART 3 - EXECUTION**

2
3 **3.1. TEMPORARY FIRE PROTECTION**

- 4 A. Until fire protection needs are supplied by permanent facilities, General Contractor shall install and maintain
5 temporary fire protection facilities of the types needed to protect against reasonably predictable and
6 controllable fire losses.
7 B. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding
8 Construction, Alterations and Demolition Operations".
9 C. Locate fire extinguishers where convenient and effective for their intended purpose.
10 D. Store combustible materials in containers in fire-safe locations.
11 E. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways
12 and other access routes for fighting fires.
13 F. Prohibit smoking on the premises.
14 G. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition
15 according to requirements of authorities having jurisdiction.
16 H. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site
17 I. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods
18 and procedures. Post warnings and information.

19
20 **3.2. COLLECTION AND DISPOSAL OF WASTE**

- 21 A. Collect waste from construction areas and elsewhere daily
22 B. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce
23 requirements strictly.
24 C. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to
25 rise above 80 deg F.
26 D. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing
27 properly. Dispose of material in a lawful manner.
28

29 **3.3. ENVIRONMENTAL PROTECTION**

- 30 A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply
31 with environmental regulations, and minimize the possibility that air, waterways and subsoil might be
32 contaminated or polluted, or that other undesirable effects might result.
33 B. Avoid use of tools and equipment which produce harmful noise.
34 C. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms
35 near the site.
36

37 **3.4. REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS**

- 38 A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion inspection.
39 B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
40 C. Clean and repair damage caused by installation or use of temporary work.
41 D. Restore existing facilities used during construction to original condition.
42 E. Restore new permanent facilities used during construction to specified condition.
43
44
45
46

END OF SECTION

SECTION 01 58 13
TEMPORARY PROJECT SIGNAGE

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PART 1 – GENERAL

1.1. SECTION INCLUDES

- A. Project identification sign.

1.2. QUALITY ASSURANCE

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.3. SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, structure, sizes.

PART 2 - PRODUCTS

2.1. SIGN MATERIALS

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4" thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized

2.2. PROJECT IDENTIFICATION SIGN

- A. Not Required.
- B. Content (if provided) One painted sign, 32 sq. ft area, bottom 6 feet above ground.
 - 1. Project title, City of Madison, Parks Division logo and name of Owner as indicated on Contract Documents.
 - 2. Names and title of Architect.
 - 3. Name of Prime Contractor.
 - 4. Full color project rendering from high resolution image as furnished by Architect.

PART 3 - EXECUTION

3.1. INSTALLATION

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Install sign surface plumb and level, with butt joints. Anchor securely.

3.2. REMOVAL

- A. Remove sign, framing supports, and foundations at completion of Project and restore the area.

END OF SECTION

**SECTION 01 60 00
PRODUCT REQUIREMENTS**

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4 PART 1 – GENERAL 1
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16 3.7. DUCTWORK, PIPING, AND CONDUIT 3
17 3.8. OWNER PROVIDED, CONTRACTOR INSTALLED EQUIPMENT 4
18

PART 1 – GENERAL

1.1. SUMMARY

- 22 A. The purpose of this specification is to provide general guidelines and responsibilities related to the receiving,
23 handling, and storage of all materials and products from arrival on the job site through installation.
24 1. Immediate inspection of delivered goods means a timely replacement if damaged.
25 2. Proper storage helps prevent damage and loss by weather, vandalism, theft, and job site accidents.
26 3. Proper storage helps with job site performance and safety.
27 2. Proper handling helps prevent damage and job site accidents.
28 B. Each Contractor shall be directly responsible for the receiving, handling, and storage of all materials and
29 products associated with the Work of their Division or Trade.
30 C. Each Contractor responsible for Work associated with Owner provided materials or products shall be responsible
31 for the receiving, handling and storage of the material/product as outlined in Section 3.8 below..
32

1.2. RELATED SPECIFICATIONS

- 34 A. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public
35 Works Construction”.
36 1. Use the following link to access the Standard Specifications web page:
37 <http://www.cityofmadison.com/business/pw/specs.cfm>
38 a. Click on the “Part” chapter identified in the specification text. For example if the specification
39 says “Refer to City of Madison Standard Specification 210.2” click the link for Part II, the Part II
40 PDF will open.
41 b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you
42 to the referenced text.
43 c. City Standard Detail Drawings (SDD) may be located from the index in Part VIII.
44 B. Section 01 57 21 Indoor Air Quality
45 C. Section 01 74 13 Progress Cleaning
46 D. Section 01 76 00 Protecting Installed Construction
47 E. Other Divisions and Specifications that may address more specifically the requirements for the storage and
48 handling of materials and products associated Work of other Divisions or Trades.
49

1.3. QUALITY ASSURANCE

- 51 A. The GC shall be responsible for ensuring that these minimum storage and handling requirements are met by all
52 contractors on the project site including but not limited to the following:
53 1. Receiving deliveries of materials, products, and equipment.
54 a. Inspect all deliveries upon arrival for damage, completeness, and compliance with the
55 construction documents.
56 i. Deliveries shall remain in original packaging or crates, shipping manifest shall be kept with
57 the delivery and the packaging shall have visible identification of the items within the
58 packaging.

- 1 b. Immediately report any damaged products or equipment to the GC, begin arrangements for
- 2 immediate replacement.
- 3 c. Materials or equipment that have been damaged, are incomplete, or do not comply with the
- 4 construction documents shall not be permitted to be installed.
- 5 2. All materials and products shall be stored within the designated limits of the project site. Only store the
- 6 amount of material necessary for upcoming operations so as not to interfere with other construction
- 7 activities and access to Work by the Owner and Architect. Any offsite storage shall be at the expense of
- 8 the contractor storing the material or product. All offsite storage requirements shall comply with this
- 9 specification. All offsite storage of materials is subject to Owner Representative Quality Management
- 10 review at any time.
- 11 3. Large storage containers may be used but shall be weather tight, securable, placed on concrete blocks,
- 12 timbers, or jack stands and shall be level.
- 13 4. When lifting equipment is required the equipment rating shall be greater than the loading requirements
- 14 of the item being lifted. In addition all of the following shall apply as necessary:
- 15 a. Only designated and/or designed lift points shall be used.
- 16 b. Large items shall have tag lines and handlers at all times during lifting operations.
- 17 c. Lift at multiple points as needed to prevent bending.
- 18 5. Materials and products stored inside of the structure shall comply with all of the following:
- 19 a. Storage shall not be allowed to impede the flow of work in progress.
- 20 b. Storage shall not be allowed to hide completed work from review and inspections.
- 21 c. Storage shall not exceed the design loads of the structural components it is being stored upon.
- 22 6. All materials and products shall be stored according the manufacturers minimum recommended
- 23 requirements. All of the following shall be considered before storing any product or material:
- 24 a. Dust and dirt
- 25 b. Moisture and humidity, including rain and snow
- 26 c. Excessive temperatures, direct sun, etc
- 27 d. Product or material weight and size
- 28 e. Potential for breakage
- 29 f. Product incompatibility with other products such as corrosiveness, chemical reactions,
- 30 flammability, etc.
- 31 g. Product or material value and replacement cost
- 32 7. The Contractor shall be responsible for providing fully functional tarps or plastic wrap, to protect
- 33 materials and products from the weather. All coverings shall be free of large holes and tears, and shall be
- 34 tied, strapped, or weighted down to resist blowing.
- 35 8. The Contractor shall be responsible for any temporary heating, cooling, or other utility requirement that
- 36 may be associated with the storage of a material or product.
- 37 9. The Contractor shall be responsible for securing materials and products of value such as copper, A/V
- 38 equipment, etc. Such items shall be stored in securable shipping containers, job trailers or other such
- 39 storage devices. Container shall be kept secured when not in use.
- 40 B. The GC shall inspect the job site daily to ensure that all products and materials stay weather tight and are
- 41 secured against vandalism or theft as required by this specification.
- 42 C. The Owners Representative may at any time request improvements regarding storage of any material or product
- 43 being provided under these construction documents.
- 44

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. GENERAL CONTRACTOR REQUIREMENTS

- 50 A. Designate material storage and handling areas as needed including all of the following:
- 51 1. Designate specific areas of the site for delivery and storage of materials to be used during the execution
- 52 of the Work.
- 53 2. Designated areas shall not be located so as to interfere with the installation of any Work including Work
- 54 by others such as the installation of utilities or the maintenance of existing utilities. This shall include not
- 55 storing items in active utility easements as designated by the site plan.
- 56 B. Arrange for openings in the building as needed to allow delivery and installation of large items. Openings shall
- 57 be appropriately sized to include the use of booms, slings, and other such lifting devices that may be larger than
- 58 the item being installed.

- 1 1. When openings are required in completed Work (new or existing) the GC shall be responsible for
2 providing an appropriate opening and for restoring the opening to the original or better condition upon
3 completion. Restoration shall be weather tight and complete.
4 C. Repeated moving and handling of items being stored shall not be allowed. The GC shall be responsible for any
5 damage and replacement because of mishandling or excessive handling.
6

7 **3.2. BULK MATERIAL**

- 8 A. Bulk material such as sand, gravel, top soil and other types of fill shall be stored away from the construction area
9 and shall be stock piled as follows:
10 1. All bulk material shall be piled safely and efficiently in as small an area as practical. Only store the
11 amount of material necessary for upcoming operations so as not to interfere with other construction
12 activities and access to Work by the Owner and Architect.
13 2. All stock piles shall have silt fence/sock properly installed around the perimeter to prevent erosion and
14 loss of material. Refer to City of Madison Standard Specification Section 210.1(f) and other related
15 specification or details.
16 3. Fine grained material shall be protected with tarps to prevent blowing. Tarps shall be weighted or staked
17 to stay in place.
18 B. Bulk material such as brick, concrete block, stone, and other palletized materials shall be stored on original
19 shipping pallets until ready for use.
20

21 **3.3. DRY PACKAGED MATERIAL**

- 22 A. Dry packaged material such as cement, mortar, etc shall be stored on pallets, on slightly elevated ground or clear
23 stone pad to keep water away from the base of the material being stored. Protect from moisture.
24

25 **3.4. STRUCTURAL AND FRAMING MATERIAL**

- 26 A. All structural and framing material shall be stored in an organized manner arranged by type, size and dimension.
27 Materials shall be stored on pallets or timbers as necessary and shall not be allowed to lie directly on the ground.
28 B. Long and heavy items shall be supported at several points to prevent bending and warping.
29

30 **3.5. EQUIPMENT**

- 31 A. Equipment delivered to the site shall be stored away from all construction activities until the item can either be
32 moved inside or properly installed.
33 B. Equipment shall be stored on slightly elevated ground or clear stone pad to keep water away from the base of
34 the equipment.
35

36 **3.6. FINISH PRODUCTS**

- 37 A. Finish products such as flooring, tile, counters, lockers, toilets, partitions, lighting, and other similar items should
38 not be delivered and stored until the structure has been enclosed, is weather tight, temperature controlled and
39 the contractor is ready for such items to be installed.
40 1. Storage of finished products outside for any length of time shall not be allowed.
41 B. Products that cannot be stored inside the structure shall be stored in secured containers or job trailers until such
42 time as they are ready to be installed.
43 C. Products with a high potential for breakage such as glass, mirrors, tiles, toilet fixtures, etc. shall be stored with
44 additional protection as necessary such as but not limited to the following:
45 1. Store in original shipping containers until ready for installation.
46 2. Do not store in high traffic areas.
47 3. Shield with other materials such as cardboard, plywood, or similar products.
48

49 **3.7. DUCTWORK, PIPING, AND CONDUIT**

- 50 A. All piping and conduit shall be stored horizontally unless otherwise specified by the manufacturer or Division and
51 Trade Specifications.
52 1. Do not store directly on grade.
53 2. Cover metal pipes and tubes to prevent rust and corrosion, allow ventilation to prevent condensation.
54 3. Whenever possible use pipe stands for storing pipe and conduit to prevent tripping and rolling hazards.
55 B. All ductwork shall be stored horizontally or vertically as necessary unless otherwise specified by the
56 manufacturer or Division and Trade Specifications.
57 1. During storage, both ends of each duct shall be protected with plastic sheathing to prevent dust and dirt
58 from getting inside the duct. Sheathing shall be sufficiently taped to the duct.

**SECTION 01 71 23
FIELD ENGINEERING**

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9 1.5. RECORDS 1
10 PART 2 – PRODUCTS – THIS SECTION NOT USED 1
11 PART 3 – EXECUTION – THIS SECTION NOT USED 1
12

PART 1 – GENERAL

1.1. REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field engineering services required for the Project:
1. Land surveying services required to execute the Work, to include building addition location and layout, and location and layout of pavements and all proposed site improvements.
 2. Verification of existing building dimensions, elevations, and relationship to proposed additions.
 3. Professional Engineering services to execute Contractor’s construction methods.
 4. Registered Professional Engineer in the State of Wisconsin to determine the load capacity of the existing structure for use of Contractors temporary facilities, equipment, lifts, machinery, material storage, etc.

1.2. RELATED REQUIREMENTS

- A. Conditions of the Contract

1.3. PROCEDURES

- A. A property survey has been prepared for the Owner and has been bound with Contract Drawings. Surveys shall describe physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. If information is incomplete, notify Owner to furnish additional information. Verify easement locations, front, side, and rear yard restrictions, if any; and property line locations. Verify control points, and establish bench marks. Locate and layout roads, walks, parking areas and all civil structures and all proposed site improvements.
- B. Verify locations of underground services, utilities, structures, etc. which may be encountered or affected by the Work.

1.4. PROJECT SURVEY REQUIREMENTS

- A. Using datum, the lot lines and present levels have been established as indicated 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 employee, the Contractor responsible shall pay the cost of restoration.
- B. Establish lines and levels, locate and layout, by instrumentation and similar appropriate means, additions, column locations, floor levels, stakes for walks, etc.
- C. Provide data to all Subcontractors for their use as applicable.
- D. From time to time, verify layouts by same methods.

1.5. RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 – EXECUTION – THIS SECTION NOT USED

END OF SECTION

**SECTION 01 73 29
CUTTING AND PATCHING**

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8 1.4. QUALITY ASSURANCE 1
9 1.5. WARRANTY 2
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11 2.1. GENERAL 2
12 PART 3 - EXECUTION 2
13 3.1. EXAMINATION 2
14 3.2. PREPARATION 2
15 3.3. PERFORMANCE 2
16 3.4. CLEANUP AND RESTORATION 3
17

PART 1 – GENERAL

1.1. SUMMARY

- 21 A. This Section includes general procedural requirements for cutting and patching including, but not limited to the
22 following:
23 1. Examination
24 2. Preparation
25 3. Performance
26 4. Cleanup and Restoration
27

1.2. RELATED SPECIFICATION SECTIONS

- 29 A. Divisions 02 through 32 Sections for specific requirements and limitations applicable to cutting and patching
30 individual parts of the Work.
31 B. Division 07 Section "Penetration Fire Stopping" for patching fire-rated construction.
32

1.3. DEFINITIONS

- 34 A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
35 B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other
36 Work.
37 C. Level Alpha
38

1.4. QUALITY ASSURANCE

- 40 A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying
41 capacity or load-deflection ratio.
42 B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results
43 in reducing their capacity to perform as intended or that may result in increased maintenance or decreased
44 operational life or safety.
45 C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that
46 could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that
47 may result in increased maintenance or decreased operational life or safety. Some miscellaneous elements
48 include the following:
49 1. Water, moisture, or vapor barriers
50 2. Membranes and flashings
51 3. Exterior curtain-wall construction
52 4. Equipment supports
53 5. Piping, ductwork, vessels, and equipment
54 6. Noise and vibration control elements and systems
55 D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and
56 patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that
57 would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has
58 been cut and patched in a visually unsatisfactory manner.

1 **1.5. WARRANTY**

- 2 A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting
3 and patching operations, by methods and with materials so as not to void existing warranties.
4

5 **PART 2 - MATERIALS**

6
7 **2.1. GENERAL**

- 8 A. Comply with requirements specified within other sections of the Specifications.
9 B. In-Place Materials: Use materials identical to existing in-place materials. For exposed surfaces use materials that
10 visually match in-place adjacent surfaces to the fullest extent possible.
11 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the
12 visual and functional performance of in-place materials.
13

14 **PART 3 - EXECUTION**

15
16 **3.1. EXAMINATION**

- 17 A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
18 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including
19 compatibility with in-place finishes or primers.
20 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
21

22 **3.2. PREPARATION**

- 23 A. Temporary Support: Provide temporary support of Work to be cut.
24 B. Protection: Protect in-place construction and existing conditions during cutting and patching to prevent damage.
25 Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting
26 and patching operations. If the failure to protect, or the lack of protection, of in-place construction and/or
27 existing conditions results in damage, the contractor shall be responsible for repair to previous condition.
28 C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
29 D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be
30 removed, relocated, or abandoned, bypass such services/systems before cutting to eliminate interruption to
31 occupied areas.
32

33 **3.3. PERFORMANCE**

- 34 A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the
35 earliest feasible time, and complete without delay.
36 1. Cut in-place construction to provide for installation of other components or performance of other
37 construction, and subsequently patch as required to restore surfaces to their original condition.
38 B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations,
39 including excavation, using methods least likely to damage elements retained or adjoining construction. If
40 possible, review proposed procedures with original Installer; comply with original Installer's written
41 recommendations.
42 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and
43 chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance
44 of adjacent surfaces. Temporarily cover openings when not in use.
45 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
46 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
47 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by
48 cutting and patching operations.
49 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap,
50 valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other
51 foreign matter after cutting.
52 6. Proceed with patching after construction operations requiring cutting are complete.
53 C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following
54 performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and
55 comply with installation requirements specified in other Sections.
56 D. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of
57 installation.

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3.4. CLEANUP AND RESTORATION

- A. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 1. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - 2. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 4. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - 5. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.
 - 7. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 8. Any smoke and fire caulking that has been disturbed must be replaced by the Contractor as required by code.

END OF SECTION

**SECTION 01 74 13
PROGRESS CLEANING**

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4 PART 1 – GENERAL 1
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12 3.2. PROJECT SITE CLEANING 2
13 3.3. PROGRESS CLEANING 2
14 3.4. FINAL CLEANING..... 3
15 3.5. CALL BACK WORK 4
16

PART 1 – GENERAL

1.1. SUMMARY

- 20 A. Throughout the execution of this contract all contractors shall be responsible for maintaining the project site in a
21 standard of cleanliness as described in this specification.
22 B. All contractors shall also comply with the requirements for cleaning as described in other specifications.
23 C. Work included in this specification shall include but not be limited to:
24 1. Safety Cleaning
25 2. Project Site Cleaning
26 3. Progress Cleaning
27 4. Final Cleaning
28

1.2. RELATED SPECIFICAITONS

- 30 A. Section 01 35 00 Special Procedures
31 B. Section 01 60 00 Product Requirements
32 C. Section 01 74 19 Construction Waste Management and Disposal
33 D. Section 01 76 00 Protecting Installed Construction
34

1.3. QUALITY ASSURANCE

- 36 A. The General Contractor (GC) shall conduct daily inspections, more often if necessary, of the entire project site to
37 ensure the requirements of cleanliness are being met as described within these specifications.
38 B. All contractors shall comply with other regulatory requirements as they apply to waste recycling, reuse, hauling,
39 and disposal requirements of any governmental authority having jurisdiction.
40 C. The Owner reserves the right to have work done by others in the event any contractor fails to perform cleaning
41 as described within these specifications. The cost of any Owner provided cleaning shall be charged to the
42 contractor through a deduct change order.
43

PART 2 - PRODUCTS

2.1. CLEANING MATERIALS AND EQUIPMENT

- 47 A. The Contractor shall provide all required personnel, equipment, and materials necessary to maintain the
48 required level of cleanliness as described in this specification.
49 B. Use only cleaning materials and equipment that are compatible with the surface being cleaned, as
50 recommended by the manufacturer, or as approved by the A/E.
51 C. Use only cleaning materials, equipment, and methods as recommended in the manufacturers care and use guide
52 of the material, finish or equipment being cleaned.
53

PART 3 - EXECUTION

3.1. SAFETY CLEANING

- 57 A. All Contractors shall be responsible for safety cleaning as required by OSHA and other regulatory requirements
58 as applicable.

- 1 B. Safety Cleaning shall include but not be limited to the following:
- 2 1. All work areas, passageways, ramps, and stairs shall be kept free of debris, scrap materials, pallets, and
- 3 other large items that would obstruct exiting routes. Small items such as tools, electrical cords, etc are
- 4 picked up when not in use.
- 5 2. Form and scrap lumber shall have nails/screws removed or bent over. Lumber shall be neatly stacked in
- 6 an area designated by the GC.
- 7 3. Spills of oil, grease, and other such liquids shall be cleaned immediately or sprinkled with sand/oil-dry
- 8 first, then cleaned.
- 9 4. Oily, flammable, or hazardous items shall be stored in appropriate covered containers and storage
- 10 devices unless actively being used.
- 11 5. Oily, or flammable rags, and other such waste shall only be disposed of in authorized covered containers.
- 12 6. Disposal by burning shall not be allowed at any time.

13
14 **3.2. PROJECT SITE CLEANING**

- 15 A. This section applies to the general cleanliness of the project site as a whole for the duration of the execution of
- 16 this contract.
- 17 B. Exterior Project Site Areas
- 18 1. The GC and other Contractors as appropriate shall ensure the following levels of cleanliness are applied
- 19 to the exterior project site areas.
- 20 a. The overall appearance of the project site is neat and orderly. Defined areas for material storage,
- 21 material waste, job trailers, and the project area are clean and well maintained.
- 22 b. The construction fence is maintained, erect with no gaps, and properly posted per all regulatory
- 23 requirements.
- 24 c. All erosion control measures are properly maintained, cleaned, and repaired as necessary.
- 25 d. All loose materials (construction or waste) are properly tied or weighted down to resist blowing.
- 26 e. All construction materials are properly covered with fully functional tarps or plastic wrap,
- 27 protected from the weather, coverings are tied, strapped, or weighted down to resist blowing.
- 28 f. Dust control is applied as necessary or as required by any regulatory requirement.
- 29 C. Interior Project Site Areas
- 30 1. All Contractors shall ensure the following levels of cleanliness are applied to the interior project site
- 31 areas.
- 32 a. The overall appearance of the project site is neat and orderly. Defined areas for material storage,
- 33 material waste, and project area are clean and well maintained.
- 34 b. Stored materials are kept in original shipping containers whenever possible. Stored materials not
- 35 in shipping containers are properly stored and protected according to other applicable
- 36 specifications.
- 37 c. All scraps and debris shall be properly disposed of as often as necessary to keep work areas,
- 38 passageways, stairs, and ramps free of debris and clear for emergency exiting.
- 39 d. Boxes, pallets, and other such shipping containers, are broken down, stored in a consolidated area
- 40 or, disposed of as often as is necessary.
- 41 e. Hand tools, supplies, materials, electrical cords not being used are picked up and stored in gang
- 42 boxes, not left as walking hazards in work areas, passageways, etc.
- 43 D. Job Trailer
- 44 1. The interior of the job trailer shall be kept clean and available as a work space at all times. The GC shall
- 45 ensure that the following is provided for within the job trailer:
- 46 a. Meeting space including tables and chairs.
- 47 b. Sufficient space for all contractors to access the official construction documents, provide updates,
- 48 etc.

49
50 **3.3. PROGRESS CLEANING**

- 51 A. This sub-section shall apply to all Progress Cleaning prior to the installation of finishes, fixtures, and trim (IE
- 52 rough-in).
- 53 1. For the purposes of this section "clean" shall be defined as a level of cleanliness free of dust and other
- 54 material capable of being removed by use of reasonable effort using a good quality janitor broom and
- 55 shop-vac.
- 56 2. Daily cleanings shall be conducted by all contractors at the end of the work day as follows:
- 57 a. Debris in excavated areas shall be removed prior to backfill and compaction.
- 58 b. Debris in wall cavities, chase spaces, etc shall be removed prior to enclosing the spaces.

- 1 c. Large items shall be properly stored, returned to designated areas, or disposed of as necessary.
2 d. Loose materials shall be properly secured.
3 e. Flammable or hazardous materials are properly stored or disposed of.
4 3. Weekly cleaning shall be conducted by all contractors as designated by the GC. Weekly cleanings shall
5 include all the above for a daily cleaning and other necessary cleaning as designated by the GC.
6 B. This sub-section shall apply to Progress Cleaning in preparation for the installation of finishes, fixtures, and trim.
7 a. Surfaces receiving finishes shall be thoroughly cleaned prior to contractors applying finish
8 materials. The GC shall be responsible for inspecting the area and surfaces being cleaned for
9 finish prior to the sub-contractor applying the finish. This shall include but not be limited to the
10 following:
11 i. Wall surfaces shall be wiped clean of dirt and oily residues, vacuumed free of dust, and
12 shall be free of surface imperfections prior to painting or installing wall coverings.
13 ii. Metal surfaces shall be wiped clean of dirt and oily residues, and be free of surface
14 imperfections prior to painting.
15 iii. Flooring shall be broom swept of large and loose items then vacuumed clean of dust and
16 small particles, and damp mopped clean and dried prior to installing any flooring finish.
17 Additional cleaning may be required depending on the preparation requirements
18 recommended by the flooring material manufacturer.
19 C. This sub-section shall apply to Progress Cleaning after the installation of finishes, fixtures, and trim.
20 1. For the purposes of this section "clean" shall be defined as a level of cleanliness free of dust and other
21 material capable of damaging or visually disfiguring finished work, finishes, fixtures, and trim.
22 2. Progress Cleaning at this point in the contract shall be conducted immediately as follows:
23 a. Dust, dirt, etc shall be swept and vacuumed off of finish flooring and trim.
24 b. Liquid spills shall be cleaned up according to the spill type. This shall include drips and spills
25 caused by paint, stain, sealants, and other such items.
26 3. The Contractor(s) at no additional cost to the Owner shall be responsible for replacing any finished work,
27 finishes, fixtures, and trim damaged or disfigured because of inadequate or improper cleaning.
28

29 3.4. FINAL CLEANING

- 30 A. As noted in Specification 01 29 76 Progress Payment Procedures, Progress Payment Milestone Schedule, Final
31 Cleaning shall not be conducted prior to requesting the 90% contract total progress payment and all of the
32 following shall be complete:
33 1. All final regulatory inspections including but not limited to Building Inspection Department and Madison
34 Fire Department inspections have been successfully completed.
35 2. All Quality Management Observation (QMO) reports have been closed out.
36 3. All Demonstration and Training has been completed.
37 4. All Attic Stock has been consolidated and located to its designated area
38 5. All protection for installed construction shall be removed prior to final cleaning by the contractor
39 responsible for providing the protections. This shall include the removal of any adhesive residues left
40 behind from tapes. Contractors shall only use manufacturer authorized cleaning materials for removing
41 adhesives, etc.
42 B. For the purposes of this section "clean" shall be defined as a level of cleanliness generally provided by skilled
43 cleaners using commercial quality building maintenance equipment and materials.
44 C. The GC shall be responsible for ensuring that all requirements under this section are being met.
45 D. General Requirements
46 1. Employ experienced personnel or professional cleaners for final cleaning as necessary for the areas or
47 equipment being cleaned.
48 2. Cleaning equipment used shall be commercial grade equipment commonly used by professional cleaners.
49 3. Cleaning equipment and materials shall be cleaned, rinsed, or replaced to ensure a uniform level of
50 cleanliness is being maintained during the final cleaning. This shall include but not be limited to the
51 following:
52 a. Vacuum cleaner bags and/or filters are changed and/or cleaned as often as necessary.
53 b. Dust & wipe down rags are washed, rinsed, or replaced before starting each room.
54 c. Mopping equipment
55 i. Mop water for washing shall have cleaning solution added to the amount and temperature
56 per manufacturer's recommendations. Mop washing water shall be replaced often to
57 maintain the levels of the cleaning solution and temperature required.
58 ii. Mop water for rinsing shall remain clean, clear, and be replaced as often as necessary.

**SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

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PART 1 – GENERAL

1.1. SUMMARY

- 24 A. This specification includes administrative and procedural requirements for the recycling, re-use, salvaging, and
25 disposal of non-hazardous construction and demolition waste.
26 B. The General Contractor (GC) shall be fully responsible for complying with all applicable ordinances and other
27 such regulatory requirements during the execution of this contract.
28

1.2. RELATED SPECIFICAITONS

- 30 A. 01 29 76 Progress Payment Procedures
31 B. 01 31 23 Project Management Web site
32 C. 01 32 19 Submittals Schedule
33 D. 01 33 23 Submittals
34 E. 01 77 00 Closeout Procedures
35 F. Other Divisions and Specifications that may address the proper disposal of construction or demolition waste as it
36 pertains to work being conducted under that particular specification.
37

1.3. CITY ORDINANCES

- 39 A. There are two (2) Madison General Ordinances (MGO) that the City of Madison has regarding construction and
40 demolition waste.
41 1. MGO 10.185, Recycling and Reuse of Construction and Demolition Debris, describes the requirements
42 associated with this ordinance including definitions, documentation requirements, and penalties.
43 2. MGO 28.185, Approval of Demolition (Razing, Wrecking) and Removal, describes the requirements
44 associated with applying for and receiving a demolition permit.
45 B. All City of Madison, Board of Public Works, contracts being conducted by City Engineering, Facility Management,
46 for construction, remodeling, or demolition shall comply with the above ordinances regardless of project type or
47 size.
48

1.4. DEFINITIONS

- 50 A. Clean: Untreated and unpainted material, free of contamination caused by oils, solvents, caulks, and other
51 chemicals.
52 B. Construction and Demolition Debris: Materials resulting from the construction, remodeling, repair, and
53 demolition of utilities, structures, buildings, and roads.
54 C. Disposal: Off-site removal of construction and demolition debris and the subsequent sale, recycling, reuse, or
55 deposit in authorized landfill or incinerator.
56 D. Hazardous: Exhibiting the characteristics of hazardous substance, i.e. ignitability, corrosiveness, toxicity, or
57 reactivity and including but not limited to asbestos containing materials, lead, mercury and PCBs.
58 E. Non-hazardous: Exhibiting none of the characteristics of a hazardous substance.

- 1 F. Nontoxic: Not immediately poisonous to humans or poisonous after a long period of exposure.
- 2 G. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured
- 3 into a new product.
- 4 H. Recycle: Any process by which construction or demolition debris is diverted from final disposal as solid waste at
- 5 a permitted landfill and instead is collected, separated, and/or processed into raw materials for new, reused, or
- 6 reconstituted products; or for the recovery of materials for energy production processes.
- 7 I. Recycler: Any recycling facility, transfer station, or other waste handling facility which accepts construction and
- 8 demolition debris for recycling, or for other transferring to a recycling facility.
- 9 J. Recycling: The process of sorting, cleaning, treating, or reconstituting solid waste and other discarded materials
- 10 for the purpose of preparing the material to be recyclable. Recycling does not include burning, incinerating or
- 11 thermally destroying waste.
- 12 K. Return: To give back reusable items or unused products to vendors for credit.
- 13 L. Reuse: Shall mean any of the following:
- 14 1. The on-site use of reprocessed construction and demolitions debris.
- 15 2. The off-site redistribution of a material, for use in the same manner or similar manner at another
- 16 location.
- 17 3. The use of non-toxic, clean wood as an alternative fuel source.
- 18 M. Salvage: To remove a waste material from the project site for resale or reuse by the Owner or others.
- 19 N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- 20 O. Trash: Any product or material unable to be re-used, returned, recycled, or salvaged.
- 21 P. Waste: Extra materials or products that have reached the end of its useful life or its intended use. Waste
- 22 includes salvageable, returnable, recyclable and re-useable construction and demolition materials, and trash.
- 23

24 1.5. PERFORMANCE REQUIREMENTS

- 25 A. The GC shall develop a Waste Management Plan that results in end-of-project rates for salvage/recycling/reuse
- 26 of 95 percent (minimum) by weight of the total waste generated by the Work. Percentages may be adjusted on
- 27 a project by project basis depending on selected LEED goals associated with the project.
- 28 B. The GC shall salvage or recycle 100 percent of all uncontaminated packaging materials including but not limited
- 29 to the following:
- 30 1. Paper
- 31 2. Cardboard
- 32 3. Beverage containers
- 33 4. Boxes
- 34 5. Plastic Sheet and film
- 35 6. Polystyrene packaging
- 36 7. Wood crates and pallets
- 37 8. Plastic pails and buckets
- 38 C. Promote a resourceful use of supplies and materials through proper planning and handling. Generate the least
- 39 amount of waste possible by minimizing errors, poor planning, breakage, mishandling, contamination or other
- 40 similar factors.
- 41 D. Use all reasonable means to divert construction waste from landfills and incinerators through recycling, reuse, or
- 42 salvage as appropriate.
- 43

44 1.6. SUBMITTALS AND DELIVERABLES

- 45 A. The GC shall provide his/her completed Waste Management Plan to the Project Management Web Site as a
- 46 submittal for review by the Project Architect and City Project Manager.
- 47 1. See item 1.8 below for Waste Management Plan submittal requirements.
- 48 2. The Waste Management Plan shall be completed, submitted, and approved as a pre-requisite for
- 49 Progress Payment number 1.
- 50 3. Copies of all documentation required by this specification shall be submitted to the appropriate Project
- 51 Management Web Site Library. Documentation shall be reviewed by the City Project Manager during all
- 52 Progress Payment reviews for compliance and accuracy.
- 53 B. The Waste Management Coordinator shall provide copies of items 1 through 5 below to the appropriate Project
- 54 Management Web Site Library and shall update the Waste Management Summary Log to reflect the records
- 55 being submitted.
- 56 1. Records of Donations: Indicate receipt and acceptance of itemized salvageable waste donated to
- 57 individuals or organizations. Indicate if the organization is tax exempt.

- 1 2. Records of Sales: Indicate receipt and acceptance of itemized salvageable waste sold to individuals or
- 2 organizations. Indicate if the organization is tax exempt.
- 3 3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by
- 4 recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts and
- 5 invoices.
- 6 4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and
- 7 incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts and invoices.
- 8 5. Statement of Refrigerant Recovery: The Refrigerant Recovery Technician responsible for recovering
- 9 refrigerant shall provide the GC with a statement indicating all of the following:
- 10 a. All recovery was performed according to EPA Regulations.
- 11 b. All refrigerant present was recovered; indicate the total quantity recovered by unit.
- 12 c. Date of Recovery.
- 13 d. Name, address, company name, and phone number of technician performing the recovery.
- 14 e. Technician shall sign and date the statement.
- 15 C. LEED Submittal: The GC shall provide the following information using the appropriate LEED letter template upon
- 16 project completion: indicating that the requirements of the credit have been met. *NOTE: This requirement shall*
- 17 *only apply to projects having a LEED certification goal.*
- 18 1. Total waste material generated.
- 19 2. Total waste material diverted by diversion method; recycling, salvage, re-use, etc.
- 20 3. Statement that the credit requirements have been met.
- 21 4. GC shall sign the letter.
- 22

23 **1.7. QUALITY ASSURANCE**

- 24 A. Waste Management Coordinator: The GC shall be responsible for designating a Waste Management
- 25 Coordinator. Coordinator may be the GC Supervisor, GC Project Manager or other member of the GC staff
- 26 having knowledge of proper waste management procedures and all applicable regulations.
- 27 B. Regulatory Requirements: comply with all hauling and disposal regulations of authorities having jurisdiction.
- 28 C. The Waste Management Coordinator shall comply with Specification 01 31 19 Project Meetings, Section 3.7.B.1
- 29 and conduct a Waste Management Conference at the job site. This conference shall be repeated as necessary as
- 30 additional trades are added to the Work. The conference shall include but not be limited to the following:
- 31 1. Identify the Waste Management Coordinator; provide trade contractors with name, phone, and email
- 32 information.
- 33 2. Review and discuss the Waste Management Plan and the roles of the Coordinator.
- 34 3. Review the requirements for documenting and reporting procedures of each type of waste and its
- 35 disposition.
- 36 4. Review procedures for material separation; indicate availability and locations of containers and bins.
- 37 5. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
- 38 6. Review waste management procedures specific to each trade.
- 39 D. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- 40

41 **1.8. WASTE MANAGEMENT PLAN**

- 42 A. Develop a plan consisting of waste identification, a waste reduction work plan, and cost/revenue analysis.
- 43 Indicate quantities by weight or volume. Use the same units of measure throughout the waste management
- 44 plan.
- 45 1. Waste Identification: Indicate anticipated types and quantities of site clearing, demolition waste, and
- 46 construction waste that will be generated during the execution of this contract. Include assumptions for
- 47 the estimates.
- 48 2. Waste Reduction Work Plan: The work plan shall consist of but not be limited to all of the following:
- 49 a. Identify methods for reducing construction waste. Re-using, framing and forming materials, re-
- 50 planning material cuts to minimize waste, etc.
- 51 b. Identify what types of materials will be recycled. Provide lists of local companies that receive
- 52 and/or process the materials. Include names, addresses, and phone numbers.
- 53 c. Identify what types of materials will be disposed of and whether it will be disposed of in a landfill
- 54 facility or by incineration facility. Provide lists of local companies that receive and/or process the
- 55 materials. Include names, addresses, and phone numbers.
- 56 d. Identify methods to be used on site for separating waste including all of the following:
- 57 i. Sizes of containers to be used.
- 58 ii. Labels to be used on the containers to identify the type of waste allowed in the container.

- 1 2. Inspect containers and bins frequently for contamination and inappropriately sorted materials. Remove
- 2 contaminated materials and resort as necessary.
- 3 3. Stockpile bulk materials such as sand, topsoil, stone, etc., on site away from the construction area and
- 4 without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water, and
- 5 cover to prevent windblown dust. Do not store within the drip lines of existing trees.
- 6 4. Whenever possible store items off the ground and/or protect them from the weather.
- 7

8 **3.4. GUIDELINES FOR RECYCLABLE, RE-USABLE, AND SALVAGEABLE WASTE**

- 9 A. The following guidelines is not a complete or all inclusive list and shall be adjusted as needed by the methods
- 10 and procedures identified in the Waste Management Plan.
- 11 B. Asphalt Paving: Break-up into transportable pieces or grind, transport to an authorized recycling facility.
- 12 C. Carpet and Pad: Separate carpet and pad scraps, containerize and transport to an authorized recycling facility.
- 13 D. Ceiling System Components: Suspended ceiling system components shall be sorted by material type as follows:
- 14 1. Broken, cut, or damaged tiles shall be containerized, transport to an authorized recycling facility.
- 15 2. Damaged, or cut tracks, trim and other metal grid system components shall be sorted with other metals
- 16 of similar types, palletize, transport to an authorized recycling facility.
- 17 E. Clean Fill: When allowed by Division 31 Specifications; concrete, masonry, stone, asphalt pavement, sand and
- 18 other such materials may be used as clean fill on this project site. The GC shall verify with the Project Architect,
- 19 Structural Engineer, or Civil Engineer as necessary prior to using any materials as clean fill. Materials shall be
- 20 processed, placed, and compacted as specified. If not being re-used on site, transport to an authorized recycling
- 21 facility.
- 22 F. Clean Wood Materials: Including but not limited framing cutoffs, wood sheathing or paneling materials,
- 23 structural or engineered wood products, and pallets or crates. Clean Wood shall be free of paints, stains, oils,
- 24 preservatives and other such contaminants.
- 25 1. Useable pieces shall be sorted by type and dimension, bundled and transported off site by the GC or
- 26 returned to the supplier.
- 27 2. Non-useable pieces shall be palletized or containerized, transport to an authorized recycling facility.
- 28 3. Clean, uncontaminated sawdust and wood shavings shall be bagged, transport to an authorized recycling
- 29 facility.
- 30 G. Concrete: Break-up into transportable pieces, remove all reinforcing and other metals, transport to an
- 31 authorized recycling facility.
- 32 H. Glass Products: Shall be sorted by types, do not include light fixture lamps and bulbs. Products broken in
- 33 shipment shall be returned to the supplier. Broken or cracked items still in frames shall be taped to prevent
- 34 further breakage and injury to workers. Transport to an authorized recycling facility.
- 35 I. Gypsum Board: Stack large clean pieces on wooden pallets or container, store in a dry location, transport to an
- 36 authorized recycling facility.
- 37 J. Light Fixture Lamps and Bulbs: Fluorescent tubes shall be containerized, transport to an authorized recycling
- 38 facility.
- 39 K. Masonry and CMU: Remove all metal reinforcing, anchors, and ties, clean undamaged pieces and neatly stack on
- 40 pallets, transport damaged pieces to an authorized recycling facility.
- 41 L. Metals: Sort metals by type as follows, this does not include piping:
- 42 1. Architectural metals including but not limited to siding, soffit, and roofing panels shall be sorted by
- 43 material, palletize or bundle as needed and transport to an authorized recycling facility.
- 44 2. Structural steel, sort by size and type; palletize and transport to an authorized recycling facility.
- 45 3. Miscellaneous metals such as aluminum, brass, bronze, etc shall be sorted by type, containerized or
- 46 palletized as necessary, transport to an authorized recycling facility.
- 47 M. Packaging and shipping materials
- 48 1. Cardboard boxes and containers: Breakdown all cardboard boxes and containers into flat sheets. Bundle
- 49 and store in a dry location until transported for recycling.
- 50 2. Pallets:
- 51 a. Whenever possible require deliveries using pallets to remove them from the project site.
- 52 b. Neatly stack pallets in preparation for reusing them or providing them to other companies for
- 53 salvage or re-use.
- 54 c. Break down pallets into component wood pieces that comply with the requirements for recycling
- 55 clean wood materials. Neatly stack or palletize pieces in preparation for transportation.
- 56 3. Crates: Break down crates into component wood pieces that comply with the requirements for recycling
- 57 clean wood materials. Neatly stack or palletize pieces in preparation for transportation.
- 58 4. Polystyrene Packaging: Separate and bag materials.

- 1 N. Piping and conduit: Reduce all piping and conduit to straight lengths, sort and store by size, material and type.
2 Remove supports, hangers, valves, boxes, sprinkler heads, and other such components, sort and store by size,
3 material and type. Transport to authorized recycling facilities according to material types.
4 O. Roofing: Roofing materials shall be sorted and containerized by type, transport to authorized recycling facilities
5 according to material types.
6 P. Site-Clearing Waste: Sort all site waste by type.
7 1. Only stockpile soils types and quantities required for re-use on the project site. All remaining quantities
8 shall be transported off site to an authorized facility that receives such materials.
9 2. Brush, branches, and trees with no marketable re-use shall be transported to facilities for chipping into
10 mulch.
11 3. Trees with a marketable re-use shall be salvaged and transported to facilities that specialize in processing
12 trees for future use as wood products.
13

14 **3.5. GUIDELINES FOR DISPOSAL OF WASTES**

- 15 A. The following guidelines shall be adjusted as needed by the methods and procedures identified in the Waste
16 Management Plan.
17 B. Any waste that is contaminated, organic, or cannot be recycled, re-used, or salvaged shall be legally disposed of
18 in an authorized landfill or incinerator. Disposal methods shall follow all applicable regulatory requirements.
19 C. No waste material of any kind, except those types designated as clean fill in section 3.4 above, shall be allowed
20 to be buried on the project site at any time.
21 D. No burning of any kind of waste material shall be permitted on this project site at any time.
22 E. Paint and Stain: Paints, stains, and their containers shall be disposed of as follows:
23 1. Whenever possible containers should be thoroughly cleaned immediately after emptying and sorted with
24 as appropriate (metal or plastic) for recycling
25 2. Empty containers, regardless of type or base material, may be disposed of with lids off with general
26 garbage.
27 3. Latex paint may be placed with general garbage if properly solidified as follows:
28 a. Small amounts (an inch or less in can): Remove lids and allow paint to dry out in the can and
29 harden. Protect cans from rain and freezing.
30 b. Large amounts (more than one inch): Mix paint with equal amounts of cat litter, stir and allow to
31 completely dry. Alternate method: mix with commercial paint hardener.
32 4. Oil-based or combustible paints and stains, regardless of liquid or solid, shall be transported to an
33 approved facility that takes such items such as Dane County Clean Sweep Sites.
34 F. Treated Wood Materials: Treated wood materials including but not limited to wood that has been painted,
35 stained, or chemically treated shall not be recycled or incinerated.
36
37
38
39
40

END OF SECTION

SECTION 01 76 00
PROTECTING INSTALLED CONSTRUCTION

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PART 1 – GENERAL

1.1. SUMMARY

- 25 A. The purpose of this specification is to provide clear responsibilities, guide lines, and requirements related to
26 providing protection to already installed construction.
27 B. Already installed construction shall include but not be limited to the following:
28 1. Any existing site feature such as pavement, curbs, drainage features, utilities, landscaping features (trees,
29 shrubbery, plantings, flagpoles, etc) and other such exterior items not associated with the building
30 whether on or adjacent to the project site.
31 2. Any existing structure on or adjacent to the project site.
32 3. Any existing interior work that may be adjacent to the new work including all paths of ingress/egress to
33 areas associated with accessing the Work.
34 4. Any existing feature of any kind within the public right-of-way that may be on the project site property,
35 adjacent to the project site or across the street from the project site.
36 C. All contractors shall be familiar with the specifications of their Division of Work for specific requirements on
37 protection of the Work.
38 D. The requirements noted within this specification do not relieve any contractor of the responsibility for
39 compliance with any code, statute, ordinance, or other such regulatory requirement having jurisdictional
40 authority over these contract documents.

1.2. QUALITY ASSURANCE

- 43 A. It shall be the responsibility of every contractor and worker assigned to the project to be diligent in protecting all
44 existing work, and newly installed construction.
45 B. It shall be the General Contractors' (GC) responsibility under the contract to provide all reasonable protection
46 methods, materials, or precautionary measures required to protect new or existing construction as described in
47 within this specification to the project as a whole.
48 1. The GC shall be responsible to ensure any damaged new or existing construction is repaired or replaced
49 at no additional cost to the Contract.
50 2. The GC at his/her discretion may direct other contractors to provide and maintain protection of
51 completed work associated with their Division of Work. I.E.: The carpet installer may be required by the
52 GC to provide carpet protection along traveled paths, ingress/egress, etc after installation.
53 C. It shall be the responsibility of the GC to ensure that all materials being used to protect installed construction are
54 compatible with, and/or adjacent to, the materials being protected. This shall include but not be limited to the
55 material used as covering, tapes used to fasten protective materials, etc.

1
2 **1.3. RELATED SPECIFICATIONS**

- 3 A. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public
4 Works Construction”.
- 5 1. Use the following link to access the Standard Specifications web page:
6 <http://www.cityofmadison.com/business/pw/specs.cfm>
7 a. Click on the “Part” chapter identified in the specification text. For example if the specification
8 says “Refer to City of Madison Standard Specification 210.2” click the link for Part II, the Part II
9 PDF will open.
10 b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you
11 to the referenced text.
12 c. City Standard Detail Drawings (SDD) may be located from the index in Part VIII.
- 13 B. Section 01 60 00 Product Requirements
14 C. Section 01 74 13 Progress Cleaning
15

16 **PART 2 - PRODUCTS**

17
18 **2.1. FENCING MATERIALS AND BARRICADES**

- 19 A. For temporary barricade situations, the responsible contractor may provide one of the following that sufficiently
20 provide a sturdy physical barrier and/or visual barrier as necessary for the intended application.
21 1. Standard orange construction barrels each with a standard rubber base ring and reflective tape
22 a. Provide flashing amber lights as needed to increase night time visibility
23 2. Steel “T” style fence posts
24 3. 4’0” high standard orange construction fence
25 4. Traffic barricades
26 5. Jersey barriers
27 6. Other types of fencing or barricades typically used in the construction industry
- 28 B. The contractor responsible for providing the fencing materials and barricades shall also be responsible for
29 maintaining them. This shall include but not limited to fixing damaged fencing, standing up barrels that have
30 been knocked over, realigning barrels, and ensuring flashing lights are fully operational at all times.
- 31 C. The following fencing and barricade designations, and their use descriptions shall be used throughout this
32 specification to provide uniformity in describing protection requirements.
33 1. Type A, Jersey Barriers, to be used as permanent blocking devices to deny access to alternate project site
34 entrances or exits.
35 2. Type B, Traffic Barricades, to be used as temporary blocking devices to deny access to alternate project
36 site entrances or exits.
37 3. Type C, Construction Barrels without construction fencing shall be used for lane closures, temporary
38 blocking devices to deny access and the protection of single locations (I.E. identify the location of an
39 access structure) that do not require fencing.
40 4. Type D, Construction Barrels with construction fencing where it becomes necessary to surround an object
41 with a complete visual barricade and it is impractical or unacceptable to install fence posts. The surround
42 shall be constructed in such a manner as to provide a buffer zone around and access to the item being
43 protected.
44 5. Type X, Other fencing or barricade types that may be designated and detailed within the construction
45 documents shall use additional alpha numeric designations.
46

47 **2.2. EROSION CONTROL PROTECTION**

- 48 A. Refer to City of Madison Standard Specification 210.2 for authorized materials associated with erosion control
49 materials.
50

51 **2.3. INTERIOR FINISH PROTECTION MATERIALS**

- 52 A. Except where noted in other areas of the construction documents or this specification the responsible
53 contractor:
54 1. Shall not provide the cheapest or least effective method as an effort to meet any protection requirement.
55 2. Shall provide materials of sufficient quality, and durability to provide adequate protection based on the
56 seasonal conditions and the anticipated duration at the time the protection will be needed.
57 3. Shall provide sufficient quantity of protection material to protect the construction as needed.

- 1 B. Prior to installing protective measures the responsible contractor shall propose to the GC, Project Architect (PA)
2 and City Project Manager (CPM) the proposed plan for protection, materials to be used and samples as
3 necessary.
4 1. The PA and CPM reserve the right to disapprove any proposed method and/or material and/or make
5 alternate proposals.
6

7 **PART 3 - EXECUTION**
8

9 **3.1. GENERAL EXECUTION REQUIREMENTS**

- 10 A. The GC shall be responsible for ensuring all of the following procedures and requirements are implemented as
11 needed for the duration of the Work performed under this contract.
12 B. The GC shall also be responsible for the following:
13 1. Reporting any incident of damage to existing property, right-of-way, or utility to the CPM immediately
14 upon rendering the incident safe, and notifying emergency response teams, and emergency utility crews
15 as needed.
16 2. Conduct a site walk through prior to leaving at the end of each day to assess:
17 a. Protection measures are properly in place, provide correction actions as necessary.
18 b. Note damage to existing completed work and schedule repair/replacement as needed.
19 3. Ensure all contractors and workers are being diligent in protecting existing work, and newly installed
20 construction.
21

22 **3.2. PROTECT ADJACENT PROPERTIES**

- 23 A. Whenever possible through the design process the City of Madison shall have previously provided notice to
24 adjacent property owners that work will be occurring on or near their property. The City of Madison shall also
25 have obtained any permanent or temporary easements that may be necessary to complete any Work on
26 adjacent properties.
27 B. It shall be the responsibility of the GC to do the following for all Work under this contract being performed on or
28 adjacent to the property line:
29 1. Contact the adjacent property owner and provide him/her with information on the work to be done,
30 equipment to be used, and estimated duration of the work. Information to be updated and
31 communicated to property owner(s) as construction progresses and site conditions change.
32 a. If any adjacent property is a rented or leased space the GC shall also make contact and provide
33 the same information to the tenants.
34 b. Determine from the owner and/or tenants if there are any concerns for children, pets, special
35 plantings, or other concerns.
36 2. Discuss the following with all contractors performing work on or near the property line.
37 a. Work to be completed and timeline.
38 b. Concerns of adjacent property owners/tenants from item 1 above.
39 c. Which protective measures will be necessary to protect adjacent properties and address the
40 concerns of adjacent property owners/tenants.
41 3. Ensure all protective measures are placed and maintained during the execution of Work on or adjacent to
42 the property line. Interact with the adjacent property owners/tenants as needed.
43 C. Any contractor doing work on or adjacent to the property line shall install and maintain any protective measure
44 identified in the contract documents, this specification, or as directed by the GC.
45 D. The GC shall be responsible for restoring any damage to structure and property located on or adjacent to the
46 property line.
47 1. Restoration shall include but not be limited to repair or replacement using like materials and finishes to
48 its original condition or better.
49 2. Restoration of landscaping materials shall include watering of any seed, sod, or other planting of any kind
50 for a reasonable period of time to encourage germination and root development.
51 E. The GC shall keep the CPM informed directly to any issues pertaining to adjacent property owners and tenants.
52

53 **3.3. PROTECT LANDSCAPING FEATURES**

- 54 A. Except where specifically stated in other areas of the construction documents the following minimal protection
55 requirements shall apply under this section.
56 1. Whenever possible do not install new landscape features until exterior building construction has been
57 completed, equipment such as scaffolding and lifts are no longer needed and have been removed, and
58 heavy equipment operation is no longer required.

- 1 2. Whenever possible remove and temporarily store all existing landscape features such as benches, waste
- 2 receptacles, signage, and other such features that will be within the area of Work that can be removed.
- 3 3. Landscape features that cannot be removed such as flag poles, light poles, light bollards, etc. shall be
- 4 protected with Type D fencing for areas on pavement or Type E fencing for areas on soil.
- 5 4. Planting beds shall be protected using Type E fencing around the exposed perimeter of the planting bed
- 6 as needed.
- 7 5. The City of Madison Standard Specification 107.13 shall apply to all tree protection in and around the
- 8 project site at all times.
- 9

10 **3.4. PROTECT UTILITIES**

- 11 A. The contractor shall be responsible for notifying all utilities to determine emergency response procedures and
- 12 protection requirements prior to installing any construction protection.
- 13 1. This includes requesting utility marking through Diggers Hotline.
- 14 a. Call 811 or 1-800-242-8511 to request a public utility locate
- 15 b. For emergency locate call (262) 432-7910 or (877) 500-9592
- 16 2. Contact the Owner and CPM for any available private utility information on the property that may be
- 17 available prior to calling a private utility locating company.
- 18 B. Except where specifically stated in other areas of the construction documents the following minimal protection
- 19 requirements shall apply under this section.
- 20 1. Hydrants, lamp posts, electrical transformers, and other utility pedestals shall be protected with Type D
- 21 fencing for areas on pavement or Type E fencing for areas on soil. Fence posts shall be located so as to
- 22 not be directly over the utility main.
- 23 2. Storm sewer structures in pavement shall have proper inlet protection according to City of Madison
- 24 Standard Specification 210.1(g) and Type C Construction Barrels when necessary.
- 25 3. Storm sewer structures in turf and other landscaped areas shall have proper inlet protection according to
- 26 City of Madison Standard Specification 210.1(g) and Type E fencing for areas on soil.
- 27 4. Stormwater management features such as greenways, retention/detention ponds, bio-filtration ponds
- 28 and other such features shall be properly protected according to the appropriate erosion control
- 29 measure specified on the Erosion Control Plan. See multiple sections of City of Madison Standard
- 30 Specification 210.1
- 31 a. For the protection of hard to see items such as structures, castings, inlets, etc. in grassy areas
- 32 provide Type E fencing for areas on soil.
- 33 c. For the protection of storm water management features having special soils and plants such as
- 34 bio-filtration ponds provide Type E fencing for areas on soil.
- 35 5. Other structures and covers including but not limited to cleanouts, wiring hand holes, valve boxes, access
- 36 structures, grease trap structures, etc shall be protected as follows:
- 37 a. Provide Type E fencing for areas on soil.
- 38 b. When paving operations are complete provide a construction barrel or cone near structures as
- 39 necessary depending on required heavy construction traffic.
- 40

41 **3.5. PROTECT PUBLIC RIGHT OF WAY**

- 42 A. Except where specifically stated in other areas of the construction documents the following minimal protection
- 43 requirements shall apply under this section.
- 44 1. All public right-of-way (area from behind the sidewalk to the centerline of the street) shall remain open
- 45 and accessible except during periods of active work. At such times the public right of way shall be
- 46 properly closed and signed as referenced in City of Madison Standard Specification 107.9.
- 47 2. Bus stops and bus stop structures shall remain accessible at all times.
- 48 3. Traffic signage and traffic signals, traffic control boxes shall be protected with Type D fencing for areas on
- 49 pavement or Type E fencing for areas on soil.
- 50 a. Protection at traffic signage/signals shall not obstruct the viewing of the sign/signal for its
- 51 intended purpose at any time.
- 52 B. When additional protection for traffic control is required, the use of barricades, guardrails, lane closures and
- 53 other such procedures will be detailed within the construction documents.
- 54 C. When additional protection for overhead sidewalk cover is required the contract documents shall indicate the
- 55 specific location and structural requirements of the protective structure.
- 56

1 **3.6. PROTECT STORED MATERIALS**

- 2 A. All contractors shall refer to Specification 01 60 00 Product Requirements for all storage and protection
3 requirements of building materials and products delivered to the site.
4

5 **3.7. PROTECT WORK - EXTERIOR**

- 6 A. Provide all temporary services that may be required to protect the installed material from heat, cold, humidity,
7 etc, while materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.
8 B. Open trenches, pits, and other such excavations shall be properly covered, lined, or shored as needed during
9 periods of inclement weather to prevent the caving of soils onto existing work in progress. Refer to the
10 appropriate specifications and/or regulatory requirements governing this type of work as necessary.
11 C. Provide adequate protection at all openings with heavy duty tarps, plastic sheathing, or wood framing and
12 sheathing as needed to protect interior work in progress from inclement weather as needed.
13 D. Protect exterior finishes of all kinds with heavy duty tarps or plastic sheathing as needed while landscaping is
14 being installed through full germination of seeded areas or installation of filter fabric and mulches to keep dust,
15 dirt, and mud off of finished exterior surfaces.
16 E. Designate specific curb mounting points and provide wood blocking where small vehicles, skid loaders and other
17 such equipment may need access to areas being landscaped.
18 F. Provide plywood turning pads for skid loaders to turn on to prevent tire marking on new pavement.
19 G. Do not permit the parking of vehicles with any kind of fluid leaks to park on new pavement.
20 H. The contractor shall be responsible for cleaning, repairing, or replacing any completed work or work in progress
21 under this specification as deemed necessary by the CPM without additional cost to the contract.
22

23 **3.8. PROTECT WORK - INTERIOR**

- 24 A. The GC shall do all of the following:
25 1. Provide all temporary services that may be required to protect the installed material from heat, cold,
26 humidity, etc, while materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.
27 2. Provide adequate visual and/or physical protection as needed to protect newly completed interior work
28 such as paint, flooring material, sealants, grouts, etc that may be drying and/or curing.
29 3. Provide adequate space and materials for cleaning boots, tool boxes, supplies, and other items coming
30 into the project site once finish work has begun.
31 4. Clean dirtied areas and repair/replace damaged areas immediately.
32 B. The contractors responsible for interior work shall be responsible for protecting their work and finishes from dirt,
33 mud, snow, spills, splatters, and physical damage after installation as follows:
34 1. Protect vinyl composite, rubber composite, painted/stained concrete, and tiled flooring as follows:
35 a. Define foot traffic areas and protect with Ramboard Temporary Floor Protection products as a
36 minimum basis of design or other protection product(s) compatible with installed flooring product
37 if Ramboard is not compatible. Products to be used shall be new.
38 i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do
39 not allow any debris or other material between the installed flooring and the protection
40 material.
41 ii. Repair tears immediately, replace worn areas with like material as necessary.
42 2. Protect carpeted areas as follows:
43 a. Define foot traffic areas and protect with a minimum of 6mil, clear, polyethylene sheeting 3 feet
44 wide. Products to be used shall be new.
45 i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do
46 not allow any debris or other material between the installed flooring and the protection
47 material.
48 ii. Repair tears immediately, replace worn areas with like materials as necessary.
49 3. Protect all finished walls in high traffic areas with Ramboard Temporary Wall protection products or
50 approved equal.
51 i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do
52 not allow any debris or other material between the installed flooring and the protection
53 material.
54 ii. Repair tears immediately, replace worn areas with like materials as necessary.
55 3. Protect counter tops, cabinets, and other finished surfaces with large sheets of thick cardboard or
56 Ramboard products. Do not allow toolboxes, finish materials, parts and other such items to be placed on
57 finished materials.

- 1 C. All protection shall stay in place until the CPM, PA, and GC mutually deem the project is ready for Final Cleaning.
- 2 The contractors responsible for protecting the work shall be responsible for removing the protection and
- 3 removing any adhesive residue at that time. Contractors shall only use manufacturer authorized cleaning
- 4 materials for removing adhesives, etc.
- 5 D. Contractors doing work in un-protected areas of finished work shall be required to provide drop cloths and other
- 6 protection as noted within this specification for the duration of their work.
- 7 1. Finished areas shall be sufficiently covered to accommodate all equipment, and materials being used to
- 8 complete the work being done.
- 9 2. Finished areas shall be sufficiently covered to prevent splatters, over spray, etc when doing touch-up
- 10 work.
- 11 3. Contractors who do not provide sufficient protection under this sub-section shall be responsible for any
- 12 costs associated with cleaning, repairing or replacing already finished construction at no additional cost
- 13 to the contract.
- 14
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- 18

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

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PART 1 – GENERAL

1.1. SUMMARY

- 21 A. The purpose of this specification is to clearly define and quantify the requirements associated with closing a City
22 of Madison Public Works Contract for facility related work.
23 B. All contracts have two distinct but related paths. Each path needs to be properly closed independently in order
24 to close the contract as a whole.
25 1. Construction closeout is related to closing out all of the Work associated with the construction
26 documents.
27 a. It shall be the responsibility of all contractors to be fully aware of the required Work and closeout
28 requirements involved in their individual trades.
29 2. Contract closeout is related to closing out all of the administrative aspects of the contract in general.
30 a. It shall be the responsibility of all contractors to be fully aware of the administrative requirements
31 required by the contract and to provide the supporting documentation required.
32 3. Construction Closeout must be completed before Contract Closeout can begin.
33 C. This specification will provide general knowledge associated with the following areas:
34 1. Construction Closeout Requirements
35 2. Construction Closeout Procedure
36 3. Contract Closeout Requirements
37 4. Contract Closeout Procedure
38 5. Final Payment and Certificate of Completion
39

1.2. RELATED SPECIFICATIONS

- 41 A. Contractors shall review all references to other specifications including specifications relating to the execution of
42 the Work associated with their Division or Trade.
43 B. Section 01 29 76 Progress Payment Procedures
44 C. Section 01 31 23 Project Management Web Site
45 D. Section 01 32 26 Construction Progress Reporting
46 E. Section 01 45 16 Field Quality Control Procedures
47 F. Section 01 74 13 Progress Cleaning
48 G. Section 01 45 16 Construction Waste Management and Disposal
49 H. Section 01 76 00 Protecting Installed Construction
50 I. Section 01 78 13 Completion and Correction List
51 J. Section 01 78 23 Operation and Maintenance Data
52 K. Section 01 78 36 Warranties
53 L. Section 01 78 39 As-Built Drawings
54 M. Section 01 78 43 Spare Parts and Extra Materials
55 N. Section 01 79 00 Demonstration and Training
56 O. Section 01 91 00 Commissioning
57 P. Other requirements as noted in the contract documents signed by the General Contractor
58

1 **1.3. DEFINITIONS**

- 2 A. **Substantial Compliance:** A letter provided to the City of Madison Building Inspection and signed by the Project
3 Architect indicating that all Work has been completed to a level that would allow Owner Occupancy and that all
4 construction is in compliance with the construction documents. A copy of this letter is also provided to the
5 State of Wisconsin Department of Health and Safety as necessary to clear plan review requirements. This letter
6 does not represent construction closeout.
- 7 B. **Certificate of Occupancy:** The Regulatory letter from the City of Madison Building Inspection Department
8 indicating that all regulatory requirements and inspections have been completed and the building may now be
9 occupied for its intended use. This letter does not represent construction closeout.
- 10 C. **Certificate of Substantial Completion:** A letter provided by the Department of Public Works, signed by the City
11 Engineer indicating that Construction activities are substantially complete. This letter does represent
12 construction closeout and the date of this letter begins the date of the Warranty Period.
- 13 D. **Construction Closeout:** The point in the contract where all contractual requirements associated the execution of
14 the Work as described in the plans, specifications, and other documents have been successfully met and the
15 items described in 1.3.A, .B, and .C above have been completed.
- 16 E. **Final Progress Payment:** The progress payment associated with achieving Construction closeout as described in
17 1.3.D above. At this point the contractor may request all monies associated with the contract be paid with the
18 exception of held retainage.
- 19 F. **Contract Closeout:** The point in the contract where all contractual requirements associated with the City of
20 Madison, Board of Public Works contract has been successfully met.
- 21 G. **Final Payment:** The final contract payment submittal that may be approved by the City of Madison after all
22 contractual requirements of the Public Works Contract have been met and any remaining monies (retainage)
23 due to the contractor may be released for the Final Payment.
- 24

25 **1.4. QUALITY ASSURANCE – CONSTRUCTION CLOSEOUT**

- 26 A. All contractors shall be responsible for properly executing the construction closeout requirements associated
27 with their Work as described in the specifications governing their Work.
- 28 B. The GC shall be responsible for all of the following:
- 29 1. Ensuring that all contractors have met the construction closeout requirements associated with their
30 Work.
- 31 2. Coordinate the collection of all construction closeout deliverables from all contractors, provide the
32 deliverables to the Project Architect and City Project Manager for review as necessary, and ensure all
33 contractors correct deficiencies of deliverables and resubmit as needed for final acceptance.
- 34 3. Ensure all closeout requirements identified in the Construction Closeout Checklist below have been
35 completed as intended by the construction documents.
- 36

37 **1.5. QUALITY ASSURANCE – CONTRACT CLOSEOUT**

- 38 A. The City of Madison, Department of Civil Rights (DCR) monitors contract compliance for construction and
39 procurement contracts to ensure that local, state and federal regulations are followed by contractors working on
40 City of Madison Public Works (PW) projects. DCR will monitor all PW projects from contract award through the
41 final payment at the close of the project. Contractors will be required to submit reporting paperwork
42 throughout the PW project process.
- 43 1. Contractors are encouraged to visit the web site identified below for additional information, checklists,
44 forms, and other information provided by DCR as it relates to Contract Compliance.
45 <http://www.cityofmadison.com/Business/PW/contractCompliance.cfm>
- 46 2. Questions regarding the process should be directed to parties and offices as identified on the various
47 forms, documents, and instructions or contact:
48 City of Madison, Department of Civil Rights
49 210 Martin Luther King Jr. Blvd., Room 523
50 Madison, WI 53703
51 (608) 266-4910
- 52 B. All Sub-Contractors have submitted the applicable required documents described in item 1.5.D below to the
53 General Contractor (GC) for Contract Closeout.
- 54 C. The GC has submitted the required applicable documents described in item 1.5.D below for all contractors to the
55 appropriate City of Madison Agency per instructions associated with each submittal.
- 56 D. The documents required for submittal to the City of Madison for Contract Closeout may include any/all of the
57 items listed below depending on contract type. It is the sole responsibility of all contractors to know and submit
58 the required and complete documentation in a timely fashion.

- 1 1. Weekly Payroll Reports
- 2 2. Employee Utilization Reports
- 3 3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination
- 4 4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination
- 5 5. Documentation required for Small Business Enterprise (SBE) goals
- 6 6. Other documents as maybe required or requested through the Finalization Review Process

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. CONSTRUCTION CLOSEOUT CHECKLIST

- A. All contractors shall be responsible for reviewing the drawings and specifications within their Divisions of Work to provide a complete and comprehensive list of all Construction Closeout Requirements to the GC.
 1. The checklist shall include all items identified within the construction documents that require any of the following (and examples) prior to moving into Contract Closeout Procedures:
 - a. Documents indicating a specified level of performance has been achieved, such as:
 - i. Test reports of all types
 - ii. Startup reports
 - b. Required documentation, such as:
 - i. As-builts and record drawings
 - ii. Operation and maintenance data
 - c. Physical items to be turned over to the owner, such as:
 - i. Attic stock
 - ii. Keys
 - d. Required maintenance completed, such as:
 - i. Ducts cleaned
 - ii. Filters replaced
 - e. Commissioning and LEED related items and submittals
 - f. Owner and Maintenance Training
- B. Each list shall indicate the title of the closeout requirement, the associated specification of the requirement, the required result or deliverable, the responsible contractor(s), and a column to verify the item has been turned in and completed.
- C. The GC shall be responsible for all of the following:
 1. Consolidating all the closeout lists into one master Construction Closeout Checklist.
 - a. The checklist shall be in a tabular data format similar to the sample below
 2. Upload the completed checklist to the Contract Closeout-Miscellaneous Documents Library on the Project Management Web Site for review.
 3. Resubmit the checklist as needed after initial reviews have been completed.
- D. The GC shall work with all contractors to amend the Construction Closeout Checklist throughout the execution of the project based on changes and modifications as necessary.

<u>Title</u>	<u>Specification</u>	<u>Description</u>	<u>Responsibility</u>	<u>Completed</u>
Quality Management Observation Reports	01 45 16	All QMO reports have been properly responded to, reviewed and closed by the CPM.	All, GC	
As-Built Drawings	01 78 39	As-Built drawings have been reviewed and accepted per the specification	All, GC	
Testing and Balancing of HVAC	23 09 23	Provide final TnB reports indicating design performance has been achieved	HVAC	

3.2. CONSTRUCTION CLOSEOUT REQUIREMENTS

- A. The timely submittal or completion of closeout requirements shall go hand in hand with the Progress Payment Milestone Schedule that can be found in Specification 01 29 76 Progress Payments. No payments shall be made until all requirements for that payment have been met.
 1. The GC and all major Subcontractors, PA, and CPM, shall review all requirements for Construction/Contract Closeout during two (2) special meetings.

- 1 a. The first meeting shall be held at the 50% Contract Total Payment milestone. This meeting shall
2 discuss the requirements associated with various construction/contract closeout documentation
3 and events when they are due with respect to progress payments.
4 b. The second meeting shall be held at the 70% Contract Total Payment milestone. This meeting
5 shall review the contractors progress regarding the closeout checklist, begin making plans for
6 upcoming deadlines such as scheduling training, where to put attic stock, and when they are due
7 with respect to progress payments.
8 2. The GC, PA, and CPM, shall utilize the Construction Closeout checklist to ensure that all construction
9 closeout requirements have been met.

10
11 **3.3. CONSTRUCTION CLOSEOUT PROCEDURE**

- 12 A. Upon successful completion and final acceptance of all Construction Closeout Requirements the GC may submit
13 to the CPM and PA the request for Final Progress Payment (100% contract total, less retainage).
14 B. The PA will confirm with the design consultants, CPM, and other City of Madison staff that all requirements of
15 the Work have been completed and will do the following:
16 1. Approve the final progress payment application
17 2. Provide the required signed payment documents to the CPM
18 3. Provide the required Letter of Substantial Compliance to the following as required:
19 a. State Safety and Building Division
20 b. Local Building Inspection office
21 c. GC
22 d. CPM
23 C. The CPM shall draft the City Letter of Substantial Completion for signature by the City Engineer. This letter shall
24 state any of the following that may still be tied to the contract and/or warranty:
25 1. Indicate that the date of the letter shall also be the beginning of the Warranty period.
26 2. Indicate any allowed due outs, reasons for them, and anticipated dates of finalization.
27 a. QMO issues such as off season testing of equipment
28 b. Off season training of equipment
29 D. The GC and all subcontractors shall finalize all warranty letters associated with their Work using the date noted
30 on the City Letter of Substantial Completion, and provide the CPM with all warranties as described in
31 Specification 01 78 36 Warranties. Upon receipt and final approval of the Warranties the CPM may initiate final
32 processing of the Final Progress Payment (100% contract total, less retainage).
33

34 **3.4. CONTRACT CLOSEOUT REQUIREMENTS**

- 35 A. The GC and all sub-contractors shall follow all requirements associated with documenting contract compliance
36 and provide documentation as required or requested by DCR or PW staff. All contractors are encouraged to stay
37 current with submissions of the following documentation:
38 1. Weekly Payroll Reports no later than the Progress Payment equal to 50% of the contract total.
39 2. Employee Utilization Reports
40 3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination
41 4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination
42 5. Documentation required for Small Business Enterprise (SBE) goals
43 6. Other documents as maybe required or requested through the Finalization Review Process
44 B. Near the Progress Payment equal to 80% of the contract total the GC shall request in writing a Finalization
45 Review. At that time DCR or PW staff shall prepare a report of all contract documentation submitted to date. A
46 list of missing items or outstanding issues will be emailed to the GC. No additional follow-up will be generated
47 by DCR or PW Staff.
48

49 **3.5. CONTRACT CLOSEOUT PROCEDURE**

- 50 A. The Contract Closeout Procedure will not begin until the Construction Closeout Procedure has been completed.
51 B. When the GC feels he/she has successfully met all of the Contract Closeout Requirements associated with
52 Section 3.3 above the GC may submit to the request for Final Payment to the CPM.
53 C. The CPM shall sign and submit the Final Payment request for processing.
54 D. DCR and PW staff shall do a complete review of all documentation associated with item 3.3.A above.
55 E. The GC shall be notified directly by DCR or PW Staff of any documentation that may still be missing, have
56 incomplete information, or other outstanding issues. It shall be the responsibility of the GC to continue follow-
57 up with DCR and PW staff until all documentation has been successfully submitted and accepted.

- 1 F. When all required documentation associated with Contract Closeout has been successfully submitted and
2 accepted by DCR and PW Staff the City of Madison shall process the Final Payment of any remaining monies
3 including retainage.
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END OF SECTION

**SECTION 01 78 13
COMPLETION AND CORRECTION LIST**

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PART 1 – GENERAL 1
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1.2. RELATED SPECIFICATIONS 1
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PART 1 – GENERAL

1.1. SUMMARY

- A. The City of Madison has developed a multi-faceted Quality Management Program that begins with contract signing and runs through contract closeout to ensure the best quality materials, workmanship, and product are delivered for the contracted Work.
 - 1. The Progress Management Web Site is a Construction Management tool that provides contractors, consultants, and staff a single on-line location for the daily operations and progression of the Work.
 - 2. The Quality Management Observation (QMO) is an ongoing observation of the construction process as it progresses. The City of Madison does not use a "Punch List" or "Corrections List" as it is typically known throughout the construction industry. The QMO process acts as an "in progress punch list". Work identified as not in compliance with the contract documents by the Owner, Owner Representatives, Owner Consultants, etc. shall be resolved immediately at the Contractor's expense. Unresolved issues will be subject to withholding of progress payment(s) until completed.
 - 3. Very stringent expectations are tied to Construction Closeout and Contract Closeout procedures. Specific milestones throughout the project need to be met and the milestones are tied to the Progress Payment Schedule.
- B. All contractors shall be required to review the specifications identified in Section 1.2 below, and other related specifications identified therein to become familiar with the terminology and expectations of this City of Madison Public Works contract.

1.2. RELATED SPECIFICATIONS

- A. Section 01 29 76 Progress Payment Procedures
- B. Section 01 31 23 Project Management Web Site
- C. Section 01 45 16 Field Quality Control Procedures
- D. Section 01 77 00 Closeout Procedures

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 – EXECUTION – THIS SECTION NOT USED

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

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16

PART 1 – GENERAL

1.1. SUMMARY

- 19
20 A. The purpose of this specification is to provide clear responsibilities and guide lines related to providing well
21 documented and complete Operation and Maintenance (O&M) Data related to general facility use, equipment,
22 systems, finishes, and materials to City of Madison Staff (Owner, Owner Representatives, Maintenance, and
23 Custodial Personnel) as needed.
24 B. Operation and Maintenance Data shall apply to both of the following categories except where specific
25 requirements are noted under their separate titles as follows:
26 1. Operation and Maintenance Data: Generally shall mean the owner manual that provides information on
27 start-up, shut-down, operation, troubleshooting, maintenance, parts, and other such documentation as it
28 pertains to all equipment and systems installed under the Work.
29 2. Use and Care instructions: Where applicable use and care instructions shall also be considered O&M for
30 such things as flooring, tile, partitions, and other such finishes and trim related items, installed under the
31 Work.
32

1.2. RELATED SPECIFICATIONS

- 33
34 A. Section 01 29 76 Progress Payment Procedures
35 B. Section 01 31 23 Project Management Web Site
36 C. Section 01 77 00 Closeout Procedures
37 D. Section 01 78 13 Completion and Correction List
38 E. Section 01 78 19 Maintenance Contracts
39 F. Section 01 78 36 Warranties
40 G. Section 01 79 00 Demonstration and Training
41 H. Section 01 91 00 Commissioning
42 I. Other Divisions and Specifications that may address more specifically the requirements for O&M Data.
43

1.3. QUALITY ASSURANCE

- 44
45 A. All O&M Data shall meet the requirements identified in Section 1.4 below.
46 B. All contractors shall provide O&M Data for each piece of equipment, system, or finish installed during the
47 installation of the Work. O&M Data shall be provided to the General Contractor (GC) for verification and
48 submittal.
49 C. The GC shall be responsible for receiving all required O&M Data files from all contractors for verifying that all
50 files submitted meet the requirements in Section 1.4 below.
51

1.4. O&M DATA REQUIREMENTS

- 52
53 A. O&M Data shall be provided in digital PDF format as follows:
54 1. PDF files shall be complete first generation consumer useable editions of PDF documents as provided by
55 any of the following:
56 a. Product manufacturer
57 b. Supplier of product
58 c. Product manufacturer internet site

- 1 2. Acceptable PDF files shall have the following functionality:
- 2 a. Word searchable
- 3 b. Key areas are bookmarked
- 4 c. Table of Contents and/or Index linked to content is preferred whenever possible.
- 5 3. Scanned printed material, with word searchable capabilities, saved as a PDF, is not acceptable and will be
- 6 rejected without further review.
- 7 B. O&M Data shall include but not be limited to the following manufacturers' published information as appropriate
- 8 for the equipment, system, material, or finish:
- 9 1. Installation instructions
- 10 2. Parts lists, assembly diagrams, explosion diagrams
- 11 3. Wiring diagrams
- 12 4. Start-up, shut-down, troubleshooting and other related operation procedures
- 13 5. Lubrication, testing, parts replacement, and other such maintenance procedures
- 14 6. General use, care, and cleaning instructions
- 15 7. Special precautions and safety requirements
- 16 8. A list of certified equipment vendors, service companies, parts suppliers including company name,
- 17 address, and phone number
- 18 9. A list of the recommended spare parts to have on hand at all times
- 19 10. A list by type of all recommended lubes, oils, packing material, and other maintenance supplies
- 20 11. Copies of final test reports, balance reports, and other related documentation
- 21 12. Warranty information for equipment and systems
- 22

23 1.5. O&M DATA SUBMITTALS

- 24 A. O&M Data shall be prepared as identified in this specification and shall be submitted for review as per the
- 25 schedule identified in Specification Section 01 29 76, Progress Payment Procedures.
- 26 B. O&M Data Draft submittals will be reviewed for content, procedure, and compliance only. A general critique
- 27 with recommendations for improvement will be made but re-submittals will not be required.
- 28 C. O&M Data Final submittals will be reviewed for content, procedure, and compliance. Re-submittals will be
- 29 required until such time as each submittal is accepted.
- 30

31 *NOTE: Acceptance of O&M Data Final submittals is required to be complete prior to scheduling and conducting owner*

32 *related training and construction closeout.*

33

34 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

35 **PART 3 - EXECUTION**

36 3.1. O&M DATA PREPARATION - GENERAL

- 39 A. All contractors shall prepare O&M Data for draft and final submission as follows:
- 40 1. Obtain digital PDF files for each piece of equipment, system, material or finish as described in Sections
- 41 1.4.A.1 and 1.4.A.2 above.
- 42 2. Verify that all information as described in Section 1.4.B above is included with the PDF file. Obtain
- 43 missing information as necessary for a complete submittal.
- 44 B. Rename each individual PDF file as follows.
- 45 1. Do not use special characters such as #, %, &, /, etc. These characters are reserved by the Project
- 46 Management Web Site software the City of Madison uses; however the under-score (or under-bar) '_' is
- 47 an allowed character.
- 48 2. Use the following format and examples for renaming your file:
- 49 a. Format: ***Equipment name_What_WARNER BEACH PARK SHELTER_Contract number_Year***
- 50 i. *Equipment Name* represents the name of any equipment, system, material or finish as
- 51 designated in the Contract Documents.
- 52 ii. *What* represents what the file is about
- 53 iii. *WARNER BEACH PARK SHELTER* represents the title of the project or contract. A shortened
- 54 version of the title may be identified by the City Project Manager to be used by all
- 55 contractors.
- 56 iv. *Contract number* is the specific identification number the Work was bid under and appears
- 57 on the plan set title sheet and in each sheet title block
- 58 v. *Year* represents the year the contract will be closed out

- 1 b. Examples of file names
 2 i. AHU 2_Operation Manual_Fire Admin_1234_2015
 3 ii. CPT 2_Use and Care_MPD West_9876_2011
 4 C. All contractors shall submit the completed digital PDF files to the GC in sufficient time for the GC to meet the
 5 O&M Data submission deadlines as described in Specification Section 01 29 76, Progress Payment Procedures.
 6 D. O&M Data shall be submitted and reviewed as described in sections 3.2 and 3.3 below.

7
 8 **3.2. O&M DATA DRAFT SUBMITTAL**

- 9 A. All contractors shall prepare and submit the following for an O&M Data Draft review submittal:
 10 1. Prepare three (3) complete O&M Data file samples as described in section 3.1 above.
 11 2. Review all specifications within his/her Division of Work and prepare a complete O&M Data checklist
 12 listing all equipment, systems, materials, or finishes. Checklist shall be in tabular form similar to the
 13 example below and shall indicate the title (and plan identifier when applicable) of the O&M Data, the
 14 associated specification, and a column to verify the item has been turned in and completed.
 15 B. The GC shall be required to review all contractors’ samples and checklists for compliance with this specification
 16 and shall return any to the originating contractor that are insufficient for re-submittal.
 17 1. When acceptable to the GC, he/she shall upload each O&M Data draft submittal file to the O&M Draft
 18 library on the Project Management Web Site.
 19 C. The Project Architect, City Project Manager, CxA, Consulting Staffs and Owner Representatives shall review the
 20 O&M Data draft submittals and checklist within fifteen (15) working days as follows:
 21 1. Provide general critique comments by Division on O&M Data samples submitted. Critique is intended to
 22 provide all contractors with information on strengths and weaknesses of their submittals.
 23 a. Re-submittal of the O&M Data samples will not be required.
 24 2. Review in detail the O&M Data Checklist for completeness. Provide comments as needed.
 25 a. Re-submittal of the O&M Checklist will be required until accepted.
 26

<u>Title</u>	<u>Specification</u>	<u>Completed</u>
Overhead Door Operator	08 36 00	
Air Handling Unit (AHU-3)	23 00 00	
Water Heater (WH-1)	22 30 00	

27
 28 **3.3. O&M DATA FINAL SUBMITTAL**

- 29 A. All contractors shall prepare and submit the following for an O&M Data Final review submittal:
 30 1. Prepare complete O&M Data files as described in Section 3.1 above according to their approved checklist
 31 as described in Section 3.2 above.
 32 2. Submit completed checklist and all final O&M Data files to the GC for final submittal review.
 33 B. The GC shall be required to spot check all contractors’ submittals for completeness against their checklists and
 34 for compliance with this specification and shall return any to the originating contractor that are insufficient for
 35 re-submittal.
 36 1. When acceptable to the GC, he/she shall upload each O&M Data final submittal file to the O&M Final
 37 library on the Project Management Web Site.
 38 C. The Project Architect, City Project Manager, CxA, Consulting Staffs and Owner Representatives shall review the
 39 O&M Data final submittals and checklist within fifteen (15) working days as follows:
 40 1. Review the files submitted against the checklist and request any missing files through the GC.
 41 2. Review in detail all of the O&M Data files for completeness.
 42 a. Submittals shall be accepted or rejected as individual PDF files.
 43 b. Contractors shall re-submit entire O&M submittal if any portion is rejected or incomplete.
 44

45 **3.4. CONSTRUCTION CLOSEOUT**

- 46 A. All contractors shall review Specification 01 77 00, Closeout Procedures and Specification 01 79 00
 47 Demonstration and Training.
 48 1. Acceptance of all final O&M Data submittals is required prior to scheduling Demonstration and Training
 49 Sessions.
 50 2. Completion of all Demonstration and Training Sessions is required to receive the Substantial Compliance
 51 for Occupancy Certificate, and to begin Construction Closeout procedures.
 52
 53
 54

END OF SECTION

SECTION 01 78 36
WARRANTIES

1
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16

PART 1 – GENERAL

1.1. SUMMARY

- 19
20 A. The purpose of this specification is to provide clear responsibilities and guide lines related to providing all
21 Warranties and Guarantees related to the Work, workmanship, materials, equipment, and other such items
22 required by the Construction Documents.
23 B. Manufacturers’ disclaimers and limitations on product warranties do not relieve any contractor of the warranty on
24 the Work that includes the product.
25 C. Manufacturers’ disclaimers and limitations on product warranties do not relieve suppliers, manufacturers and
26 any contractor required to provide special warranties under the contract documents.
27

1.2. RELATED SPECIFICATIONS

- 28
29 A. Section 01 29 76 Progress Payment Procedures
30 B. Section 01 31 23 Project Management Web Site
31 C. Section 01 77 00 Closeout Procedures
32 D. Section 01 78 23 Operation and Maintenance Data
33 E. Section 01 91 00 Commissioning
34 F. Other Divisions and Specifications that may address more specifically the requirements for Warranties related to
35 the installation of all items and equipment installed under the execution of the Work.
36

1.3. DEFINITIONS

- 37
38 A. See specification 01 77 00 for the definitions of the following terms that may also be used in this specification:
39 1. Substantial Compliance
40 2. Certificate of Occupancy
41 3. Certificate of Substantial Completion
42 4. Construction Closeout
43 5. Contract Closeout
44 B. Emergency Repair: The Owner or Owner Representative reserves the right to make emergency repairs as
45 required to keep equipment or materials in operation or to prevent damage to property and injury to persons
46 without voiding the contractors warranty or bond or relieving the contractor of his/her responsibilities during
47 the warranty period.
48 C. Installer: The company or contractor hired to install a finished product that was manufactured and supplied
49 specifically for the Work within this contract. The Installer may or may not be the same company that supplied
50 the product. See the definition for supplier.
51 D. Supplier: Any company that makes a specific finished product for the Work from information within the Contract
52 Documents. Examples of suppliers would include custom cabinets, steel stairs and railings, etc. A supplier would
53 not be a company that distributes items manufactured by others such as an electrical or plumbing supplier.
54 E. Warranty: A written guarantee from the manufacturer to the owner on the integrity of a product and its
55 installation, and the manufacturers’ responsibility to repair or replace the defective product or components
56 within a specified time from the date of ownership. Warranty may also be used interchangeably with
57 Guarantee. The following warranty types may be part of any specification within the Work associated with the
58 Construction Documents:

- 1 1. Expressed Warranty: A warranty that provides specific repair or replacement for covered components of
- 2 a product over a specified length of time.
- 3 2. Implied Warranty: A warranty that is not stated explicitly by a seller or manufacturer that the product is
- 4 merchantable and fit for the intended purpose.
- 5 3. Standard Product Warranty: Preprinted written warranties published by individual manufacturers for
- 6 particular products and are specifically endorsed by the manufacturer to the Owner. Standard warranties
- 7 may be for any amount of time but shall not be for anything less than one (1) year from the warranty
- 8 date.
- 9 4. Special Warranty: A written warranty required by the Contract Documents either to extend the time
- 10 limit provided under a standard warranty or to provide greater rights to the Owner.
- 11 F. Warranty Date: The effective date that begins all warranty periods required for products, installations, and
- 12 work-manship associated with the execution of the Work for this contract. The Warranty Date shall be set by
- 13 the CPM.
- 14 G. Related Damages and Losses: When correcting failed or damaged Warranted Work, remove and reinstall (or
- 15 replace if necessary) the construction that has been damaged as a result of the failure or the construction that
- 16 must be removed and replaced to obtain access for the correction of Warranted Work.
- 17 H. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected reinstate the
- 18 warranty by a new written endorsement. The reinstated warranty shall be equal to the original warranty with an
- 19 equitable adjustment for depreciation unless specifically noted otherwise in a specification.
- 20 I. Replacement Cost: All costs that may be associated with Work being replaced under warranty including but not
- 21 limited to the following:
- 22 1. Related damages and losses
- 23 2. Labor, material and equipment
- 24 3. Permits and inspection fees
- 25 4. This shall be regardless of any benefit the Owner may have had from the Work through any portion of its
- 26 anticipated useful service life.
- 27 J. Replacement Work: All materials, products, required labor, and equipment necessary to replace failed or
- 28 damaged warranted to an acceptable condition that complies with the requirements of the original Construction
- 29 Documents.
- 30 K. Owners Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not
- 31 limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods
- 32 shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations,
- 33 rights, and remedies.
- 34 1. Rejection of Warranties: The Owner reserves the right to reject any warranty and to limit the selection of
- 35 products with warranties not in conflict with the requirements of the contract documents.
- 36 2. Where the Contract Documents require a Special Warranty or similar commitment on the Work or
- 37 product, the Owner reserves the right to refuse acceptance of the Work until the Contractor presents
- 38 evidence the entities required to countersign such required commitments have done so.
- 39

40 1.4. GENERAL CONTRACTORS RESPONSIBILITIES

- 41 A. The General Contractor (GC) shall be responsible to remedy, at his/her expense, any defect in the Work and any
- 42 damage to City owned or controlled real or personal property when the damage is a result of:
- 43 1. The GC's failure to conform to Contract Document requirements.
- 44 a. Any substitutions not properly approved and authorized may be considered defective.
- 45 2. Any defect in workmanship, materials, equipment, or design furnished by the GC or Sub-contractors.
- 46 B. All warranties as described in this specification and these Contract Documents shall take effect on the date
- 47 established by the CPM, as noted in Section 1.3F above.
- 48 1. All warranties shall remain in effect for one (1) year thereafter unless specifically stated otherwise in the
- 49 Contract Documents or where standard manufacturer warranties are greater.
- 50 C. The GC's warranty with respect to Work repaired or replaced, including restored or replaced Work due to
- 51 damage, will run for one (1) year from the date of Owner Acceptance of said repair or replacement.
- 52 1. This shall be regardless of any benefit the Owner may have had from the Work through any portion of its
- 53 anticipated useful service life.
- 54 D. Warranty Response
- 55 1. See Section 3.5 of this specification.

PART 2 – PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. WARRANTY CHECKLIST

- A. All contractors shall be responsible for reviewing the drawings and specifications within their Divisions of Work to provide a complete and comprehensive list of all Warranty Requirements to the GC.
- B. Each list shall indicate the title (and plan identifier when applicable) of the warranted item, the associated specification of the warranted item, the terms of the warranty (years), and a column to verify the item has been turned in and completed.
- C. The GC shall be responsible for all of the following:
 - 1. Consolidating all the warranty lists into one master Warranty Checklist.
 - a. The checklist shall be in a tabular data format similar to the sample below.
 - 2. Upload the completed checklist to the Submittal Library on the Project Management Web Site for review. See Specification 01 33 23 Submittals for more information on this procedure.
 - 3. Resubmit the schedule as needed after initial reviews have been completed.
- D. The GC shall work with all contractors to amend the Warranty Checklist throughout the execution of the project based on changes and modifications as necessary.

<u>Title</u>	<u>Specification</u>	<u>Terms</u>	<u>Completed</u>
Overhead Door Operator	08 36 00	MFR 2yr	
Exterior Bench and Trash Receptacles	12 93 00	MFR 3 year warranty on finish	
Kitchen Sink (SK-1)	22 42 00	MFR 5 year	
Disposal (D-1)	22 42 00	MFR 7 year parts and in-home service	
Toilet (WC-1)	22 42 00	MFR 1 year limited	

3.2. LETTERS OF WARRANTY

- A. All letters of warranty shall be in a typed letter format and provide the following information:
 - 1. The letter shall be on official company stationary including company name, address, and phone number.
 - 2. Indicate WARNER BEACH PARK SHELTER, contract number, and contract address the warranty is for on the reference line.
 - 3. Provide a description of the warranty(ies) being provided.
 - a. Include Division, Trade, or Specification information as necessary.
 - b. Only combine warranties of related Divisional Work together. Create new letters for additional Divisions as necessary.
 - 4. Indicate the effective Warranty Date. As noted in Section 1.3.F above, the Warranty Date shall be the date the Certificate of Substantial Completion was signed by the City Engineer.
 - 5. Contractor Letters of Warranty shall only be signed by a principal officer of the company.
 - 6. After signing the letter provide the GC with a high quality color scanned image in PDF format and the original signed letter.
- B. The GC shall be responsible for the Final Warranty submittal as identified in Section 3.4 below.
- C. The GC shall obtain letters of warranty from all of the following:
 - 1. The General Contractor shall provide warranty letters for all Work that was self performed under the contract documents, identify all trades or Divisions of Work.
 - 2. All Sub-contractors shall provide warranty letters for Work performed under the contract documents; identify all trades or Divisions of Work.
 - 3. Suppliers, as required by other specifications within the Construction Documents where the manufacture of a specific product unique to the Work of this contract was required.
 - a. The terms and conditions of the Supplier Letter of Warranty shall be as defined by the specifications associated with the Work but shall not be less than the industry standard of repair, or replace defective materials and workmanship within one (1) year of the warranty date.
 - b. When the supplier is also the installer a single written letter may be submitted identifying both the warranty for the manufacture of the product and the warranty for the installation of the product.
 - 4. Installers as required by other specifications within the Construction Documents where the installation of a specific product unique to the Work of this contract was required.

**SECTION 01 78 39
AS-BUILT DRAWINGS**

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18

PART 1 – GENERAL

1.1. SUMMARY

- 22 A. This specification is intended to provide clear guidelines and identify the responsibilities of all contractors as they
23 pertain to City of Madison contract procedures regarding the accurate recording of the Work associated with the
24 execution of this contract. This shall include but not be limited to work that will be hidden, concealed, or buried.
25 B. Each contractor shall be responsible for maintaining an accurate record of all installations, locations, and
26 changes to the contract documents during the execution of this contract as it may relate to their specific division
27 or trade.
28 C. The General Contractor (GC) shall be responsible for ensuring all contractors provide as-built record information
29 to the Master As-Built Document Set as described in this specification.
30

1.2. RELATED SPECIFICAITONS

- 32 A. 00 31 21 Survey Information
33 B. 01 26 13 Request for Information
34 C. 01 31 23 Construction Bulletin
35 D. 01 32 33 Photographic Documentation
36 E. 01 26 63 Change Orders
37 F. 01 29 76 Progress Payment Procedures
38 G. 01 31 23 Project Management Web Site
39 H. 01 33 23 Submittals
40 I. 01 77 00 Closeout Procedures
41 J. 01 91 00 Commissioning
42 K. Other Divisions and Specifications that may address more specifically the requirements for field recording the
43 installation of all items associated with the execution of this contract by Division or Trade.
44

1.3. RELATED DOCUMENTS

- 46 A. Other related documents shall include but not be limited to the following:
47 1. Bidding documents including drawings, specifications, and addenda.
48 2. Required regulatory documents of conditional approval.
49 3. Field orders, verbal or written by inspectors having regulatory jurisdiction.
50 4. Shop drawings and installation drawings.
51

1.4. PERFORMANCE REQUIREMENTS

- 53 A. The GC shall be responsible for maintaining the “Master As-Built Document Set” in the job trailer at all times
54 during the execution of this contract. This document set shall include all of the following:
55 1. Master As-Built Plan Set
56 2. Master As-Built Specification Set
57 3. Other Document Sets

- 1 B. The GC shall designate one person of the GC staff to be responsible for maintaining the Master As-Built
2 Document Set at the job trailer. This shall include, posting updates, revisions, deletions and the monitoring of all
3 contractors posting as-built information as described in this specification.
4 C. All contractors shall use this specification as a general guideline regarding the requirements for documenting
5 their completed Work. Contractors shall explicitly follow additional specification requirements within their own
6 Division of Trade as it may apply to this specification.
7

8 **1.5. QUALITY ASSURANCE**

- 9 A. The GC shall be responsible for all of the following:
10 a. Spot checking all sub-contractors field documents to insure daily information is being recorded as
11 work progresses.
12 b. Discuss as-built recording to the plan set at weekly job meetings with all sub-contractors on site.
13 c. Schedule time with sub-contractors in the job trailer for recording as-built information to the plan
14 set.
15 d. Insure that all sub-contractors are providing clear and accurate information to the plan set in a
16 neat and organized manner.
17 e. Insure sub-contractors who have completed work have finalized recording all as-built information
18 to the plan set before releasing them from the project site.
19 B. The Project Architect, the City Project Manager, Commissioning Agent and other design team staff will perform
20 random checks of the Master As-Built Document Set during the execution of this contract to ensure as-built
21 information is being recorded in a timely fashion as the Work progresses. An updated and current Master As-
22 Built Document Set is a stipulation for approval of the progress payment.
23

24 **PART 2 – PRODUCTS**

25
26 **2.1. OFFICE SUPPLIES**

- 27 A. The GC shall provide a sufficient supply of office products in the job trailer at all times for all contractors to use in
28 recording as-built information into the plan set. This shall include but not be limited to the following:
29 a. Red ink pens, medium point. Pens that bleed through paper, markers, and felt tips will not be
30 accepted.
31 b. The use of highlighters is acceptable. Assign colors to various trades for consistency in recording
32 information.
33 c. Straight edges of various lengths for drawing dimension, extension and other lines.
34 d. Civil and Architectural scales
35 e. Clear transparent, non-yellowing, single sided tape.
36 f. Correction tape or correction fluid for correcting small errors.
37

38 **PART 3 - EXECUTION**

39
40 **3.1. FIELD DOCUMENT AS-BUILTS**

- 41 A. The GC and all Sub-contractors shall be responsible for keeping their own field set of as-built documents
42 including plans, specifications and published changes.
43 B. Field sets shall be kept dry and in good condition at all times.
44 C. No Work shall be buried, covered, or hidden, by any additional Work, regardless of Contractor or Trade, until
45 locations of all materials and equipment has been properly documented as described below.
46 D. All contractors shall be required to record the following as-built information:
47 a. Notes on the daily installation of materials and equipment.
48 b. Sketches, corrections, and markups indicating final location, positioning, and arrangement of
49 materials and equipment such as pipes, conduits, valves, cleanouts, pull boxes and other such
50 items. Note all final locations on plan sheets, indicate dimension off identifiable building features.
51 Riser diagrams need only be corrected for significant changes in locations, routing or
52 configuration.
53 i. The use of photographs in lieu of hand drawn sketches is acceptable.
54 ii. Photos shall be taken according to Specification 01 32 33 Photographic Documentation
55 iii. Print photo and markup with dimensions or notes as necessary.
56 c. Identify by the use of existing plan symbology and notes the size, type, quantity, and use as
57 applicable of materials such as pipes, valves, conduits, etc.

- 1 c. The Plan Set shall be available at anytime for easy reference during progress meetings and for
2 emergency location information of new work already completed.
- 3 2. The Master As-Built Specification Set (Spec Set) shall begin with one complete bid set of specifications
4 and any additional specifications that were supplied by published addenda during the bidding process.
5 The Spec Set shall be provided in three "D" ring type binders of sufficient thickness to accommodate the
6 specification set. Multiple binders are allowed as necessary. Label the front cover and binding edge with
7 "Master As-Built Specifications" in bold red letters. Provide other information as necessary to distinguish
8 the contents of multi-volume sets.
 - 9 a. The Spec Set shall be kept dry, legible, and in good condition at all times.
 - 10 b. The Spec Set shall be kept up to date with new revisions within two (2) working days of
11 supplemental drawings being issued.
 - 12 c. The Spec Set shall be available at anytime for easy reference during progress meetings.
- 13 3. Other Document Sets may be kept at the GCs option in three "D" ring type binders of sufficient thickness
14 to accommodate the documentation. Other documentation sets may include but not be limited to RFIs,
15 CBs, COs, etc.
- 16 C. The Land Surveyor Sub-Contractor shall be required to use digital surveying for all exterior site surveying, and
17 provide deliverable digital as-builts as specified in Specification 00 31 21 Survey Information. As soon as practical
18 the surveyor shall provide the GC with a preliminary copy of installed buried utilities for inclusion with the plan
19 set in the job trailer. The surveyor shall provide final digital as builts as per section 3.2 above.
- 20 D. All contractors shall be responsible for updating the Plan Set from their field sets at least once per work week.
21 Updates shall include but not be limited to the following procedures:
 - 22 a. All updates shall be done only in red ink. Place a "cloud" around small areas of correction to call
23 attention to the change.
 - 24 b. Whenever possible place general work notes, field sketches, supplemental details, photos, and
25 other such information on the reverse side of the preceding sheet. Installation notes including
26 dates shall be kept neatly organized in chronological order as necessary.
 - 27 c. Accurately locate items on the plan set as follows:
 - 28 i. For items that are located as dimensioned provide a check mark or circle indicating the
29 dimension was verified.
 - 30 ii. For items that are within 5 feet of the location indicated on the plans leave as shown and:
 - 31 • Provide correct dimensions to existing dimension strings or,
 - 32 • Accurately locate with new dimension strings
 - 33 iii. For items that are more than 5 feet from the location indicated on the plans
 - 34 • Accurately draw the items in the new location as installed and,
 - 35 • Accurately locate with new dimension strings and,
 - 36 • Note that the existing location is void.
 - 37 d. Include dimensioned locations for items that will be buried, concealed, or hidden in the ground,
38 under floors, in walls or above ceilings.
 - 39 i. Dimensions shall be pulled from identifiable building features, not from centers of columns
40 or other buried features.
 - 41 ii. When necessary pull more dimensions as needed from opposing directions to properly
42 locate single items.

3.4. AS-BUILT REVIEW AND ACCEPTANCE

- 45 A. The GC shall provide the Master As-Built Plan Set to the Project Architect (PA), the City Project Manager (CPM),
46 the Commissioning Agent (CxA) and other design team staff for content review prior to the Progress Payment
47 Milestone indicated in Specification 01 29 76 Progress Payment Procedures. The submitted plan set shall include
48 the digital survey information produced under Section 3.2 above.
 - 49 1. If the plan set is not approved:
 - 50 a. The PA and CPM shall only be required to generalize deficiencies by trade there shall be no
51 requirement or expectation to generate a "punch list" of required corrections.
 - 52 b. The GC and Sub-contractors as necessary shall be responsible for inspecting the installation and
53 correcting the drawings as needed.
 - 54 c. The GC shall re-submit the plan set for review.
 - 55 2. If the plan set is approved the PA shall take possession of the plan set to be used in providing the owner
56 with digital CAD record drawings. Upon completion of transferring the information to CAD the PA shall
57 provide the Owner with CAD record drawings, record PDFs, and the Master As-Built Plan Set.

- 1 **3.5. CHANGES AFTER ACCEPTANCE**
- 2 A. No Contractor shall be responsible for making changes to the As-Built record documents after acceptance by the
- 3 PA and CPM except when necessitated by changes resulting from any Work made by the Contractor as part of
- 4 his/her guarantee.
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END OF SECTION

SECTION 01 78 43
SPARE PARTS AND EXTRA MATERIALS

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17

PART 1 – GENERAL

1.1. SUMMARY

- 21 A. This specification is intended to provide clear guidelines and identify the responsibilities of all contractors as they
22 pertain to City of Madison contract procedures regarding spare parts, special tools, special materials, and extra
23 materials.
24 B. Each contractor shall be responsible for knowing the specific requirements of their Division Specifications as they
25 may relate to the general information provided in this specification.
26 C. The General Contractor (GC) shall be responsible for ensuring all contractors provide spare parts and extra
27 materials as described in this specification.
28

1.2. RELATED SPECIFICAITONS

- 30 A. 01 29 76 Progress Payment Procedures
31 B. 01 31 23 Project Management Web Site
32 C. 01 77 00 Closeout Procedures
33 D. Other Divisions and Specifications that may address more specifically how to proceed with spare parts, special
34 tools, special materials, and extra materials.
35

1.3. DEFINITIONS

- 37 A. Spare Parts: Any component of a product or assembly that comes pre-packaged or was specially ordered for the
38 explicit use of the product or assembly. This shall include but not be limited to fastening devices, mounting
39 brackets, replacement parts, wheels, pulleys, wiring, alternate assembly pieces, etc.
40 B. Special Tools: Any tool of any kind that was pre-packaged or specially ordered, and is required to be used for the
41 installation or maintenance of an installed product or assembly as part of this contract.
42 C. Special Materials: Any oil, lubricant, glue, touch-up paint, or other such material that comes pre-packaged or
43 was specially ordered and is required to be used for the installation or maintenance of an installed product or
44 assembly as part of this contract.
45 D. Extra Materials (Attic Stock): Any surplus materials in new and useable condition that was installed a part of this
46 contract. Attic Stock shall include but not be limited to the following: ceiling tiles, paint, stain, floor coverings,
47 ceramic tiles, light bulbs/lamps, filters, strainers, etc. Attic Stock shall include partially opened bulk items and
48 additional unopened quantities as directed by other specifications.
49

1.4. PERFORMANCE REQUIREMENTS

- 51 A. All contractors shall be responsible for consolidating spare parts, special tools, special materials, and attic stock
52 as it pertains to the specific Work within their Division or Trade.
53 B. All contractors shall use this specification as a general guideline regarding the requirements for turning spare
54 parts, special tools, special materials, and attic stock over to the owner. Contractors shall explicitly follow
55 specification requirements within their own Division of Trade.
56

1.5. QUALITY ASSURANCE

- 58 A. The General Contractor (GC) shall be responsible for all of the following:

1. Coordinate the location for and the delivery of all spare parts, special tools, special materials, and attic stock being provided by all contractors under this contract to one centralized location as designated by the Owner.
2. Verify that all items being delivered are:
 - a. Clean, new, and in a usable condition.
 - b. Properly sealed, protected, and labeled
 - c. Properly documented

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. PACKAGING

- A. Whenever possible all surplus items should remain in their original packaging such as parts envelopes.
- B. Package small parts in re-sealable plastic bags (Ziploc) or envelopes with clasp fasteners. Do not use envelopes that seal with glue or tape envelopes closed. Do not leave packaging unsealed.
- C. Package like parts together for products or assemblies. I.E. keep all spare parts for flushometers together.
- D. Many small packages may be grouped together into a larger container by trade.
- E. Do not use unrelated boxes or containers for packaging spare items. I.E. do not use a light fixture box for spare breakers, or flushometers parts.

3.2. LABELING

- A. Whenever possible the original labeling indicating part numbers and other pertinent information shall remain on the original packaging.
- B. If original labeling is not available the contractor shall label all parts and packages using tape or labels and permanent black markers. Tape or labels being used shall absorb the permanent marker without bleeding or allowing ink to be smeared or rubbed off.
- C. Labels shall include the name of the product or equipment the item belongs to, part number and/or name, and any other information that would assist maintenance personnel in identifying the piece and related product.
- D. Labels shall include plan or specification designations (WC-1, LAV-3, DF-2, CPT-1, etc) that identify the particular product or finish material it represents.
- E. Labels for parts stored in clear re-sealable plastic bags may be placed inside the bag. Label shall face out and be able to be read from one side. Multiple bags shall be numbered individually for identification.
- F. Label the outside of large containers with the trade name (Plumbing, Electrical, etc).

3.3. INVENTORY

- A. All contractors shall provide the GC with complete inventories of all spare parts, special tools, special materials, and attic stock that they are providing at the end of the contract. The inventories shall be organized as follows:
 1. The cover sheet shall indicate the Contractors name, address, phone number, identify that the document is the "Spare Parts and Extra Materials Inventory", and identify the Division or Trade the inventory is for.
 2. Provide an inventory in a tabular format of all items being provided under this and other specifications. The minimum information to be provided for each item on the inventory shall be as follows:
 - a. Bag or container number, all items of one bag or container shall be grouped together on the inventory
 - b. Item description
 - c. Item size (if applicable)
 - d. Total quantity provided
 - e. Identify if item is a spare part, tool, special material, or attic stock
- B. The GC shall consolidate inventories from all sub-contractors into one tabular data sheet organized by Division or Trade of Work.
 1. Upon completing the consolidated list the GC shall upload the completed inventory to the Contract Closeout-Attic Stock Library on the Project Management Web Site.
 2. The GC shall notify the Project Architect and City Project Manager that the scans have been uploaded.
 3. Consulting Staff and Owner Staff shall review the inventories prior to Final Review to verify that minimum required quantities have been met. Deficiencies shall be noted and returned back to the GC for corrective action.

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3.4. STORAGE

- A. Prior to the 80% Progress Payment milestone the GC shall coordinate with the City Project Manager and Maintenance Personnel where spare parts, special tools, special materials, and attic stock shall be stored.
- B. The GC shall instruct all contractors as to the location and proper storage procedures.
- C. The GC shall be responsible for ensuring the storage area is kept neat and orderly as follows:
 - 1. Like items are stored together by material, product, or trade as necessary.
 - 2. Liquids are stored in sealable containers and the lids have been properly installed to prevent drying out, spillage, etc.
 - 3. All labels are clearly visible and provide the required information.
- D. Large items shall be stored so as not to damage other items. Do not stack heavy items or items with distinct shapes/outlines on softer items that may get crushed or imprinted.

3.5. CLOSEOUT PROCEDURE

- A. Prior to the 90% Progress Payment milestone the GC shall review all attic stock already stored by the contractors to ensure the following:
 - 1. Materials are stored in the proper location(s).
 - 2. All boxes, containers and items are properly labeled according to the submitted/approved inventory.
 - 3. Quantities are correct according to the submitted/approved inventory.
- B. The GC shall ensure that all deficiencies are corrected prior to conducting Demonstration and Training Sessions.
- C. The GC shall review with Maintenance Staff all inventories and labeling during the scheduled Demonstration and Training Sessions.
- D. Any discrepancies associated with Attic Stock shall be resolved and verified prior to the CPM releasing the 90% CT progress payment.

END OF SECTION

**SECTION 01 79 00
DEMONSTRATION AND TRAINING**

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16

PART 1 – GENERAL

1.1. SUMMARY

- 19
20 A. The purpose of this specification is to provide clear responsibilities and guidelines related to providing
21 Demonstration and Training (D&T) Sessions related to general facility use, equipment, systems, finishes, and
22 materials to City of Madison Staff (Owner, Owner Representatives, Maintenance, and Custodial Personnel) as
23 needed.
24 B. All D&T shall be coordinated through the General Contractor (GC), Project Architect (PA) and City Project
25 Manager (CPM), and will be based on or customized to the needs of City of Madison Staff being trained. New
26 equipment and systems may have complete D&T sessions as described in this specification while equipment or
27 systems staff is familiar with may have sessions more focused on maintenance only.
28

1.2. RELATED SPECIFICATIONS

- 29
30 A. Section 01 29 76 Progress Payment Procedures
31 B. Section 01 78 13 Completion and Correction List
32 C. Section 01 78 19 Maintenance Contracts
33 D. Section 01 78 23 Operation and Maintenance Data
34 E. Section 01 78 36 Warranties
35 F. Section 01 78 39 As-Built Drawings
36 G. Section 01 78 43 Spare Parts and Extra Materials
37 H. Section 01 91 00 Commissioning
38 I. Other Divisions and Specifications that may address more specifically the requirements for D&T sessions related
39 to the installation of all items and equipment installed under the execution of the Work.
40

1.3. QUALITY ASSURANCE

- 41
42 A. All contractors shall have the responsibility of preparing for and conducting D&T sessions as determined by this
43 and other Division or Trade related specifications, Owner Operation and Maintenance Manuals, and other such
44 documentation related to the Work.
45 B. The GC shall have responsibility for:
46 1. Ensuring that all contractors required to conduct a D&T session have successfully completed all of the
47 following:
48 a. Turned in all required documentation for review and documentation has been approved/accepted
49 prior to scheduling D&T sessions.
50 b. Other required documentation as needed is available and ready for use during the D&T session.
51 c. All systems have been started, tested, and running as per appropriate specification and/or
52 manufacturer’s recommendations prior to scheduling D&T sessions.
53 d. All contractors are sufficiently prepared for their D&T session
54 e. Documents the D&T session including date, time, contractor and company name, attendees and
55 other information regarding the session
56 2. Organizing the coordination and scheduling of all D&T sessions between all contractors and the
57 appropriate representatives of the Owner. These representatives may include any of the following
58 depending on the Work of the Contract:

- 1 a. Owner – end users
- 2 b. Facility Maintenance personnel
- 3 i. Facility general operation procedures including custodial services
- 4 ii. Electrical
- 5 iii. Mechanical
- 6 iv. Plumbing
- 7 v. Site
- 8 c. Information Technology (IT) Department
- 9 d. Traffic Engineering – Radio Shop
- 10 e. Architects, Engineers and Facility Management staff as project completion overview
- 11

12 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

13

14 **PART 3 - EXECUTION**

15

16 **3.1. GENERAL REQUIREMENTS**

- 17 A. The GC shall develop a specific D&T plan to be scheduled and conducted as described below but no sooner than
- 18 the meeting discussed in 3.2.A.2 below.
- 19 C. The GC shall not schedule D&T sessions to preclude required personnel from attending multiple sessions.
- 20

21 **3.2. COORDINATING AND SCHEDULING THE TRAINING**

- 22 A. The GC, PA, CxA and CPM, shall review all Training and Demonstration requirements during two (2) special
- 23 meetings.
- 24 1. The first meeting shall be held at the 50% Contract Total Payment. During this meeting the following
- 25 shall be discussed:
- 26 a. Preliminary schedule of training dates to be completed prior to beginning construction closeout.
- 27 b. List of documentation and items that need to be completed and available before and during the
- 28 training session.
- 29 c. Who (Owner, Maintenance, etc) will be attending what training session(s).
- 30 2. The second meeting shall be held at the 80% Contract Total Payment. This meeting shall review due outs
- 31 that have not yet been completed for the 90% Contract Total Payment and the requirements necessary
- 32 for Construction Closeout. All Demonstration and Training sessions shall be completed prior to receiving
- 33 the 90% progress payment and beginning Construction Closeout Procedures (see Specification 01 77 00).
- 34 a. This does not include any requirement associated with off season equipment preparation and/or
- 35 demonstration and Training Sessions.
- 36 B. All of the Construction Work shall be operationally ready prior to conducting training as follows:
- 37 1. All contractors shall have their As-Built Drawing Records available for reviewing locations of system
- 38 components during training.
- 39 2. All final and approved Operations and Maintenance Data shall be completed no less than two (2) full
- 40 weeks prior to the scheduled training.
- 41 3. All systems shall have been started, functionally tested, balanced, and fully operational, and all piping
- 42 and equipment labeling complete at least two (2) days prior to the scheduled training.
- 43 a. Seasonal equipment shall not be trained out of season. Contractors having seasonal equipment
- 44 shall work with the GC and CPM for coordinating additional training sessions as appropriate for
- 45 seasonal equipment.
- 46 C. Correction list items that prevent a piece of equipment or system from being fully operational for training shall
- 47 be corrected prior to conducting the training.
- 48

49 **3.3. TRAINING OBJECTIVES**

- 50 A. For each piece of equipment or system installed train on the following objectives/topics as applicable:
- 51 1. System design, concept, and capabilities
- 52 2. Review of related contractor as-built drawings
- 53 3. Facility walkthrough to identify key components of the system
- 54 4. System operation and programming including weekly, monthly, annual test procedures
- 55 5. System maintenance requirements
- 56 6. System troubleshooting procedures
- 57 7. Testing, inspection, and reporting requirements associated with any regulatory requirements
- 58 8. Identification of any correction list items still outstanding

- 1 9. Review of system documentation including the following:
- 2 a. Operation and maintenance data
- 3 b. Warranties
- 4 c. Valve charts, tags, and pipe identification markers
- 5 B. For each piece of specialty equipment train on the following objectives/topics as applicable:
- 6 1. Manufacturers operations instructions
- 7 2. Manufacturers use and care instructions
- 8 3. Manufacturers maintenance and troubleshooting instructions
- 9 4. System operation and programming including weekly, monthly, annual test procedures
- 10 5. Identification of any correction list items still outstanding
- 11 6. Review of system documentation including the following:
- 12 a. Operation and maintenance data
- 13 b. Warranties
- 14 C. End User Orientation
- 15 1. Facility walkthrough
- 16 2. Security and emergency features
- 17 3. General facility operation procedures
- 18 D. Facility General Use and Custodial Services – if requested
- 19 1. Facility walkthrough
- 20 2. Security and emergency features
- 21 3. General facility operation procedures
- 22 4. Care and maintenance of specialty items, finishes, etc as requested
- 23 5. Attic stock inventory and material designations
- 24

25 **3.4. DEMONSTRATION AND TRAINING PROGRAM PREPARATION**

- 26 A. Each contractor having a responsibility for providing D&T sessions shall meet with the GC, CPM, and other City
- 27 Staff as needed to review the extent of the Training Objectives in section 3.3 above needed for each piece of
- 28 equipment, system, finish, etc. This meeting shall occur no less than four (4) weeks prior to the anticipated
- 29 training session.
- 30 B. The contractor shall use the information from item 3.4.A above to prepare a formal training program for each
- 31 piece of equipment or system based on the Training Objectives in 3.3 above.
- 32 1. The formal training program shall include the following information:
- 33 a. Session title
- 34 b. List of systems, equipment, use, care, etc to be covered during the session
- 35 c. Provide the following for each systems, equipment, use, care, etc to be covered during the session
- 36 i. Name and affiliation of each instructor to be used. As needed and discretion of the Owner
- 37 the GC to require attendance by the installing technician, installing Contractor and the
- 38 appropriate trade or manufacturer’s representative.
- 39 ii. Qualifications of each instructor to be used. Practical building operation expertise as well
- 40 as in-depth knowledge of all modes of operation of the specific piece of equipment as
- 41 installed in this project is required by the training personnel. If Owner determines training
- 42 was not adequate, the training shall be repeated until acceptable to Owner.
- 43 iii. A checklist of all documentation and system/equipment requirements necessary to
- 44 complete a successful training session and the current status of each
- 45 iv. Any additional documents, training aids, video or other items to be used to complete the
- 46 training
- 47 v. Any special requirements or needs associated with item iv above to complete the training
- 48 d. The intended audience for the training
- 49 e. The approximate duration of each objective or topic to be covered
- 50 2. Submit the completed training program to the GC for review and approval by the PA and CPM.
- 51 C. The PA and CPM shall work with staff as necessary to ensure all points of anticipated training needs have been
- 52 met. The PA and CPM will approve the program as submitted or recommend changes for re-submittal as
- 53 necessary.
- 54

55 **3.5. CONDUCTING A DEMONSTRATION AND TRAINING SESSION**

- 56 A. All contractors shall conduct their required D&T Sessions as follows:
- 57 1. Begin with a classroom session
- 58 a. Provide a sign in sheet indicating all training to be conducted, instructors, etc.

- 1 b. Provide an overview of the training to be conducted including the approximate schedule.
- 2 2. Conduct a general walk-through of the site.
- 3 a. Point out locations of various equipment, valves, charts, and other related items.
- 4 b. Use the Division or Trade As-Built record drawings to indicate locations of hidden or buried items.
- 5 3. Provide a demonstration of general equipment/system operation including using the O&M manual.
- 6 a. Startup and shutdown procedures.
- 7 b. Normal operational levels as depicted by any gauges, software, etc.
- 8 c. Indicate warning devices, signs etc. and demonstrate emergency shut-down procedures.
- 9 4. Provide a demonstration of all owner level maintenance using the O&M manual.
- 10 a. Indicate frequency of maintenance.
- 11 b. Provide and review all spare parts, special tools, and special materials.
- 12 5. Provide and review all spare parts, special tools, special materials, or attic stock as applicable.
- 13 6. While conducting D&T sessions:
- 14 a. Allow hands on training whenever practical.
- 15 b. Answer questions promptly
- 16 c. Repeat demonstrations and procedures as necessary.
- 17 B. Within two (2) working days of completing the D&T session the contractor responsible for the session shall turn-
- 18 in any documentation generated including the sign in roster to the GC.
- 19 C. The GC shall turn over all training documentation to the PA and CPM upon completion of D&T sessions.
- 20 D. Re-schedule any training that has been determined to be inadequate or inappropriate for any reason including
- 21 but not limited to any of the following;
- 22 1. Unqualified instructor
- 23 2. System installation incomplete or untested to the specifications
- 24 3. Equipment failure during demonstration
- 25 4. Un-expected cancellation

26
27 **3.6. CLOSEOUT PROCEDURE**

- 28 A. Prior to receiving the 90% Progress payment the GC shall:
- 29 1. Verify with the PA and CPM that each Demonstration and Training Session was conducted properly and
- 30 according to the submitted plan.
- 31 2. Any required "Off Season" equipment testing, balancing, and Demonstration and Training Sessions have
- 32 been tentatively scheduled with the GC, necessary sub-contractors, instructors and Owner/Owner
- 33 Representatives as necessary.
- 34
- 35

36 **END OF SECTION**

37

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SECTION 02 41 13 – DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. These specifications generally follow the guidelines established by the "Standard Specifications for Public Works Construction" by the City of Madison, Wisconsin. The standards can be found at:
<http://www.cityofmadison.com/business/pw/specs.cfm> Work not specified herein or as directed by the Owner shall follow these standards.

1.2 SECTION REQUIREMENTS

- A. Coordinate with City items indicated to be removed and salvaged remain Owner's property. Carefully remove from existing construction, in a manner to prevent damage, and deliver to City. Comply with EPA regulations and hauling and disposal regulations of authorities having jurisdiction. Comply with ANSI A10.6 and NFPA 241.
- B. Unless otherwise noted Contractor shall be responsible for obtaining and paying for all permits necessary to complete demolition work.
- C. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces. Submit before Work begins.
- D. It is not expected that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Prior to starting removal and/or demolition operations be responsible and coordinate disconnection of all existing utilities, communication systems, alarm systems and other service. Coordinate with local utility company requirements for disconnection of services.
- F. Disconnect all services in manner which ensures continued operation in facilities not scheduled for demolition.

PART 2 - PRODUCTS

2.1 EQUIPMENT

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

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Demolish and remove all buildings, structures and pavements scheduled for demolition as shown on the plans.
- B. Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the work.
- C. Locate, identify, shut off, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
- D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent site plantings to remain.
- E. Explosives shall not be used for demolition activities.
- F. Carry out vehicle loading as necessary within the project boundaries or as defined or indicated on the drawings, but not in locations that block vehicular traffic on the streets or pedestrian traffic on adjacent public walks.
- G. Dismantle each structure in an orderly manner to provide complete stability of the structure at all times. Provide bracing and shoring where necessary to avoid premature collapse of structure.
- H. Demolish foundation walls and other below grade features in accordance with the plans. Unless otherwise noted, remove all below grade features to a point 4' below adjoining existing grade, or proposed grade, whichever is lower. Basement and/or lowest level floors more than 4' below existing grade need not be removed but must be broken up to permit drainage.
- I. Backfill and compact below grade areas and voids resulting from demolition of structures and other abandonment and demolition.
- J. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, trash and debris.
- K. Promptly remove demolition waste materials from Project site and legally dispose of them. Do not burn demolished materials. Transport and dispose all demolition waste in accordance with local, state, and federal guidelines.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, concrete mix designs and submittals required by ACI 301.
- B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Plain Steel Wire: ASTM A 82, as drawn.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, as drawn, flat sheet.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- E. Portland Cement: ASTM C 150, Type I or II.
- F. Fly Ash: ASTM C 618, Type C or F.
- G. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- H. Silica Fume: ASTM C 1240, amorphous silica.
- I. Aggregates: ASTM C 33, uniformly graded.
- J. Air-Entraining Admixture: ASTM C 260.
- K. Chemical Admixtures: ASTM C 494, Do not use calcium chloride or admixtures containing calcium chloride.
- L. Vapor Retarder: Reinforced sheet, ASTM E 1745, Class A.
- M. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- N. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

- O. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- P. Coordinate curing method compatibility with resinous floor finish areas.

2.2 MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:
 - 1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Slump Limit: 5 inches (125 mm) plus or minus 1 inch (25 mm).
 - 4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
 - 5. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 25 percent.
 - 6. For concrete exposed to deicing chemicals, limit use of fly ash to 25 percent replacement of Portland cement by weight and granulated blast-furnace slag to 40 percent of Portland cement by weight; silica fume to 10 percent of Portland cement by weight.
- C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M.
 - 1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 CONCRETING

- A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch (3.2 mm) for concrete exposed to view and Class C, 1/2 inch (13 mm) for other concrete surfaces.
- B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches (150 mm) and sealed.
- C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.
- E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.

- F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.
- G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.
- H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:
 - 1. Scratch finish for surfaces to receive mortar setting beds.
 - 2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
 - 3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
 - 4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
 - 5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.
- I. Cure formed surfaces by moist curing for at least seven days.
- J. Begin curing concrete slabs after finishing. Keep concrete continuously moist for at least seven days.
- K. Owner will engage a testing agency to perform field tests and to submit test reports.
- L. Protect concrete from damage. Repair surface defects in formed concrete and slabs.

END OF SECTION 03 30 00

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SECTION 04 20 00 - UNIT MASONRY

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals:
 - 1. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.
- B. Comply with ACI 530.1/ASCE 6/TMS 602.
- C. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections required by authorities having jurisdiction.
 - 1. Inspections: Level 1 special inspections according to the IBC.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90; Density Classification, Normal Weight.
 - 1. Integral Water Repellent: Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
 - 2. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
 - 3. Square-edged units for outside corners unless otherwise indicated.
 - 4. Colored CMU as called out on Drawings- Premier Ultra Burnished Masonry Unit – Twilight (63-210B) – **No substitutions**
Available from: County Materials Corporation, 6399 Nesbitt Rd, Madison, WI 53719 Megan Paul, Sales Representative – 608-556-3333
Megan.paul@countymaterials.com

2.2 MORTAR AND GROUT

- A. Mortar: ASTM C 270, proportion specification.
 - 1. Use Portland cement-lime or masonry cement mortar.
 - 2. Do not use calcium chloride in mortar.
 - 3. For masonry below grade or in contact with earth, use Type S.
 - 4. For reinforced masonry, use Type S.
 - 5. See drawings for colored mortar.
 - 6. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N.

7. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.
- B. Grout: ASTM C 476 with a slump of 8 to 11 inches (200 to 280 mm).
 - C. Refractory Mortar: Ground fireclay mortar or other refractory mortar that passes ASTM C 199 test and is acceptable to authorities having jurisdiction.

2.3 REINFORCEMENT, TIES, AND ANCHORS

- A. Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).
- B. Joint Reinforcement: ASTM A 951.
 1. Coating: Hot-dip galvanized at both interior and exterior walls.
 2. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
 3. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
 4. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.
- C. Corrugated-Metal Veneer Anchors: 7/8 inch (22 mm) wide and made from 0.030-inch (0.76-mm-) thick steel sheet, galvanized after fabrication.

2.4 EMBEDDED FLASHING MATERIALS

- A. Sheet Metal Flashing: Stainless steel, 0.0156 inch (0.4 mm) thick

2.5 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.
- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
- C. Cavity Drainage Material: Free-draining polymer mesh, full depth of cavity with dovetail shaped notches that prevent mortar clogging.

2.6 Anti-Graffiti Coating

- A. Basis of Design: PROSCO, Inc *Sure-Klean® Weather Seal Blok-Guard® & Graffiti Control II* at all exposed CMU conditions.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
- B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- C. Stopping and Resuming Work: Rack back units; do not tooth.
- D. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- E. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- F. Tool exposed joints slightly concave when thumbprint hard unless otherwise indicated.
- G. Keep cavities clean of mortar droppings and other materials during construction.

3.2 LINTELS

- A. Install lintels where indicated.
- B. Minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.3 FLASHING AND WEEP HOLES

- A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.
 - 1. Extend flashing 4 inches (100 mm) into masonry at each end and turn up 2 inches (50 mm) to form a pan.
- C. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

3.4 CLEANING

- A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly cured, clean exposed masonry.
 - 1. Wet wall surfaces with water before applying acidic cleaner, then remove cleaner promptly by rinsing thoroughly with clear water.
 - 2. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 20 00

SECTION 04 43 00 - STONE MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Samples for stone and colored mortar.
- B. Submit qualification data for masonry contractor, including a list of completed projects.
- C. Construct a sample wall panel approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high to demonstrate aesthetic effects and set quality standards for materials and execution.
- D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- E. Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Eden Stone Co. Inc. which is located at: W4520 Lime Road, Eden, WI 53019 – Telephone 920-477-2521.-**No Substitutions**

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: 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.
 - c. Minimum compressive strength of 33,000 average psi when tested in accordance with ASTM C 170

2.3 MORTAR

- A. Mortar for Stone Masonry: ASTM C 270, Proportion Specification, Type S.
 - 1. Color to match Solomon Colors, Inc. – 20x Dark Buff. -Provide Sample
 - 2. Low-Alkali Cement: Use Portland cement with not more than 0.60 percent total alkali per ASTM C 114.
 - 3. Colored Pointing Mortar: Use colored cement product of color selected.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Sand: ASTM C 144
 - 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
- D. Water: Potable

2.4 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Stainless steel, 0.016 inch thick elsewhere.

2.5 MISCELLANEOUS MATERIALS

- A. Dampproofing for Limestone: Cementitious dampproofing recommended by ILI.
- B. Weep Holes: Round polyethylene tubing, 3/8-inch.

2.6 STONE FABRICATION

- A. Gage backs of stones more than 81 sq. in. in area.

2.7 Anti-Graffiti Coating

- A. Basis of Design: PROSCO, Inc Sure-Klean® Weather Seal Blok-Guard® & Graffiti Control II at all exposed CMU conditions.

Coordinate coating compatibility with manufacture's approved test. Clean stone surfaces and spray a light water mist onto stone. If water is absorbed surface is compatible. If water beads up and runs off then coating is not compatible.

PART 3 - EXECUTION

3.1 SETTING STONE MASONRY, GENERAL

- A. Execute stone masonry by skilled masons experienced with the kind and form of stone and installation method indicated. Follow Building Stone Institute guidelines. Arrange stones for good fit, in pattern indicated.

- B. Maintain uniform joint widths except for variations due to different stone sizes and minor variations required to maintain bond alignment. Lay walls with joints not less than 1/4 inch at narrowest points or more than 1/2 inch at widest points.
- C. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
 - 1. Extend flashing 4 inches into masonry at each end and turn up 2 inches to form a pan.

3.2 INSTALLING ADHERED STONE MASONRY VENEER

- A. Install 3/8-inch thick scratch coat over CMU. Coat backs of stone units and face of scratch coat with cement-paste bond coat, then butter both surfaces with setting mortar. Tap units into place, completely filling space between units and scratch coat.
- B. Rake out joints for pointing 3/8 inch deep.

3.3 POINTING

- A. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- B. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile indicated.

3.4 CLEANING

- A. In-Progress Cleaning: Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly cured, remove large mortar particles, scrub, and rinse stone masonry veneer.
 - 1. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

END OF SECTION 04 43 00

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SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Shop Drawings.
- B. Comply with applicable provisions of the following:
 - 1. AISC 303.
 - 2. AISC 341 and AISC 341s1.
 - 3. AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

- A. W-Shapes: ASTM A 992/A 992M Grade 50 (345).
- B. Channels, Angles ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B structural tubing.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

2.2 ACCESSORIES

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.
- B. Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Configuration: Straight.
 - 2. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
 - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 - 4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
- C. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- D. Grout: ASTM C 1107, nonmetallic, shrinkage resistant, factory packaged.

2.3 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
- C. Shop Priming: Prepare surfaces according to SSPC-SP 2, "Hand Tool Cleaning"; or SSPC-SP 3, "Power Tool Cleaning." Shop prime steel to a dry film thickness of at least 1.5 mils (0.038 mm). Do not prime surfaces to be embedded in concrete or mortar or to be field welded.

PART 3 - EXECUTION

3.1 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
- C. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- D. Do not use thermal cutting during erection.
- E. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened
- F. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

END OF SECTION 05 12 00

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Shop Drawings showing details of fabrication and installation.

PART 2 - PRODUCTS

2.1 METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Pipe: ASTM A 53, standard weight (Schedule 40), black finish.

2.2 GROUT

- A. Nonshrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.

2.3 FABRICATION

- A. General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.
- B. Welding: Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth with contour of welded surface matching those adjacent.
- C. Fabricate pipe bollards with hot dipped galvanized coating. Ease exposed top outside edge prior to galvanizing.

2.4 STEEL AND IRON FINISHES

- A. Hot-dip galvanize steel fabrications at exterior locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack.
- B. Fit exposed connections accurately together to form hairline joints.
- C. Anchor bollards in concrete and fill solidly with concrete, mounding top surface.
- D. Galvanized steel bollards are to receive High Performance Coating.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: ICC-ES evaluation reports for wood-preservative treated wood, engineered wood products and metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.
- B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: AWPA C2, except that lumber not in ground contact and not exposed to the weather may be treated according to AWPA C31 with inorganic boron (SBX).
 - 1. Use treatment containing no arsenic or chromium.
 - 2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
 - 3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- B. Provide preservative-treated materials for items indicated on Drawings, and the following:
 - 1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Concealed members in contact with masonry or concrete.
 - 3. Wood framing members that are less than 18 inches (460 mm) above the ground.
 - 4. Wood floor plates that are installed over concrete slabs-on-grade.
- C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.
 - 1. Use Exterior type for exterior locations and where indicated.

2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Use Interior Type A unless otherwise indicated.
4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

2.3 LUMBER

A. Dimension Lumber:

1. Maximum Moisture Content: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness.
2. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2 Spruce-pine-fir: NLGA.
3. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
 - a. Species: As specified for framing other than non-load-bearing interior partitions.
 - b. Grade: No. 2.

B. Miscellaneous Lumber: Construction, or No. 2 grade with 15 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.4 ENGINEERED WOOD PRODUCTS

- A. Engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.
- B. Laminated-Veneer Lumber: Manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.
 1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi (17.9 MPa) for 12-inch nominal- (286-mm actual-) depth members.
 2. Modulus of Elasticity, Edgewise: 1,800,000 psi (12 400 MPa).
 3. Provide units complying with APA PRI-400, factory marked with nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

2.5 MISCELLANEOUS PRODUCTS

- A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. Power-Driven Fasteners: CABO NER-272.
 2. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- B. Metal Framing Anchors: Structural capacity, type, and size indicated.
1. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 (Z180) coating designation for interior locations where stainless steel is not indicated.
 2. Use anchors made from stainless steel complying with ASTM A 666, Type 304 for exterior locations and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Securely attach rough carpentry to substrates, complying with the following:
1. CABO NER-272 for power-driven fasteners.
 2. Published requirements of metal framing anchor manufacturer.
 3. Table 2304.9.1, "Fastening Schedule," in the IBC.

END OF SECTION 06 10 00

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SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

- A. Oriented Strand Board: DOC PS 2. Exposure Rated.

2.2 WALL SHEATHING

- A. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.

2.3 ROOF SHEATHING

- A. Oriented-Strand-Board Roof Sheathing: Exposure 1, Structural sheathing.

2.4 MISCELLANEOUS PRODUCTS

- A. Fasteners: Size and type indicated.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 - 2. Power-Driven Fasteners: CABO NER-272.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Securely attach to substrates, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in the IBC Table R602.3(1)
- B. Fastening Methods:
 - 1. Wall and Roof Sheathing:

- a. Nail to wood framing.
- b. Screw to cold-formed metal framing.

END OF SECTION 06 16 00

SECTION 06 18 00 - GLUED LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SCOPE

- A. Include labor, material, and equipment to furnish structural glued laminated timber indicated on the plans and as specified herein.

1.2 QUALIFICATIONS

- A. Manufacturer shall be by an experienced fabricator in conformance with American National Standard ANSI/AITC A190.1-2007 *Structural Glued Laminated Timber*. Manufacturer to be a licensee of the American Institute of Timber Construction (AITC).

1.3 SUBMITTALS

- A. Shop Drawings: Submit complete fabrication drawings prior to manufacture for Architect-Engineer-Contractor-Owner approval.
- B. Samples: Submit samples of texture and/or finish selection prior to manufacture for approval.

1.4 MANUFACTURER

- A. Structural glued laminated timber shall be manufactured by the following AITC licensed manufacturer:

Sentinel Structures, Inc., Peshtigo, WI 54157; www.sentinelstructures.com
- B. Supplier Qualifications: Supplier furnishing products in the vicinity for a period of not less than 5 years. This supplier shall have experience in the preparation of architectural coatings specifications, estimating, detailing, ordering, servicing of architectural products 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.

1.5 STORAGE / ERECTION

- A. General contractor / purchaser is responsible for protection of materials after arrival at jobsite. If stores temporarily at site, members shall be placed on level blocking well off the ground and members shall be separated by wood strips so that may circulate around each member. Cover top and sides with water resistant wrapping.

- B. Use non-marring slings when handling members.
- C. Erect structural glued laminated timbers plumb, level, and true to lines and dimensions with full bearing. Install temporary bracing as required.
- D. Maintain wrapping until final roof protection is provided. Slit bottom side of wrapping to allow accumulated moisture to drain away from members.
- E. Initial building heat shall be elevated gradually to desired level. To minimize surface checking, the relative humidity of the building should not be reduced rapidly.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED LAMINATED TIMBER

- A. Lumber:
 - 1. Laminating lumber shall be kiln-dried, and stress graded to meet requirements of AITC 117-Latest Edition Standard *Specification for Structural Laminated Timber*.
 - 2. Laminating combination shall be determined by the design requirements for each member and designated on the shop drawings.
 - 3. Lumber species shall be Southern Pine.
- B. Adhesive: Adhesive shall be waterproof complying with ANSI/AITC A190.1-2007.
- C. Appearance Grade: Appearance Grade shall be Industrial Appearance Grade, per AITC 110-Latest Edition *Standard Appearance Grades for Structural Glued Laminated Timber*.
- D. Surface Texture: Surface texture shall be machine planed smooth surface.
- E. Finish: No factory applied finish to be applied.
- F. Protection: Members shall be bundle wrapped.
- G. Connective Hardware: Manufacturer shall furnish necessary connection steel and hardware for joining timber members to each other and to their supports **exclusive** of setting / bearing plates, anchor bolts embedded in masonry, tie-rods, items welded to structural steel, and connections for joining timber members to steel walls. Steel to be ASTM A-36 and hardware to be ASTM A-307. Shapes to have one coat of shop applied paint containing rust inhibitor. Connection steel and hardware at exterior locations fully exposed to the weather without rood cover shall be hot-dipped galvanized per ASTM.

2.2 PRESERVATIVE TREATMENT

- A. When conditions of service are such that preservative treatment is required, treatment shall be by the pressure process in accordance with AITC 109-Latest Edition *Standard for Preservative Treatment of Structural Glued*. Members requiring treatment shall be marked on plans.
- B. Pressure preservative treatment shall be waterborne C.C.A.; individual laminations shall be treated prior to laminating. Lumber shall be kiln-dried to a maximum moisture content of 16% after treatment and prior to gluing.
- C. Retentions shall be 0.40PCF.

END OF SECTION 06 18 00

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SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS

- A. Surface-Burning Characteristics: ASTM E 84, and as follows:
 - 1. Flame-Spread Index: 25 or less where exposed; otherwise, as indicated in Part 2 "Insulation Products" Article.
 - 2. Smoked-Developed Index: 450 or less.
- B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, with flame-spread index of 75 or less. (Below Slab)
- C. Molded-Polystyrene Board Insulation: ASTM C 578, Type I, with flame-spread index of 75 or less. (Ceiling)

2.2 ACCESSORIES

- A. Vapor Retarder: Reinforced polyethylene 6 mils (0.15 mm) thick.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation.
- B. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage. Locate seams at framing members, overlap, and seal with tape.

END OF SECTION 07 21 00

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SECTION 07 22 16 - ROOF BOARD INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide tapered extruded polystyrene roof board insulation.

1.2 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance criteria, and limitations, including installation instructions.
- B. Sustainable Design: Submit manufacturer's sustainable design certifications as specified.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: The installation work of this Section shall be performed by an experienced roofing contractor approved and certified by the roofing system manufacturer.
- B. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third party inspection agency used for building code qualification.
- C. Each tapered panel shall be labeled with a code letter to identify its slope and to identify its proper position on the roof. Each panel shall also be marked with an arrow to identify direction of slope.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packaging.
- B. Store and protect products in accordance with manufacturer's instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources. Do not install insulation that has been damaged or wet.
- C. In the event the board insulation becomes wet, wipe dry prior to installation.

1.5 PROJECT CONDITIONS

- A. Roof deck shall be free of ponded water, ice or snow. This precaution is to discourage potential future condensation on the underside of the membrane.
- B. Do not expose tapered insulation to surfaces such as vent stacks, pipes or other rooftop appurtenances whose constant temperature is in excess of 165°F. If temperature cycling conditions are anticipated near the maximum recommended use temperature, consult a representative for recommendations regarding system components.

- C. When insulation is to be exposed to sunlight for prolonged periods due to job site delays, protect the insulation with a light colored opaque covering. Provisions should be made to prevent wind loss of insulation materials at the job site when partially open units of Tapered are on hand.
- D. Dark membrane ballasted systems must have ballast installed immediately after installation of membrane. This precaution is required to prevent potential damage to the insulation from excessive heat due to prolonged exposure to sunlight.
- E. Roofs exposed to chemical discharge, or to reflective vertical surfaces adjacent to the roof, require special consideration. Consult this specification for recommendations regarding system components.
- F. Any deteriorated decking shall be repaired or replaced. Roof drains must be verified to be open and adequate to promote proper roof drainage.

1.6 WARRANTY

- A. A thermal performance warranty shall be issued to the Owner upon completion of the work. Insulation shall be warranted to retain all physical properties and a minimum of 90% of its published R-value for the lifetime of the product.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com., or equal.

2.2 MATERIALS

- A. Extruded Polystyrene (XPS) Insulation:
 1. Physical Properties:
 - a. Tapered Materials: Tapered closed-cell foam panels with continuous as-extruded skin on the face and back surfaces, conforming to the minimum physical requirements of ASTM C-578, Type IV.
 - b. Fill Materials: closed-cell foam panels with continuous as-extruded skin on the face and back surfaces, conforming to the minimum physical requirements of ASTM C-578, Type IV.
 2. Product Criteria:
 - a. ASTM C578 type IV, certified by independent third party such as RADCO.
 - b. Blowing Agent Formulation: Zero ozone depleting.
 - c. Compressive Strength (ASTM D 1621): 25 psi, minimum.
 - d. Edge Condition: Square edge.
 - e. Thermal Resistance (180 day real-time aging as mandated by ASTM C 578, measured per ASTM C 518 at mean temperature of 75F): R-5.0 per inch of thickness, with 90% lifetime limited warranty on thermal resistance.
 - f. Water Absorption (ASTM C272): Maximum [0.10] percent by volume.

- g. Surface Burning Characteristics (ASTM E 84): Flame spread less than 25, smoke developed less than 450, certified by independent third party such as Underwriters Laboratories (UL).
 - h. Indoor Air Quality: Compliance certified by independent third party such as GreenGuard Indoor Air Quality Certified® and/or GreenGuard Children and Schools CertifiedSM.
 - i. Recycle Content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.
 - j. Warranty: Limited lifetime warranty covering all ASTM C578 physical properties.
3. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:
- a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Pactiv Corporation.
- B. Overlayment: For dark mechanically attached, or any color fully adhered, or chemically incompatible membranes, provide the following:
- 1. [Glass mat faced gypsum roof board.]
 - 2. [Flexible glass fiber, nonwoven, non-flammable, corrosion and mildew resistant or other suitable separator (overlayment) sheets shall be used under PVC membranes and other such membranes which contain plasticizing agents. Separator sheet shall have been evaluated and approved by the membrane manufacturer for adequacy as a separator.]
- C. Adhesion System: Per membrane manufacturer's specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation.
 - 1. Verify that the roof deck drains completely free of water within 48 hours following rainfall.
 - 2. Verify that the dead load carrying capability of the deck is sufficient to support code mandated live loads and dead loads incident on the roof, including the entire roof covering/insulation system.
 - 3. Verify that the roof deck provides adequate support for the insulation.
- B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 ROOF DECK PREPARATION

- A. Any deteriorated roof decking shall be repaired or replaced.]
- B. A thorough inspection should be required in the case of total tear off.

- C. The surface must be clean, smooth, free of fins, sharp edges, loose and foreign materials, oil, grease, and fresh roofing cement. Repair any deck joints or cracks, any deck to wall junctions, and any other deck to penetration gaps, which are greater than 1/4".
- D. Install deck and secure in accordance with construction drawings. The deck must be well secured with all mechanical fasteners flush with the surface of the deck. The deck must be of sufficient thickness to develop adequate fastener holding power. Verify requirements with the membrane manufacturer.

3.3 VAPOR RETARDER

- A. Install a vapor retarder in accordance with construction drawings. Place the vapor retarder to insure adequate end and side joint laps. When high relative humidities inside the building or other normal climatic conditions create a condensation point within the insulation board, it may be necessary to install a vapor retarder beneath the insulation or thermal barrier. Although tapered/fill layers of insulation have vapor retarding qualities, the need for more effective vapor retarding layers must be assessed based on the conditions present on each project. Tapered and fill layers of insulation are compatible with most commonly used asphaltic and sheet film vapor retarding materials. See the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals for specific design guidelines.

3.4 INSULATION

- A. Install tapered roof insulation in accordance with the manufacturer's approved shop drawings.
- B. Install thicknesses of fill in accordance with shop drawings prepared by manufacture and approved by the roofing contractor. Install tapered over the required base layers, following the directional arrow printed on each panel which indicates direction of slope. Note that Tapered panels also have a letter code printed on their surface which corresponds with panel layout shown on the approved shop drawings.
- C. Insulation joints shall not exceed 1/4" in width. Joints wider than 1/4" shall be filled with the same insulation.
- D. Insulation shall be field trimmed to fit tightly around roof protrusions and terminations.
- E. Apply only as much tapered and fill roof insulation as can be covered by the roofing membrane on the same day. Apply roof insulation in parallel rows with end joints staggered. Install side and end joints closely but do not force together. In a two layer application, apply second layer panels parallel to the first layer but with side and end joints staggered in relation to the first layer.
- F. In areas where black/dark membranes are used and where "reflected solar energy" is expected to be present, insulation need protection in addition to normally specified cover boards. For example, roof areas adjacent to higher walls, particularly walls with reflective surfaces, or near large rooftop HVAC units, or near or in between clusters of mechanical equipment, or near other structures with reflective cladding (metal or glass); or near higher reflective parapets, all such areas should be considered for additional heat protection. Such roof areas must be covered with pavers or ballast. Black/dark (non-white)

membranes must be coated with white reflective topping, and maintained white, to avoid damage due to the intensified heat exposure from reflected sun in such areas.

- G. Insulation shall be loosely placed, secured in accordance with membrane manufacturer's requirements. The insulation below the membrane is to be held in place with compatible adhesives in conjunction with the overlayment and/or membrane system. When adhering or exposing Tapered/fill insulation to hot bitumen, the bitumen must be allowed to cool to between 200°F and 250°F.

3.5 OVERLAYMENT

- A. Only dry overlayment materials shall be used. If overlayment materials become wet, allow them to fully dry before proceeding with roofing application. Requirements for overlayment materials and thickness may vary. Contact membrane manufacturer for their individual requirements.
- B. Rigid overlayment shall be adhered with a suitable adhesive per manufacturer's recommendations. Loose lay flexible sheet overlayment over Tapered and cover with a membrane attached per the manufacturer's recommendations. Edges and ends of rolls shall be lapped a minimum of 6".
- C. When cleaning agents and seam adhesives used are solvent based and capable of causing cavitation of the underlying insulation, use care when preparing membrane edges for in-field seam splicing.
- D. In areas where black/dark membranes are used and where "reflected solar energy" is expected to be present, need protection in addition to normally specified cover boards. For example, roof areas adjacent to higher walls, particularly walls with reflective surfaces, or near large rooftop HVAC units, or near or in between clusters of mechanical equipment, or near other structures with reflective cladding (metal or glass); or near higher reflective parapets, all such areas should be considered for additional heat protection. Such roof areas must be covered with pavers or ballast. Black/dark (non-white) membranes must be coated with white reflective topping, and maintained white, to avoid damage due to the intensified heat exposure from reflected sun in such areas.

END OF SECTION 03 30 00

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SECTION 07 46 00 - SIDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories; James Hardie HZ5 Engineered for Climate Siding.
- B. Factory-finished fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories; James Hardie HZ5 Engineered for Climate Siding.

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Wood framing and bracing.
- B. Section 06100 - Rough Carpentry: Sheathing.
- C. Section 07210 - Insulation: Exterior wall insulation.

1.3 REFERENCES

- A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets
- B. ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

- E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Product Warranty: Limited, non-pro-rated product warranty.
 - 1. HardiPanel HZ5 vertical siding for 30 years.
- B. Product Warranty: Limited, product warranty.
 - 1. HardieTrim HZ and HZ5 boards for 15 years.
- C. Finish Warranty: Limited product warranty against manufacturing finish defects.
 - 1. When used for its intended purpose, properly installed and maintained according to James Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of

purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

- D. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: [request info \(info@jameshardie.com\)](mailto:request info (info@jameshardie.com)); Web: www.jameshardiecommercial.com
- B. Substitutions: Not permitted.
- C. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.2 SIDING

- A. Vertical Siding: HardiePanel HZ5 siding as manufactured by James Hardie Building Products, Inc.
1. Type: Cedarmill Vertical siding panel 4 feet by 8 feet (1219 mm by 2438 mm).
- B. Trim:
1. HardieTrim HZ5 boards and HardieTrim HZ boards as manufactured by James Hardie Building Products, Inc.
 2. HardieTrim HZ5 Fascia boards as manufactured by James Hardie Building Products, Inc.

2.3 FASTENERS

- A. Wood Framing Fasteners:
1. Wood Framing: 4d common corrosion resistant nails.
 2. Wood Framing: 6d common corrosion resistant nails.
 3. Wood Framing: 8d box ring common corrosion resistant nails.
 4. Wood Framing: 0.089 inch (2.2 mm) shank by 0.221 inch (5.6 mm) head by 2 inches (51 mm) corrosion resistant siding nails.
 5. Wood Framing: 0.093 inch (2.4 mm) shank by 0.222 inch (5.6 mm) head by 2 inches (51 mm) corrosion resistant siding nails.
 6. Wood Framing: 0.093 inch (2.4 mm) shank by 0.222 inch (5.6 mm) head by 2-1/2 inches (64 mm) corrosion resistant siding nails.

7. Wood Framing: 0.091 inch (2.3 mm) shank by 0.221 inch (5.6 mm) head by 1-1/2 inches (38 mm) corrosion resistant siding nails.
8. Wood Framing: 0.091 inch (2.3 mm) shank by 0.225 inch (5.7 mm) head by 1-1/2 inches (38 mm) corrosion resistant siding nails.
9. Wood Framing: 0.121 inch (3 mm) shank by 0.371 inch (9.4 mm) head by 1-1/4 inches (32 mm) corrosion resistant roofing nails.
10. Wood Framing: No. 11 gauge 1-1/4 inches (32 mm) corrosion resistant roofing nails.
11. Wood Framing: No. 11 gauge 1-1/2 inches (38 mm) corrosion resistant roofing nails.
12. Wood Framing: No. 11 gauge 1-3/4 inches (44 mm) corrosion resistant roofing nails.

B. Metal Framing:

1. Metal Framing: 1-1/4 inches (32 mm) No. 8-18 by 0.375 inch (9.5 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
2. Metal Framing: 1-5/8 inches (41 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
3. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant ribbed buglehead screws.
4. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.311 inch (7.9 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
5. Metal Framing: 1.5 inch (38mm) [AGS-100] .100 inches by 25 inches (2540 mm by 635 mm) ET&F Pin or equivalent pneumatic fastener.

C. Masonry Walls (CMU):

1. Masonry Walls: Aerico Stud Nail, ET&F ASM No.-144-125, 0.14 inch (3.6 mm) shank by 0.30 inch (7.6 mm) head by 2 inches (51 mm) long corrosion resistant nails.

2.4 FINISHES

A. Factory Primer: Provide factory applied universal primer.

1. Primer: Factory primed by James Hardie.
2. Topcoat: Refer to Section 09900 and Exterior Finish Schedule.

B. Factory Finish: Refer to Exterior Finish Schedule.

1. Product: ColorPlus Technology by James Hardie.
2. Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.
3. Process:
 - a. Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
 - b. Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photospectrometer and verified by third party.

4. Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed
 5. Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.
- C. Factory Finish Color for Trim, Soffit and Siding Colors:
1. Timber Bark JH40-30.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
 1. Install water-resistive barriers and claddings to dry surfaces.
 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 3. Protect siding from other trades.
- D. Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
 1. Install water-resistive barriers and claddings to dry surfaces.
 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 3. Protect siding from other trades.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.

- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install Engineered weather barrier in accordance with local building code requirements.
- F. Use HardieWrap™ Seam Tape and joint and laps.
- G. Install HardieWrap™ flashing, and HardieWrap™ Flex Flashing

3.3 INSTALLATION - HARDIEPANEL HZ5 VERTICAL SIDING

- A. Install materials in strict accordance with manufacturer's installation instructions.
- B. Block framing between studs where HardiePanel siding horizontal joints occur.
- C. Install metal Z flashing and provide a 1/4 inch (6 mm) gap at horizontal panel joints.
- D. Place fasteners no closer than 3/8 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
- E. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- F. Maintain clearance between siding and adjacent finished grade.
- G. Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.
- H. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
 - 1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
 - 2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
 - 3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

3.4 INSTALLATION - HARDIETRIM HZ5 BOARDS-*For Dumpster enclosure only*

- A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
- B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- C. Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.

- D. Maintain clearance between trim and adjacent finished grade.
- E. Trim inside corner with a single board trim both side of corner.
- F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.
- G. Allow 1/8 inch gap between trim and siding.
- H. Seal gap with high quality, paint-able caulk.
- I. Shim frieze board as required to align with corner trim.
- J. Fasten through overlapping boards. Do not nail between lap joints.
- K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards.
- L. Shim frieze board as required to align with corner trim.
- M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.

3.5 FINISHING

- A. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
- B. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07 46 00

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SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Adhered EPDM membrane roofing system.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- B. Source Limitations: Obtain components including for membrane roofing system from same manufacturer.
- C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- D. Preinstallation Roofing Conference: Conduct conference at Project site. Manufacturer's representative shall be present.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle SynTec Incorporated.
 - b. Firestone Building Products.
 - c. GAF Materials Corporation.
 2. Thickness: 60 mils (1.5 mm) nominal.
 3. Exposed Face Color: Black.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Single-Ply Roof Membrane Adhesives: 250 g/L.
 - f. Single-Ply Roof Membrane Sealants: 450 g/L.
 - g. Nonmembrane Roof Sealants: 300 g/L.
 - h. Sealant Primers for Nonporous Substrates: 250 g/L.
 - i. Sealant Primers for Porous Substrates: 775 g/L.
 - j. Other Adhesives and Sealants: 250 g/L.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard, water based.

- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- F. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 SUBSTRATE BOARDS

- A. Substrate Board: ½ inch manufacturer's standard material as required for roof warranty.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

PART 3 - EXECUTION

3.1 SUBSTRATE BOARD

- A. Install manufacturers approved substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to top flanges of wood deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.2 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
- B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

- D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- E. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- F. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.3 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing agency to perform inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

END OF SECTION 07 53 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data Shop Drawings, and Samples.
- B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METAL

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, not less than 22 ga. thick; and finished as follows:
 - 1. Finish: Manufacturer's standard two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight
 - 2. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish.

2.2 ACCESSORIES

- A. Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
- B. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.
- C. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners.
 - 1. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- D. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION

- A. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
- B. 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.
- C. 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."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.
- B. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- C. Fabricate nonmoving seams in sheet metal with flat-lock seams. For aluminum, form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- D. Aluminum Flashing and Trim: Coat back side of aluminum flashing and trim with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.
- E. Separate dissimilar metals with a bituminous coating or polymer-modified, bituminous sheet underlayment.

END OF SECTION 07 62 00

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and color Samples.
- B. Warranties: Provide manufacturer's standard written warranty, signed by manufacturer agreeing to promptly repair or replace roof specialties that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper as recommended by manufacturer for use and finish indicated.
- C. Aluminum Finish: Two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight
- D. Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
- E. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with heads matching color of metal.
 - 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- F. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 ROOF SPECIALTIES

- A. Copings: Manufactured coping system consisting of formed-metal coping cap, concealed anchorage; corner units, end cap units, and concealed splice plates. Provide spring tension and hold down cleats both sides.

1. Formed Aluminum: 0.040 inch thick.
- B. Gutters and Downspouts:
1. Gutters: Manufactured in uniform section lengths, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish expansion joints, and expansion-joint covers.
 - a. Gutter Style: Rectangular
 - b. Aluminum: 0.040 inch (1.02 mm) thick.
 - c. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
 2. Downspouts: Close-face rectangular with mitered elbows. Furnish wall brackets of same material and finish as downspouts, with anchors. Provide clean out at base
 - a. Formed Aluminum: 0.050 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement.
- B. Coat back side of aluminum roof specialties with bituminous coating where they will contact wood, ferrous metal, or cementitious construction.
- C. Separate dissimilar metals with a bituminous coating or polymer-modified, bituminous sheet underlayment.
- D. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- E. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless indicated.
 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.2 m) apart. Install expansion joint caps.
- F. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- G. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 12 inches (305 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.

- H. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. Extend downspout into PVC drain underground. (6 inch minimum).

END OF SECTION 07 71 00

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- B. Sealant for General Exterior Use Where Another Type Is Not Specified
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT.
- C. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:
 - 1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use T.
- D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:
 - 1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; for Use T.
- E. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:
 - 1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.

2.2 MISCELLANEOUS MATERIALS

- A. 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. Closed Cell Cylindrical Sealant Backings: ASTM C 1330, 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.
- D. 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.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with ASTM C 1193.
- B. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

END OF SECTION 07 92 00

SECTION 08221

FIBERGLASS REINFORCED DOOR AND FRAME SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass Reinforced Plastic (FRP) Doors.

1.2 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealers: Perimeter sealant and backup materials.
- B. Section 08 71 00 - Door Hardware.

1.3 REFERENCES

- A. ASTM D 523 - Standard Test Method for Specular Gloss.
- B. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.
- C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.
- E. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
- F. SDI 100 - Recommended Specifications for Steel Doors and Frames.
- G. UL 10B - Standard for Fire Tests of Door Assemblies.
- H. UL 305 - Standard for Panic Hardware.

1.4 PERFORMANCE REQUIREMENTS

- A. Door opening assemblies:

1. Maximum flame spread 25 in accordance with ASTM E 84, self-extinguishing in accordance with ASTM D 635. 2. USDA accepted.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 33 23.
- B. Submit Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings:
 - 1. Plans: Indicate location of each door opening assembly in project.
 - 2. Elevations: Dimensioned elevation of each type door opening assembly in project; indicate sizes and locations of door hardware, and lites and louvers, if specified.
 - 3. Details: Installation details of each type installation condition in project; indicate installation details of glazing, if specified.
 - 4. Schedule: Indicate each door opening assembly in project; cross-reference to plans, elevations, and details.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing fiberglass doors and frames with a minimum documented experience of 25 years.
- B. Installer Qualifications: Company specializing in installation of fiberglass doors and frames with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's unopened, undamaged packaging, with manufacturer's labels intact.
- B. Inspect and report damage to doors at time of delivery.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Store door assemblies in on end, to prevent damage to face corners and edges.

1.8 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's 25-year warranty against failure due to corrosion from specified environment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: **Special-Lite -No Substitutions**

860 S. Williams Street Decatur, MI 49045

Phone: 800.821.6531

Web Site: [www. special-lite.com](http://www.special-lite.com)

2.2 MATERIALS

A. Fiberglass Mat: Glass fiber chopped strand, minimum 2 ounces per square foot.

B. Resins: Manufacturer's formulation for fabricating units to meet specified requirements.

C. Anchors: Manufacturer's standard stainless steel expansion anchors for existing openings, and stainless steel masonry tee anchors for new construction.

D. Fasteners: Stainless steel.

2.3 COMPONENTS

A. Non-rated Fiberglass Reinforced Plastic (FRP) Doors:

1. Thickness: 1-3/4 inches (45 mm).

2. Thermal Insulating Value: 'R' factor 11 at Foam Core.

3. Construction:

a. Core: Resin impregnated End Grain Balsa Wood, Polypropylene Honeycomb, or polyurethane foam.

b. Door Plates: Molded in one continuous piece, resin reinforced with hand-laid glass

fiber mat, nominal 1/8 inch (3 mm) thick, minimum 25 mil gel-coated surface.

c. Door Edges: Fiberglass mat reinforced, nominal 3/8 inch (9.5 mm) thick, machine tooled resin rich FRP matrix.

4. Sizes: Indicated on drawings.

B. Non-rated Fiberglass Frames:

1. Construction: One-piece pultruded fiberglass reinforced plastic, minimum 1/4 inch wall thickness, jamb-to-head joints mitered and reinforced with FRP clips and stainless steel fasteners; conforming to SDI requirements for performance equivalent to 16 gage steel frames.

2. Frame profile: 5-3/4 inches (146 mm) deep, 2 inches (51 mm) wide face; double rabbeted with 5/8 inch (16 mm) high stop.

3. Sizes: Indicated on drawings.

C. Louvers in Non-rated Doors:

1. Construction: Molded solid vanes; pultruded fiberglass reinforced plastic construction.

2. Sizes: Indicated on drawings.

D. Door Hardware: Specified Section 08 71 00.

2.4 FABRICATION

A. Fiberglass Reinforced Plastic (FRP) Doors:

1. Minimum glass fiber to resin ratio: 35 percent.
2. Mortise for lockset, and recess for strike plate in lock stile.
3. Embed steel reinforcement for hinges in fiberglass matrix; provide for hinge leaf recesses in hinge stile.

B. Fiberglass Frames:

1. Mortise for lock strike, and recess for strike plate in lock jamb.
2. Reinforce for hinges and other indicated hardware.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive work and opening dimensions and clearances are as indicated on approved shop drawings. Do not begin installation until openings have been properly prepared.

B. If opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Acclimate doors and frames to site conditions for a minimum of 24 hours before installation.

B. Do not remove labels from fire-rated doors and frames.

3.3 INSTALLATION

A. Install door opening assemblies in accordance with approved shop drawings, SDI 100, and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.

B. Use anchorage devices to securely fasten sliding door assembly to wall construction without distortion or imposed stresses.

C. Coordinate installation of thermal insulation at shim spaces at frame perimeter.

D. Installation of door hardware is specified in Section 08 71 00.

E. Install door hardware in accordance with manufacturer's printed instructions, using through-bolts to secure surface applied hardware.

F. Site Tolerances: Maintain plumb and level tolerances specified in manufacturer's printed installation instructions.

3.4 ADJUSTING

- A. Adjust doors in accordance with door manufacturer's maintenance instructions to swing open and shut without binding, and to remain in place at any angle without being moved by gravitational influence.
- B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions.

3.5 CLEANING

- A. Clean surfaces of door opening assemblies and sight-exposed door hardware in accordance with manufacturer's maintenance instructions.
- B. Remove labels and visible markings.

3.6 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

S

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, suitable for exposed applications.
- B. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, free of scale, pitting, or surface defects.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, G60 (Z180) or A60 (ZF180).
- D. Frame Anchors: Hot Dip-galvanized.

2.2 HOLLOW METAL DOORS

- A. Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated, 1-3/4 inches (44 mm) thick unless otherwise indicated.
 - 1. Exterior Doors: Level 3 and Physical Performance Level A (Extra Heavy Duty) Model 2 (Seamless), metallic-coated steel sheet faces. Provide Top cap closure. Coordinate door panel size to provide a 1/4 inch maximum gap between door bottom and the threshold.
 - 2. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets.
 - 3. Thermal-Rated (Insulated) Doors: Where indicated, provide doors with thermal resistance value (R Value) of not less than R-7 when tested according to ASTM C 1363.
- B. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.
 - 1. Steel Sheet Thickness for Exterior Doors: 16 gauge.
 - 2. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
 - 3. Frame Anchors: Not less than 0.042 inch thick.
- C. Prepare doors receive mortised and concealed hardware according to ANSI A250.6 and ANSI A115 Series standards.

- D. Reinforce doors to receive surface-applied hardware.
- E. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install hollow metal frame to comply with ANSI/SDI A250.11
- B. Coordinate with aluminum frame supplier and install doors to provide clearances between doors and frames as indicated in ANSI/SDI A250.11.
- C. 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. Use galvanizing repair paint for metallic coated surfaces.
- D. Note: Hollow Metal door will receive high performance coating.

END OF SECTION 08 11 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and color Samples.

PART 2 - PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Basis of Design for Window frame: Kawneer 225 TL IsoLock, at fixed window condition.
- B. Accessible Entrances: Comply with ICC/ANSI A117.1.
- C. Performance Requirements:
 - 1. Limit deflection of framing members normal to wall plane to 1/175 of clear span for spans up to 13 feet 6 inches
 - 2. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or 1/8 inch, whichever is smaller.
 - 3. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.
 - 4. Air Infiltration: Limited to 0.06 cfm/sq. ft. of system surface area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
 - 5. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- D. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated; ASTM B 209 sheet; ASTM B 221 (ASTM B 221M) extrusions.
- E. Glazing: As specified in Division 08 Section "Glazing."
- F. Doors: See Section 08 11 13 Hollow Metal Doors
- G. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.
- H. Fabrication: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as

required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

1. Door Framing: Reinforce to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
- I. Aluminum Finish: Fluoropolymer two-coat coating system complying with AAMA 2604.
- J. Weather-strip: Provide standard weather-strip compatible with aluminum framing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer, or by applying sealant or tape recommended by manufacturer.
- B. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- C. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.
- D. Install framing components true in alignment with established lines and grades to the following tolerances:
 1. Variation from Plane: Limit to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
 2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.5 mm). For surfaces meeting at corners, limit offset to 1/32 inch (0.8 mm).
 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).
- E. Coordinate frame preparation with hollow metal door supplier and hardware requirements.

END OF SECTION 08 41 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Hardware schedule and keying schedule.
- B. Deliver keys to Owner.

PART 2 - PRODUCTS

2.1 HARDWARE

- A. Hinges:
 - 1. Basis of Design: Hager Co. BB1168 Heavy Weight Ball Bearing full mortise 630 stainless steel.
 - 2. Stainless-steel hinges with stainless-steel pins.
 - 3. Nonremovable hinge pins for exterior and public interior exposure.
 - 4. Ball-bearing hinges for doors with closers and entry doors.
 - 5. 3 hinges for 1-3/4-inch- (45-mm-) thick doors 90 inches (2300 mm) or less in height; 4 hinges for doors more than 90 inches (2300 mm) in height.
 - 6. Continuous stainless-steel hinges on all FRP doors
- B. Locksets and Latch sets:
 - 1. L-1 Schlage L Series Mortise
 - 1 Lock Grade 1
 - 2 Function: Store Room, outside lever is always locked, latchbolt retracted by key on exterior and always openable from interior by turning lever.
 - 3 Lever Style 03 with Neuschtscheon.
 - 4 Finish 630 – Satin Stainless Steel.
 - 2. L-2 Same as L-1
 - 1 Function: Classroom lath bolt retracted by lever either side. Locked by key on exterior. Inside always free for egress. Door cannot be locked from inside.
 - 3. L-3 Schlage L400 Series Auxillary Lock
 - 1 Function: L9462 Classroom lock deadbolt thrown or retracted by key on exterior, interior – thumb turn retracts dead bolt but cannot project it.
 - 2 Finish 630 Satin Stainless Steel
 - 3 Inside Trim Thumbturn: E2 Turn L583-363 Disability.
- C. Key locks to Owner's master-key system.
 - 1. Cylinders with six-pin tumblers.

D. Closers:

1. Mount closers on interior side (room side) of door opening. Provide regular-arm, parallel-arm, or top-jamb-mounted closers as necessary.
2. Adjustable delayed opening (accessible to people with disabilities) feature on closers.
3. Basis of Design: LCN 4000 Series
 - 1 Model 4040XP with Cush-N-Stop feature. Mount closer on interior face of door panel.
 - 2 Finish: Painted Black.

E. Provide wall stops for doors without closers.

F. Push-Pull plates:

- 1 Basis of Design: Ives
 - a) 8200 Push Plate 8x16; Finish: 630 Stainless Steel
 - b) 8302 Pull Plate 4x16 with 8102 Pull 10" centers; Finish: 630 Stainless Steel

G. Protection Plates:

- 1 Basis of Design: Ives
 - a) 8400 Series Kick plate 10" high; Finish: 630 Stainless Steel, locate on push side of door.

H. Weather Strip:

1. Thresholds: Basis of Design: Reese #212555 Mill Stainless Steel. 1/2"x5" profile.
2. Sweep: Basis of Design: Reese #701 C Clear anodized aluminum with polyurethane.
3. Weather Strip: Aluminum Frame condition I supplied by aluminum frame supplier
Hollow Metal frame: Basis of Design: Reese 775 C Clear anodized aluminum with polyurethane insert.

I. Electric Strike:

1. Von Duprin 6211 heavy-duty electric rim strike, 24 volt and all necessary conduit and wiring back to control panel in Mechanical Room for complete system

J. Push Pads:

1. Von Duprin 98/99 series high-performance heavy-duty push pads

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware in locations recommended by the Door and Hardware Institute unless otherwise indicated.

3.2 HARDWARE SCHEDULE

- A. Hardware Set No. HS-1 (toilets 102. 103):
 - 1. Stainless-Steel Continuous Hinges.
 - 2. Pull Plates
 - 3. Lock L-3
 - 4. Lock L-2
 - 5. Kick Plate (Push Side)
 - 6. Closer
 - 7. Threshold
 - 8. Door Sweep
 - 9. Weather-strip (By Aluminum Frame Supplier)
 - 10. Electric strike
 - 11. Push pads

- B. Hardware Set No. HS-2 (Exterior Door to Mechanical 101):
 - 1. Stainless-Steel Continuous Hinges.
 - 2. Pull Plates
 - 3. Lock Set L-2
 - 4. Closer
 - 5. Kick Plate (Push Side)
 - 6. Threshold
 - 7. Door Sweep
 - 8. Weather-strip (By Aluminum Frame Supplier)

- C. Hardware Set No. HS-3 (Interior Door to Mechanical 101):
 - 1. Hinges.
 - 2. Lock L-1
 - 3. Threshold
 - 4. Door Sweep
 - 5. Weather-strip – for Hollow Metal Frame

END OF SECTION 08 71 00

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SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and 12-inch- square Samples.
- B. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.
- C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
 - 1. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 2. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 3. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3.
- B. Tempered Patterned Glass: ASTM C 1048, Kind FT (fully tempered), Type II, Class 1 (clear), Form 3; Quality-Q6. Provide frosted finish, frost finish to be interior.

2.2 INSULATED-GLASS TYPES

- A. Glass Type [GL-1]: Low-E coated tempered insulated glass unit. Basis of Design: PPG solarban 60
 - 1. Overall Unit Thickness: 1" with each glass lite: 1/4"
 - 2. Outboard glass: Fully tempered with frosted finish on #2 surface.
 - 3. Interspace Content: Argon
 - 4. Inboard Glass: Fully tempered with low-E coating on #3 surface.
 - 5. Winter night time U-Factor, 29 Max

6. Summer Daytime: U-Factor 27 Max
7. Solar Heat Gain Coefficient: 38 Max

2.3 GLAZING SEALANTS

- A. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."
- B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 08 80 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PANEL PRODUCTS

- A. Provide in maximum lengths available to minimize end-to-end butt joints.
- B. Water-Resistant Gypsum Ceiling Board (toilet Rooms 102 & 103): ASTM C 630/C 630M or ASTM C 1396/C 1396M, in thickness indicated. Regular type unless otherwise indicated.
- C. Cementitious Backer Units: ANSI A118.9. (Mechanical 101 Ceiling)

2.2 ACCESSORIES

- A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.
 - 1. Provide cornerbead at outside corners unless otherwise indicated.
 - 2. Provide LC-bead (J-bead) at exposed panel edges.
 - 3. Provide control joints where indicated.
- B. Joint-Treatment Materials: ASTM C 475/C 475M.
 - 1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
 - 2. Joint Compounds: Use setting-type compounds at exterior soffits.
 - 3. Cementitious Backer Unit Joint-Treatment Materials: Products recommended by cementitious backer unit manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install gypsum board to comply with ASTM C 840.

1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
 2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.
- B. Install cementitious backer units to comply with ANSI A108.11.
- C. Finishing Gypsum Board: ASTM C 840.
1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
 2. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
- D. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

END OF SECTION 09 29 00

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

- A. Single Source Responsibility-Obtain primary resinous floor materials including hardening agents, finish or sealing coats from a single manufacturer with not less than 5 years of successful experience in manufacturing and installing the principal materials described in this section. Provide secondary materials only of type and from a source recommended by the manufacturer of the primary material.
- B. Manufacturer Supervision: A representative of the materials manufacturer shall be present on site periodically for all phases of the installation of the specified coating materials. A minimum of one (1) visit for every 1000 square feet of application is required.
- C. Application Bond Testing: The manufacturer shall conduct bond testing of the materials a minimum one (1) of every 1000 square of application and document acceptability to manufacturer.
- D. Flooring supplier is to conduct moisture testing of the concrete floor slab – 1 per 1000 sf of floor or at least 1 per room whichever is more. Test as per flooring manufactures recommendation. Provide owner and architect written results and test process. Provide flooring manufacturers acceptable moisture limits to compare with test results.
- E. Core Sampling: At the discretion, direction and expense of the Division of State Facilities, core sampling may be required by the contractor and/or manufacturer.

1.2 SUBSTITUTIONS

- A. Contractors, applicators, or manufacturers that do not meet the requirements of the Bidding Requirements or this section must submit their requests for approval to the Architect for review a minimum of 14 days prior to bid opening. Any requests subsequent to that date will not be considered. Approved substitutions will be included in addendum only.

1.3 SUBMITTALS

- A. Submittals required prior to contract award:
 - 1. Letter of training certification from the manufacturer/distributor stating that contractor is an approved installer of the products specified in this Section.
 - 2. Submit written description of experience illustrating conformance with the Letter of Solicitation – Contractor Qualifications, include project Owners, contact names, and phone numbers.

3. Submit resumes on key personnel who will be performing the actual work.
4. Submittals shall be delivered to Project Manager prior to or at Pre-Construction Conference and shall include at a minimum:
 - a. Submit three (3) copies and (1) digital copy of manufacturer's product literature indicating technical data including accessory materials.
 - b. Submit three (3) copies of manufacturer's installation and application guide.
 - c. Submit three (3) copies of manufacturer's color palatte for agency color selection.
 - d. Submit three (3) samples of finished product on 12 inch by 12 inch (12" x 12")
 - e. Submit three (3) copies of manufacturer's Material Safety Data Sheets.
 - f. Construction Submittals: One (1) digital of application bond test or core test results to Architect within seventy-two hours of test.

1.4 REFERENCES

- A. References: Cited Standards are incorporated herein by reference and govern the work Pamphlet No. 03732, International Concrete Repair Institute, (Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays).

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials: Deliver materials to project site with labels legible and intact.
- B. Include and maintain labels on containers displaying the following information: Manufacturer's name, Product name, Product number, Color, Instructions for reducing (where applicable) and Component description
- C. Storage of materials: Bulk, prolonged storage of materials at application location will not be allowed. See General Requirement, Special Site Conditions for further requ
- D. irements.

1.6 JOB CONDITIONS

- A. Environmental requirements
 1. Comply with manufacturer's recommendations as to environmental conditions under which floor-coating systems can be applied.
 2. Do not apply flooring system at temperatures beyond those limits stated in the manufacturer's technical data sheet unless given written permission by the manufacturer.
 3. Do not apply flooring system in areas where dust or other airborne particulate matter is being generated.
 4. Protection: Cover or otherwise protect finished work of other trades and surfaces not being coated concurrently or not to be coated.

1.7 WARRANTY

- A. Provide written manufacturer's (NDL) no-dollar-limit warranty covering coating system workmanship of the coating and other system components supplied by the manufacturer for a period of three (3) years from date of installation.

Note: Warranty may not contain clause(s) voiding warranty due to contractor solvency, improper workmanship, contractor error, or contractor failure to follow manufacturer specification(s) and requirements to obtain the warranty requested by this project.

PART 2 – PRODUCTS

2.1 FLOORING SYSTEM

- A. Description: Medium to heavy duty, minimum 1/8" base overall thickness with integral cove base, slip resistant, aggregate filled, 100% solids epoxy flooring system, including, antimicrobial treatment, and urethane coat finish as follows:
- B. System Materials:
 - 1. Finish areas designated by Architect.
 - 2. Broadcast Coats: 100% Solids, two (2) epoxy resin coats, 1/16" including color pigments and minimum 1/8" thickness
 - 3. Aggregate: Color Granules. Color: As selected by Architect from Full Unicors Palette
 - 4. Topcoat: 95% solids minimum, urethane resin topcoat complying with the American with Disabilities Act coefficient of friction with necessary anti-slip resistance additives and a minimum thickness of 15 mils.
 - 5.
- C. Approved Manufactures:
 - 1. Dur-A-Flex, Inc
 - 2. (Dur-A-Flex Accelera-HQ)
- D. Colors: Colors shall be selected by the Architect from manufacturer's full palette of colors.
- E. Mixing: Comply in strict accordance with manufacturer's requirements for mixing and handling of all materials.
- F. Do not apply any material that has exceeded shelf and pot life as determined by manufacturer.

2.2 MISCELLANEOUS MATERIALS

- A. Grouts / Mortars: Polymer Modified, Cementitious Patch, capable of feather edge application and as approved by the flooring system manufacturer for use within their system.

- B. Sealants: Epoxy sealants as approved for use by this manufacturer. Metal low profile transition strips: 304 stainless steel transition strip.

PART 3 - EXECUTION

3.1 INSPECTION

- A. General: The Contractor and Manufacturer shall take sole responsibility for review and determination of the job conditions prior to application of any products.
- B. Selected resinous floor system shall be applied over concrete slab, ground to profile as recommended by the selected manufacturer. Prior to system application, the concrete surface shall be free of laitance, form release agents, curing agents, oil, grease and other contaminants. Surface shall be free of fins, projections, and loosely adhering concrete, dirt and dust particles.
- C. Examine surfaces scheduled to receive coating for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included herein.
- D. Notify Architect immediately upon determination that surfaces to receive coating are unacceptable for proper adhesion or subsequent performance.
- E. Do not proceed with surface preparation or coating application until conditions are suitable.

3.2 PREPARATION OF SURFACES

- A. General: Concrete surfaces shall be free of visible moisture, oil, grease, curing
- B. compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products, or any other contaminants that will affect long term adhesion of the flooring system.
- C. Moisture Content: Strictly comply with the manufacturer's requirements for evaluation / testing of moisture content. Under any circumstances, do not apply high performance floor coatings to floor slabs that exceed 5 percent moisture content or 3 pounds per 1,000 square feet per 24 hours per ASTM F 1869 Moisture Vapor Emission Rate.
- D. Other Contamination: Conduct Litmus Test for pH to determine the presence of chloride or acid is within the limits of the manufacturer's requirements.
- E. Miscellaneous Repair Work:
- F. Complete all concrete crack, spalling, deterioration, or damage as required by manufacturer to achieve approved surface for application.
- G. Install new, floor to wall cants and prep wall base to receive covered resinous base up 6", provide straight even top edge.

3.3 APPLICATION

- A. General Requirements: Comply in strict accordance with manufacturer's requirements application of all materials including but not limited to moisture content, pH balance, environmental requirements, means and methods.
- B. Install low profile transition strip at each point of resinous floor finish termination.

3.4 INSPECTIONS

- A. Architect and/or Owner shall review work of this section for visual and textural acceptability only. Said review of finished surfaces will be made at the discretion of the Architect and/or Owner prior to occupancy of Agency.
- B. The Contractor and Manufacturer are solely responsible for quality assurance, application compliance, means and methods.

3.5 FINISHED WORK

- A. Damage to finished surfaces caused by other than coating contractor shall be repaired to acceptable condition by coating contractor under cost reimbursement by GC if damage occurs prior to occupancy.
- B. The Contractor shall refinish, repair, or replace areas where any portion of finish has been damaged or is not acceptable. If refinish, repair, or replacement of any area does not produce uniformity of overall function, performance, appearance or texture of the system, it is at the discretion of the Owner to require rework.

3.6 CLEANING

- A. Remove debris promptly from work area and dispose of properly. Cleaning is to be done daily.
- B. Remove spilled, splashed or splattered coating materials from all surfaces. Do not mar surface finish of items being cleaned.
- C. Clean existing building components within the limits of the work area including but not limited to walls, ceilings, fixtures, and floors resulting release of dust or debris from floor preparation activities.
- D. See General Requirements, Cleaning and Disposal for further requirements.

END OF SECTION 09 67 23

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SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals:
 - 1. Product Data. Include printout of MPI's "MPI Approved Products List" with product highlighted.
 - 2. Samples.
- B. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.
- C. Extra Materials: Deliver to Owner 1 gal. (3.8 L) of each color and type of finish coat used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS

- A. Products:
 - 1. Tnemec: Company Incorporated
- B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."
- C. Material Compatibility: Provide materials that are compatible with one another and with substrates.
 - 1. For each coat in a system, provide products recommended in writing by manufacturers of topcoat for use in system and on substrate indicated.
- D. Colors: As selected by Architect from manufacturers full line.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

- B. Remove hardware, lighting fixtures, and similar items that are not to be coated. Mask items that cannot be removed. Reinstall items in each area after coating work is complete.
- C. Clean and prepare surfaces in an area before beginning coating work in that area. Schedule work so cleaning operations will not damage newly coated surfaces.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

3.2 APPLICATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Coat exposed surfaces, new unless otherwise indicated.
 - 1. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.
 - 2. Coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat the back side of access panels.
 - 4. Do not coat prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.
- C. Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use brushes only where the use of other applicators is not practical.
- D. Apply high-performance coatings 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.
 - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform finish, color, and appearance.

3.3 EXTERIOR COATING APPLICATION SCHEDULE

- A. Steel:
 - 1. Gloss Epoxy Coating System: Two coat(s) over epoxy primer: MPI EXT 5.1F.
- B. Galvanized Metal:
 - 1. Gloss Epoxy Coating System: Two coat(s) over epoxy primer: MPI EXT 5.3C.

3.4 INTERIOR COATING APPLICATION SCHEDULE

- A. Concrete Masonry Units:
 - 1. Water-Based Epoxy Coating System: Two coat(s) over latex block filler: MPI EXT 4.2J.

- B. Steel:
 - 1. Water-Based Epoxy Coating System: Two coats over primer: MPI INT 5.1E.

- C. Gypsum Board:
 - 1. Water-Based Epoxy Coating System: Two coats over primer: MPI INT 9.2F.

END OF SECTION 09 96 00

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1 **SECTION 099601 – MASONRY WEATHER SEAL AND GRAFFITTI BLOCK**

2 **PART 1 - GENERAL**

3 **1.1 SCOPE**

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

6 **1.2 SUMMARY**

- 7 A. This Section includes the following:

8 1. Commercial masonry sealant and graffiti coating for exposed Masonry.

- 9 B. Related Sections include the following:

10 1. Section 99700: Coatings for Masonry

11 **1.3 SUBMITTALS**

- 12 A. Product Data: Include construction and installation details, material descriptions, dimensions of
13 individual components and profiles, and finishes.

- 14 B. Warranty: Special warranty specified in this Section.

- 15 C. ANSI: Upon request by A/E, provide hardware manufactures' letters of compliance that their
16 products meet specified ANSI standards and that they have been tested and meet grades
17 specified.

18 **1.4 QUALITY ASSURANCE**

- 19 A. General: Products have been specified by manufacturer's name, brand, and catalog numbers for
20 the purpose of establishing a basis for quality, finish, design, and operational function.

- 21 B. Supplier Qualifications: Supplier furnishing products in the vicinity for a period of not less than 5
22 years. This supplier shall have experience in the preparation of architectural coatings
23 specifications, estimating, detailing, ordering, servicing of architectural products in all its branches
24 and will be available at reasonable times during the course of the work for project hardware
25 consultation to the Owner, A/E, and GC.

- 26 C. Supplier's principal office shall be located within a 100 mile radius of the Project Site.

- 27 D. Prepare a **Test Area**: in agreed upon location, a minimum 4ft by 4ft area on each type of masonry.
28 Use the manufacturer's application instructions. Let protective treatment test area cure before
29 inspection. Keep test panels available for comparison throughout the protective treatment project.

30 **1.5 DELIVERY, STORAGE, AND HANDLING**

- 1 A. The GC or contractor of his choice will receive the products when delivered at the job site. A dry
2 locked storage space complete with shelving, will be provided for the purpose of unpacking,
3 sorting out, checking and storage.
- 4 B. Direct factory shipments to the job site not acceptable. Promptly replace items damaged in
5 shipment with proper material without additional cost.
- 6 C. Handle product in a manner to minimize damage.

7 **1.6 OWNERS INSTRUCTIONS**

- 8 A. Upon completion of hardware installation, assist the GC in instructing Owner in maintenance of
9 all products and other work of this Section.

10 **1.7 WARRANTY**

- 1 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace
defective product
- 11 1. Failures include, but are not limited to, the following:
 - 12 a. Structural failures including excessive cracking, fading, peeling, etc.
 - 13 b. Deterioration of finish from UV exposure or Graffiti removal process.

14

15 **PART 2 - PRODUCTS**

16 **2.1 MASONRY SEALANT AND GRAFFITI CONTROL COATING**

17

18 **2.2 MANUFACTURER;**

- 19 A. PROSCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone (800) 255-4255; Fax (785)
20 830-9797. E-mail: CustomerCare@proscocom

- 21 **2.3 PRODUCT DESCRIPTION;** *Sure-Klean® Weather Seal Blok-Guard® & Graffiti Control II* is a
22 clear-drying, water-based silicone emulsion for weatherproofing concrete block and other porous
23 masonry materials and protecting them from graffiti attacks without altering the natural
24 appearance. *Blok-Guard® & Graffiti Control II* is appropriate for interior and exterior use. *Blok-*
25 *Guard® & Graffiti Control II* is easy to apply with low-pressure spray, brush or roller, and protects
26 exterior walls exposed to normal weathering. Graffiti removal from treated surfaces is fast and
27 easy using Defacer Eraser® Graffiti Wipe.

- 1 A. TYPICAL TECHNICAL DATA:
- 2 1. FORM: Milky white liquid
 - 3 2. SPECIFIC GRAVITY: 1.00
 - 4 3. pH: n/a
 - 5 4. WEIGHT / GALLON: 3.82 LBS
 - 6 5. ACTIVE CONTENT: 6 %
 - 7 6. TOTAL SOLIDS: 6% ASTM D 5095
 - 8 7. FLASH POINT: greater than 212 degrees F (>100 degrees C)
 - 9 8. FREEZE POINT: 32 degrees F (0 degrees C)
 - 10 9. SHELF LIFE: 1-year in tightly sealed, unopened container
 - 11 10. VOC CONTENT: less than 20g/L, Low Solids Coating. Complies with all known federal,
12 state and district AIM VOC Standards.
- 13 B. LIMITATIONS:
- 14 1. Not suitable for extremely dense or polished surfaces.
 - 15 2. Not appropriate for application to asphaltic or painted surfaces.
 - 16 3. Not suitable for application to synthetic resin paints, gypsum, plaster or other non-masonry
17 surfaces.
 - 18 4. Not recommended for below-grade applications.
 - 19 5. Will not prevent water preparation through structural cracks, defects, or open joints.
 - 20 6. May darken or enhance the natural color of some surfaces. Always protect.
 - 21 7. Not recommended for horizontal surface.

22 PART 3 - EXECUTION

- 23 3.1 **APPLICATION:** Before applying, read "Preparation" and "Safety Information" sections in the
24 Manufacturer's Product Data Sheet for *Weather Seal Blok-Guard® & Graffiti Control II*. Refer to
25 the Product Data Sheet for additional information about application of *Blok-Guard® & Graffiti*
26 *Control II*. Do not dilute or alter.
- 27 For Best results, apply *Blok-Guard® & Graffiti Control II* "wet-on-wet" to a visibly dry and absorbent
28 surface.
- 29 A. SPRAY:
- 30 1. Using low-pressure (<50 psi) spray equipment, saturate, "wet-on-wet" spraying from the
31 bottom up. Avoid excessive overlapping. *For textured and porous surfaces*, apply enough
32 material to create 6 to 8 inch rundown below the contact point.
 - 33 2. Let first application penetrate masonry surface for 2 to 3 minutes. *For textured and porous*
34 *surfaces*, reapply in same saturating manner to ensure complete coverage of recessed
35 surfaces.
 - 36 3. Immediately brush out runs and drips to prevent build-up.
- 37 B. BRUSH or ROLLER APPLICATION: Saturate uniformly. Let product penetrate for 2-3 minutes.
38 Re-saturate. Brush out heavy runs and drips that don't penetrate.
- 39 C. DENSE, SMOOTH SURFACE APPLICATION: Apply a single coat. Use enough to completely
40 wet the surface without creating drips, puddles or rundown. Do not over apply. Test for
41 application rate.
- 42 D. SECOND COAT / POROUS SURFACES APPLICATION: Some surfaces will need an additional
43 coat of *Blok-Guard & Graffiti Control II* for maximum protection. Apply the second wet-on-wet coat

1 as soon as the first application is dry to the touch or within one hour. Allowing more than one
2 hour between coats could reduce the effectiveness of the second coat or cause darkening.

3 3.2 **DRYING TIME:** In normal weather (60-80 degrees F; [16-27 degrees C] 50% humidity), Blok-
4 Guard® & Graffiti Control dries to the touch in about 1 hour. Drying takes longer at lower
5 temperatures.

6 Blok-Guard & Graffiti Control gains its weather repellency properties in 24 hours. Protect treated
7 surfaces from rain for at least 6 hours after application.

8 3.3 **CLEANUP:** Clean tools, equipment and over-spray with soap and warm water. Cleanup is more
9 difficult from surfaces hotter than 95 degrees F (35 degrees C).

10 3.4 **GRAFFITI REMOVAL:** Remove most types of graffiti with PROSCO'S Defacer Eraser® Graffiti
11 Wipe or Enviro Klean® SafStrip®. See product literature or call Customer Care at 800-255-4255.

12 **3.5 BEST PRACTICES:**

13 A. Surface should be clean, dry and absorbent before application.

14 B. Clean soiled surface with the appropriate Sure-Klean® or Enviro-Klean® cleaner before
15 application. Call Customer Care at 800-255-4255 for recommendations.

16 C. Preferred method of application is low-pressure (<50 psi) spray equipment. Use fan-type spray
17 tip and adjust pressure to avoid atomization of the material.

18 D. Apply evenly. Saturate the surface but do not over apply. Brush out runs and drips.

19 E. On dense surfaces, follow the "Dense Smooth Application Instructions" on page 2.

20 F. A second application may be needed on highly porous masonry. Apply the second coat within
21 one hour or as soon after the first is dry to the touch.

22 G. ALWAYS TEST for best coverage rates and confirm results before overall application. Test using
23 the application instructions included herein. Let the test area dry thoroughly before inspection.

24 H. Never go it alone. If you have problems or questions, contact your local PROSCO distributor or
25 field representative. Or call PROSCO Technical Customer Care Center, toll-free, at 800-255-
26 4255.

27 **PART 4 - SAFETY INFORMATION:** Sure Klean® Weather Blok-Guard® Graffiti Control II is a water
28 carried product. Use appropriate safety equipment and job site controls. Read the full label and MSDS for
29 precautionary instructions before use.

30 A. **FIRST AID: 24 Hour Emergency Information – INFOTRAC at 800-535-5053**

31 1. Ingestion: Call a physician, emergency room or poison control center immediately. Do not
32 induce vomiting. If vomiting occurs, keep victims head lower to avoid aspiration. Get medical
33 assistance.

- 1 2. Eye Contact: Rinse thoroughly for 15 minutes. Get immediate medical assistance.
- 2 3. Skin Contact: Remove contaminated clothing and rinse thoroughly for 15 minutes. Seek
- 3 medical assistance in persistent irritation develops. Launder contaminated clothing before reuse.
- 4 4. Inhalation: Seek medical attention if irritation develops. If you experience dizziness or nausea,
- 5 get to fresh air. Seek medical assistance if symptoms persist.

END OF SECTION 09 96 01

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and Samples.
- B. Regulatory Requirements: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PART 2 - PRODUCTS

- A. Exterior signage for restrooms.
 - 1. Acrylic panels matte-finished. Provide solid general contrasting color to the white letters and graphic symbols.
 - 2. Provide sign for:
 - a. MEN (include both a male graphic and accessible symbol above letters and braille under letters)
 - b. WOMEN (include both a female graphic and accessible symbol above letters and braille under letters)
 - c. Letters to be 3/4" Arial font.
 - d. Male and Female Graphic to be +- 5" tall
 - e. Accessible symbol +- 4" tall
 - f. Braille to comply with ADA regulations.
 - 3. Finishes and Colors: As selected from manufacturer's full range
- B. Address numbers.
 - 1. Brass or aluminum powder coated black.
 - a. Letters to be 6" tall Arial font. (or eq)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate signs where indicated or directed by Architect. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
- B. Wall-Mounted Signs:
 - 1. Mechanical Fasteners: Use non-removable stainless steel mechanical fasteners placed through predrilled holes.
 - 2. Locate signs to comply with ADA regulations.

END OF SECTION 10 14 00

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SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and Samples.
- B. Regulatory Requirements: Comply with ICC/ANSI A117.1 for toilet compartments designated as accessible.

PART 2 - PRODUCTS

2.1 TOILET COMPARTMENTS AND SCREENS

- A. Products:
 - 1. Basis of Design: Bradley Phenolic-Series 700 High density polyethylene (HDPE)

2.2 MATERIALS

- A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface and with minimum 1-inch- (25 mm-) thick doors and pilasters and minimum 1-inch- (25 mm-) thick panels and screens.
 - 1. Color: As selected by Architects from manufactures line.
- B. Pilaster Shoes and Sleeves (Caps): Stainless steel not less than 4 inches high.
- C. Brackets: Continuous.
 - 1. Material: Stainless steel

2.3 FABRICATION

- A. Toilet Compartments: Floor and ceiling anchored.
- B. Urinal Screens: Wall hung.
- C. Doors: Unless otherwise indicated, 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.

- D. Door Hardware: Stainless steel. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
1. Hinges: Continuous type, adjustable to hold door open at any angle up to 90 degrees.
 2. Latches and Keepers: Surface-mounted unit designed for emergency access and with combination rubber-faced door strike and keeper.
 3. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
 4. Door Pull: Provide at out-swinging doors. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units rigid, straight, level, and plumb, with not more than 1/2 inch (13 mm) between pilasters and panels and not more than 1 inch (25 mm) between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sleeve nuts for through-bolt applications.
1. Stirrup Brackets: Align brackets at pilasters with brackets at walls. Locate full length continuous wall brackets level and square so holes for wall anchors occur in masonry or tile joints.
 2. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

END OF SECTION 10 21 13

SECTION 10 28 00 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, ASTM B 16 (ASTM B 16M), or ASTM B 30.
- C. Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063-T6 or 6463-T6.
- D. Sheet Steel: ASTM A 1008/A 1008M, 0.0359-inch (0.9-mm) minimum nominal thickness.
- E. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 (Z180).
- F. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.2 TOILET AND BATH ACCESSORIES

- A. Toilet Tissue Dispenser:
 - 1. Basis-of-Design Product: Royce Rolls Ringer Co. Model # STP
 - 2. Type: Double-roll dispenser with paddle lock feature.
 - 3. Mounting: Surface mounted with concealed anchorage
 - 4. Material: Stainless steel.
 - 5. Operation: Controlled delivery
 - 6. Capacity: Designed for 4-1/2- or 5-inch- diameter-core tissue rolls.
- B. Liquid-Soap Dispenser:
 - 1. (Supplied by Owner installed by Contractor.)
- C. Grab Bar:
 - 1. Material: Stainless steel, 0.050 inch (1.3 mm) thick.

2. Mounting: Concealed.
3. Gripping Surfaces: Smooth, satin finish.
4. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications.

D. Sanitary Napkin Disposal Unit:

1. Basis-of-Design Product: Royce Rolls Ringer Co. Model # SNR
2. Mounting: Surface.
3. Material: Stainless steel, No. 4 finish (satin).
4. Door or Cover: Self-closing.
5. Receptacle: Removable.

E. Mirror Unit:

1. Basis-of-Design Product: Royce Rolls Ringer Co. Stainless-Steel Mirror set in tamper-proof stainless-steel frame size as indicated on drawings.

F. Warm-Air Dryer:

1. Basis-of-Design Product: Excel Model HO-1W
2. Type: Electronic-sensor activated.
3. Mounting: Surface.
4. Material: Steel, with white epoxy finish

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
1. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.
- B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 10 28 00

1 **SECTION 22 00 00 - PLUMBING**

2
3
4 **PART 1 - GENERAL**

5
6 **1.01 DESCRIPTION**

7
8 A. Work Included: Provide plumbing where shown on the Drawings, as specified herein, and as
9 needed for a complete and proper installation including, but not necessarily limited to:

- 10
11 1. Domestic Hot and Cold Water Piping.
12 2. Drain, Waste, and Vent Systems.
13 3. Plumbing Fixtures and Trim.
14 4. Lake Water Filter Piping.
15

16 B. Related Work:

- 17
18 1. Documents affecting work of this Section include, but are not necessarily limited to,
19 General Conditions, Supplementary Conditions, and Sections in Division 1 of these
20 Specifications.
21 2. Demolition and deactivation of plumbing systems in existing facilities as noted on the Site
22 Drawings.
23

24 C. Work of Other Sections:

- 25
26 1. Openings for new Plumbing work in new construction walls, floors, roof, ceiling, etc. shall
27 be provided by the General Contractor. Location and size of these openings shall be the
28 responsibility of the Plumbing Contractor.
29 2. Electrical line voltage wiring (110 volts and greater) by the Electrical Contractor. Wiring
30 diagrams shall be furnished to the Electrical Contractor by the Plumbing Contractor.
31 3. Roofing, exterior wall and related exterior openings shall be caulked, sealed and patched
32 by the General Contractor.
33 4. Exterior site utilities by the Site Contractor - refer to Divion 33 requirements.
34

35 **1.02 GENERAL PROVISIONS**

36
37 A. This specification Section is a general description of the work requirements. The particular
38 descriptions are not intended to be all-inclusive. Bidders shall also refer to the Drawings.
39

40 B. Prior to submitting a bid, the Contractor shall call the Engineer's attention (in writing only) to any
41 materials or items of work believed to be inadequate. Bidders are required to visit the premises,
42 take measurements, inspect existing conditions and limitations, and obtain first hand information
43 necessary to submit a bid. The intent of the Contract is to obtain complete system installations,
44 tested, ready for operation. No extras will be allowed because Contractor's misunderstanding of
45 the scope work involved.
46

47 C. Everything essential for the completion of the work implied to be covered by these Specifications
48 to make the system ready for normal and proper operation must be furnished and installed by this
49 Contractor. Accordingly, any omission from either the plans or the Specifications, or both of
50 details necessary for the proper installation and operation of the system shall not relieve this
51 Contractor from furnishing such detail in full and proper manner.
52

53 D. The Drawings show various details indicating the general arrangement of the plumbing work,
54 sizes and locations of piping, equipment, etc. The said Drawings with figures, lettering, etc., shall
55 be considered a part of these Specifications and no charge or alternation shall be made in any
56 case unless ordered by the Engineer.
57

- 1 E. In addition to the Plumbing work, refer to the Plumbing work shown on the general Construction
2 Drawings of the building as being part of this Contract, unless specified to be done by other
3 contractors.
4

5 **1.03 QUALITY ASSURANCE**
6

- 7 A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the
8 necessary crafts and who are completely familiar with the specified requirements and the
9 methods needed for proper performance of the work of this Section.
10
11 B. Without additional cost to the Owner, provide such other labor and materials as required to be
12 complete the work of the Section in accordance, with the requirements of governmental agencies
13 having jurisdiction, regardless of whether such materials and associated labor are called for
14 elsewhere in the Contract Documents.
15
16 C. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for
17 lack of skill on the part of the Workmen.
18
19 D. For the actual field fabrication, installation and testing of the Plumbing work, use only thoroughly
20 trained and experienced workmen complete familiar with the items required and manufacturer's
21 current recommended methods of installation.
22

23 E. Reference Standards:
24

25	ANSI	American National Standards Institute
26	ASME	American Society of Mechanical Engineers
27	ASSE	American Society of Sanitary Engineering
28	ASTM	American Society of Testing and Material
29	AWWA	American Waterworks Association
30	CISPI	Cast Iron Soil Pipe Institute
31	FM	Factory Mutual
32	MCA	Mechanical Contractors Association
33	NEC	National Electric Code
34	NEMA	National Electrical Manufacturers Association
35	NFPA	National Fire Protection Association
36	NSF	National Sanitation Foundation
37	WQA	Water Quality Association

38

39 **1.04 CODES AND PERMITS**
40

- 41 A. This contractor must comply with building codes and other ordinances in force where the building
42 is located as far as same apply to his work.
43
44 B. Plumbing work shall meet all Federal, State, Local Codes, ordinances and utility regulations.
45
46 1. In the event of conflict between or among specified requirements and pertinent
47 regulations, the more stringent requirement will govern when so directed by the Engineer.
48
49 C. Plumbing Contractor must secure permits from proper offices and pay all legal fees as may be
50 necessary for fulfilling the requirements of these specifications.
51
52 D. Submit one (1) copy of all permits to the Owner.
53

54 **1.05 COORDINATION**
55

- 56 A. Cooperate and coordinate with other trades to assure that all systems pertaining to the Plumbing
57 work shall be installed in the best feasible arrangement. Coordinate as required with all other
58 trades to share space in common areas and to provide the maximum of access to each system.
59

- 1 B. Arrange plumbing work in neat, well organized manner with piping and similar services running
- 2 with primary lines of building construction, and with minimum of 8 foot overhead clearance, where
- 3 possible.
- 4
- 5 C. Locate equipment properly to provide easy access, and arrange entire plumbing work with
- 6 adequate access for operation and maintenance.
- 7
- 8 D. Give right-of-way to piping, which must slope for drainage.
- 9
- 10 E. Where Plumbing work is to connect to existing, the Contractor must field verify all connection
- 11 points before beginning any rough-in work. Verify gravity flow lines and proper invert elevations
- 12 required prior to starting piping installation.
- 13

14 **1.06 ELECTRICAL PROVISIONS OF PLUMBING WORK**

- 15
- 16 A. Line Voltage Wiring: The Electrical Contractor is to make all line voltage (100 volts and greater)
- 17 electrical wiring connections for hookup of the units and systems.
- 18
- 19 B. Low Voltage Control Wiring: Exposed low voltage (less than 100 volts) temperature control
- 20 wiring in connection with the Plumbing systems shall be in EMT conduit by the Plumbing
- 21 Contractor in strict accordance with the applicable sections of the Electrical Specifications.
- 22 Concealed low-voltage control wiring may be routed to equipment without conduit, unless subject
- 23 to physical damage.
- 24
- 25 C. The Plumbing Contractor shall consult with the Electrical Contractor before ordering electrical
- 26 motors, to ascertain correct electrical current characteristics. Plumbing Contractor shall furnish
- 27 complete list and location of equipment requiring electrical connections and necessary wiring
- 28 diagrams to the Electrical Contractor.
- 29
- 30 D. Motors: Where not otherwise indicated, comply with applicable provisions of the National
- 31 Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.
- 32
- 33 1. Phases and Current: 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-
- 34 start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA
- 35 rated 200 volt, three-phase, 60 cycle. Provide 2 separate windings on 2 speed three-
- 36 phase motors. Coordinate with actual current characteristics; refer to Division 16 of
- 37 Specifications.
- 38 2. High Efficiency Motors: All motors 1 HP and larger shall be high efficiency motors
- 39 meeting or exceeding values tested in accordance with IEEE Standards 112, Method B
- 40 procedures as stated in NEMA MG 1-12.53a.
- 41 3. Temperature Rating: Class B insulation for 70 degree C temperature rise.
- 42 4. Service Factor: 1.15 for three-phase; 1.35 for single-phase.
- 43 5. Construction: General purpose, continuous duty.
- 44 6. Frames: NEMA Standard for horsepower specified.
- 45 7. Overload Protection: Built-in thermal, with internal sensing device for stopping motor,
- 46 and for signaling where indicated.
- 47 8. Bearings: Permanently lubricated and sealed ball bearings.
- 48
- 49 E. Motor Starter & Disconnect Switches: Where motor starters and disconnect switches are
- 50 indicated to be an integral part of equipment furnished by Plumbing Contractor, they shall meet
- 51 requirements of Division 16 and shall be connected by the Electrical installer.
- 52
- 53 1. Field assembled motor starters and disconnect switches are to be the responsibility of
- 54 the Electrical Contractor, unless indicated otherwise.
- 55
- 56 F. Wiring Connections: Wired connections in flexible conduit, except where plug-in electrical cords
- 57 are indicated and permitted by governing regulations.
- 58
- 59 G. General Wiring: Comply with applicable provisions of Division 16 Section.

- 1
2 H. Drip Pans: Furnish drain pans below piping which passes directly above electrical work.
3 Install drain piping and drain valve.
4

5 **1.07 PAINTING PLUMBING WORK**
6

- 7 A. General: All field painting of plumbing equipment shall be done by the General Contractor,
8 unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.
9

- 10 B. All equipment shall be provided with factory-applied prime and final coat paint finish, unless
11 otherwise specified.
12

- 13 C. If factory-applied paint finish in any Plumbing equipment furnished by the Plumbing Contractor is
14 damaged in shipment or during construction of the building, the equipment shall be refinished by
15 the Plumbing Contractor to the satisfaction of the Architect or Engineer.
16

- 17 D. Prime paint all field-fabricated metal work under plumbing work, comply with applicable
18 provisions of Division 9.
19

20 **1.08 PLUMBING SYSTEM IDENTIFICATION**
21

- 22 A. General: Provide adequate marking of plumbing system and control equipment to allow
23 identification and coordination of maintenance activities and maintenance manuals.
24

- 25 1. Furnish and install adequate marking, tagging and labeling of all *accessible and exposed*
26 Plumbing equipment, piping and control devices, per ANSI A13.1-1981. Accessible
27 locations shall include all ceiling spaces above accessible ceilings.
28

- 29 B. Equipment: Identify all major Plumbing equipment with plastic-laminate signs of 2" high painted
30 stencils and contrasting background. Provide test of sufficient clarity and lettering to convey
31 adequate information at each location and mount permanently. Identify control equipment by 1-
32 1/2" x 4" plastic laminate nameplates with 1/4" high lettering.
33

- 34 C. Piping: Identify piping once every 30 feet at each branch, at termination of lines, and near valve
35 or equipment connections. Place flow directional arrows at each piping system for identification
36 of flow direction. Provide lettering of the appropriate size to convey information on wrap-around
37 signage, adhesive-backed or paint stenciled labels.
38

- 39 D. Valves: Identify all valves with 1-1/2" diameter polished brass tags with stamp-engraved labels or
40 plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and
41 submit valve tag schedule, listing location, service and tag description, and incorporate in
42 Instruction Operations Manual.
43

- 44 E. Operational Labels: *Where* needed for proper or adequate information on operation and
45 maintenance of Plumbing systems, provide tags or labels of plastic or laminated card stock,
46 typewritten to convey the message.
47

48 **1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS**
49

- 50 A. The General Contractor will be required to leave openings in ceiling, floors, walls, roof, partitions,
51 etc., as required to install the Plumbing work specified or shown on the Drawings. The Plumbing
52 Contractor is responsible for correct size and location of his openings. Where penetrations
53 through existing construction are required, they shall be the responsibility of the Plumbing
54 Contractor.
55

- 56 1. Pipe Sleeves: Schedule 40 black steel pipe, 1" larger than carrier pipe.
57

- 1 B. The Plumbing Contractor shall set sleeves and anchors for all equipment, etc., and shall provide
2 watertight seals on pipes through exterior walls, floors and roof and where noted on the
3 Drawings.
4
- 5 C. Pack annular space between sleeves and pipe with fiberglass insulation and seal with approved
6 caulking materials. Where penetrations occur through fire-rated walls or floors, fill space with
7 fire-resistive insulation similar to high-temperature mineral wool, US Gypsum Thermafiber batts
8 or Cera-blanket FS insulation by Tremco. Seal openings with UL approved fire-resistive fire stop
9 caulk/sealant or assembly.
10
- 11 1. Fireproof plastic piping through fire-rated construction per approved UL listed assembly.
12
- 13 D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be
14 made in advance of construction of such parts of the building.
15
- 16 E. If the Plumbing Contractor should neglect to inform the General Contractor of his opening
17 requirements and that portion of the Building construction has been completed, the Plumbing
18 Contractor shall pay the General Contractor for providing such openings.
19
- 20 F. Make arrangements with various other contractors for all special framing, spacing and chases.
21 Mason will leave chases in mason work, but Plumbing Contractor is responsible for correct size and
22 location.

23 **1.10 CUTTING AND PATCHING**

- 24
- 25 A. General: Refer to Division 1 General Requirements.
26
- 27 B. Perform all cutting and patching required for complete installation of the HVAC systems, unless
28 specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
29
- 30 1. All cutting and patching necessary of structural members to install any Plumbing work
31 shall not be done without permission, and then only carefully done under the direction of
32 the Architect and General Contractor.
33
- 34 C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or
35 otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by
36 the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled
37 in such cutting and patching to do the work.
38
- 39 1. All patching work in existing areas shall match existing work and restore the finish to
40 its original condition in material, quality, texture, finish and color unless specifically noted
41 or scheduled otherwise.
42

43 **1.11 TESTS AND INSPECTIONS:**

- 44
- 45 A. All plumbing tests shall be conducted in the presence of and to the satisfaction of the Governing
46 Authorities, Architect/ Engineer, and Owner or his authorized representative.
47
- 48 B. The Plumbing Contractor shall be responsible for applying tests and ordering inspections as
49 required by Federal, State and local Code and Inspection authorities.
50
- 51 1. All work shall remain exposed until it has been tested, inspected and approved.
52

53 **1.12 TEMPORARY SERVICES**

- 54
- 55 A. Provide temporary services for all plumbing services to the existing facility to maintain function of
56 sanitary, storm, natural gas and water services during the construction period.
57

58 **1.13 TRENCHING AND BACKFILLING**

- 1
2 A. Trench, excavate and tunnel to place place all piping and other related work necessary at the
3 elevations indicated or required, as shown on the Drawings.
4
5 1. Cut bottom of trench to grade, make trench 12" wider than the widest
6 dimension of the pipe.
7 2. All pipes shall be laid on a compacted bed of sand 6" deep. Do not lay
8 piping on large stones, rocks or bricks.
9
10 B. Backfill in layers and compact sufficiently to prevent settlement. Backfill with damp sand and fine
11 gravel mixture.
12
13 1. Exterior locations shall be backfilled to 12" of grade with sand and fine
14 gravel mixture and the remainder with native compacted topsoil.
15 2. Do not start backfill operations until plumbing work has been properly inspected and
16 approved.

17 **1.14 CONCRETE FOR PLUMBING WORK**

- 18
19 A. General: Comply with pertinent provisions of Division 1 and Division 3.
20
21 B. All concrete work for equipment pads by the Plumbing Contractor.
22
23 C. Concrete Equipment Pads: For each piece of floor or ground mounted HVAC equipment as
24 indicated on the Drawings, provide a 4" concrete housekeeping pad at a minimum of 4 inches
25 wider than the full size of the respective equipment's base. Equipment pads are required for the
26 following equipment:
27
28 1. Water Heater.
29 2. Water Softener.
30

31 **1.15 EQUIPMENT ACCESS**

- 32
33 A. General: All valves, equipment and accessories shall be installed to permit access to equipment
34 for maintenance, servicing or repairs. Relocation of piping, or equipment to accomplish
35 equipment access shall be completed by this Contractor at no additional cost.
36
37 B. Location: Provide access doors where equipment is located in chases or inaccessible locations.
38 Access panels shall be furnished by this Contractor and installed by the specific trade
39 responsible for the material in which the access panels are installed.
40
41 C. Construction: Access doors in fire-rated construction must have UL label. Access doors shall be
42 of size to provide adequate access to equipment concealed in wall, ceiling and furred-in spaces.
43 Milcor or approved equal, 14-gauge steel frame and door, prime-coated, except stainless steel in
44 areas subject to excessive moisture.

45 **1.16 EQUIPMENT SUPPORTS**

- 46
47 A. General: Provide all supporting steel and related materials not indicated on structural drawings
48 as required for the installation of equipment and materials, including angles, channels, beams
49 and hangers.
50
51 1. Prime coat paint all metal supports.

52 **1.17 EQUIPMENT GUARDS**

- 53
54 A. General: Provide equipment guards over belt-driven assemblies, pump shafts, exposed fans
55 and related elsewhere, as indicated in this specification or required by Code.

1
2 1. All belt guards shall be OSHA-approved types.
3

4 **1.18 GUARANTEE**
5

- 6 A. All material and workmanship must be new and first class in every respect; the plumbing
7 equipment must be turned over to the owner in complete working order and free from mechanical
8 or performance defects.
9
10 B. The Plumbing Contractor must guarantee all labor and materials for one (1) year from the
11 completion of the plumbing system. Maintain and repair plumbing equipment for the above
12 period, unless such defects are clearly the result of bad management after plumbing system is
13 turned over to the Owner.
14
15 C. Before final acceptance of the plumbing work, the Plumbing Contractor shall have the entire
16 apparatus and system in complete and satisfactory operation and shall maintain same in
17 satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel
18 to be furnished by Owner.
19
20 D. The Plumbing Contractor shall submit to the Engineer in triplicate, at the completion of his work, a
21 certified statement, signed by a principal of the firm, stating that the system has been fully installed
22 and is operating within the intent of the Drawings and Specifications and that all system components
23 have been tested and adjusted. This statement shall be submitted before the system is presented to
24 the Owner for final inspection.
25

26 **1.19 SUBMITTALS**
27

- 28 A. Refer to Division 1 for additional submittal requirements.
29
30 B. The Plumbing Contractor will be held responsible for correction of work deemed necessary by the
31 Engineer due to proceeding with the work without shop drawings that have the
32 Architect/Engineers final approval.
33
34 C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and
35 capacities.
36
37 1. Incomplete drawings will be disapproved.
38
39 D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings.
40 Approval of shop drawings describing equipment that cannot fit in the space allotted does not
41 relieve this Contractor from providing equipment that will meet the space requirements.
42
43 E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete
44 detail for all equipment, materials, etc., to be furnished and installed for this project as follows:
45
46 1. Valves.
47 2. Pipe and piping specialties.
48 3. Insulation systems.
49 4. Plumbing fixtures.
50 5. Instructions and O&M manuals(2 copies).
51 6. As-built Drawings(1 copy).
52

53 **1.20 HOUSEKEEPING AND CLEANUP**
54

- 55 A. Periodically as work progress and/or as directed by the Architect/Engineer, the Contractor shall
56 remove waste materials from the building and leave the area of the work room clean. Upon
57 completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.
58

1 **1.21 LUBRICATION**

- 2
- 3 A. Upon completion of the work and before turning over to the Owner, clean and lubricate all
- 4 bearings except sealed and permanently lubricated bearings. Use only lubricant recommended
- 5 by the manufacturer.
- 6
- 7 1. The Contractor is responsible for maintaining lubrication of all mechanical equipment
- 8 under his contract until work is accepted by the Owner.
- 9
- 10 B. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and
- 11 recommended periods of lubrication. Incorporate chart in Instruction Manual.
- 12

13 **1.22 INSTRUCTIONS AND MANUALS**

- 14
- 15 A. Upon completion of the installation, but before final acceptance of the system, the Plumbing
- 16 Contractor shall instruct the Owner on the care and operation of all parts of the Plumbing system.
- 17
- 18 B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance
- 19 instructions for all mechanical equipment and installed under this contract. Prepare in bound
- 20 copies complete with index tabs. Information must include parts lists, equipment warranties, and
- 21 wiring diagrams. Submit bound copies to Architect for disbursement.
- 22

23 **1.23 AS-BUILT DRAWINGS**

- 24
- 25 A. During construction maintain a set of prints showing installed as-built work for the project.
- 26
- 27 B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the
- 28 Architect/Engineer.
- 29

30

31 **PART 2 - PRODUCTS**

32

33 **2.01 DOMESTIC WATER PIPE SCHEDULE**

34

35 A. Above Ground Piping:

- 36
- 37 1. Type 'L' copper water tube, H(hard drawn) temper, ASTM B88; with cast copper fittings,
- 38 ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder,
- 39 ASTM B32; flux ASTM B813.
- 40 2. PEXa tubing approved for potable water piping: Crosslinked Polyethylene, ASTM F876 &
- 41 ASTM F877. Fittings: Insert type fittings with cold flaring memory type fittings
- 42 equal to Uponor. Crimp or compression ring fittings will not be allowed.
- 43 3. Copper mechanical grooved fittings and couplings on roll grooved pipe(pro-press) may
- 44 be used in lieu of soldered fittings.
- 45

46

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

- 48
- 49 1. Type 'K' copper water tube, O(annealed-soft) temper, ASTM B88; with cast copper
- 50 fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%)
- 51 solder, ASTM B32; flux ASTM B813; or cast copper flared pressure fittings, ANSI B16.26.
- 52 2. PEXa tubing approved for potable water piping: Crosslinked Polyethylene, ASTM F876 &
- 53 ASTM F877. Fittings: Insert type fittings with cold flaring memory type fittings
- 54 equal to Uponor. Crimp or compression ring fittings will not be allowed.
- 55

56 **2.02 DRAIN, WASTE AND VENT PIPE SCHEDULE**

57

58 A. Interior Above Ground:

1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketed 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.

13 B. Interior Below Ground:

1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketed 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.

21 **2.03 LAKE WATER FILTER PIPING SCHEDULE**

23 A. Above & Below Ground Piping:

1. CPVC schedule 40(SDR 11) tubing with solvent weld joints, ASTM D2846 and F442.

28 **2.04 VALVES**

30 A. Approved Manufacturers:

1. Conbraco Apollo;
2. Milwaukee;
3. Watts;
4. Nibco.

37 B. Check valves:

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

41 C. Ball valves:

1. 2" and smaller: 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.

47 **2.05 VENT FLASHING**

49 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.

53 B. Approved Manufacturers: SSMC, Oatey or approved equal.

55 **2.06 PIPE HANGERS**

57 A. Piping:

1. Split ring hangers with supporting rods.

- 1 2. Adjustable clevis.
2
3 B. Multiple or Trapeze Hangers:
4
5 1. Steel channels with welded spacers and hanger rods.
6
7 C. Floor Support:
8
9 1. Painted steel pipe saddle, stand and bolted floor flange.
10
11 D. Copper Pipe Supports:
12
13 1. All supports, fasteners, clamps, etc. directly connected to copper piping
14 shall be copper-plated or polyvinylchloride(PVC)-coated.
15 2. Where steel strut supports are used, provide isolation collar between supports/clamp and
16 copper piping.
17
18 E. Approved Manufacturers: Fee and Mason, B-line, Grinnell or approved equal.
19
20 **2.07 CLEANOUTS**
21
22 A. Exterior: Smith #4253 with XH cast iron top in concrete areas.
23
24 B. Interior Floors: Smith 4930-PB square nickel-bronze top.
25
26 C. Finished walls: Smith #4532 stainless steel with access plate and screw.
27
28 D. Provide cleanout plugs of extra heavy bronze
29
30 E. Approved Manufacturers: Josam, Smith, Wade, Zurn or approved equal.
31
32 **2.08 ACCESS**
33
34 A. General: All piping, conduit and accessories shall be installed to permit access to equipment for
35 maintenance. Any relocation of piping, equipment or accessories required to provide
36 maintenance access shall be accomplished by the Contractor at no additional cost.
37
38 B. Removable Access Plates: Where only hand access is sufficient for valve access, provide
39 removable plate-type access unit of minimum size which will facilitate required access.
40
41 1. Provide units of type, style, design, material and finish appropriate for location and
42 exposure in each instance.
43 2. In exposed surfaces of occupied spaces provide round plate units, flush floor units and
44 frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome
45 or stainless steel finish in other surfaces.
46
47 C. Walls:
48
49 1. Smith #4767 flush wall stainless steel cover plate with screw latch lock in finished tile
50 walls at wet locations.
51 2. Smith #4760 or #4765 with bonderized prime-coated steel face and screw latch lock in
52 walls of other finished rooms.
53
54 D. Ceilings:
55
56 1. Provide Smith #4765 flush ceiling bonderized prime-coated steel face with screw latch
57 lock.
58
59 E. Floors:

1
2 1. Smith #4910 with aluminum or nickel-bronze non-skid top.
3

4 **2.09 WATER HAMMER ARRESTORS**
5

6 A. Provide Smith #5000 series or equal, stainless steel or air chambers at each fixture group
7 utilizing a flush valve or fast closing solenoid valve, as sized and recommended by the
8 manufacturer.
9

10 B. *Approved Manufacturers:* Josam, PPP, Smith, Wade, Zurn or approved equal.
11

12 **2.10 HANDICAPPED INSULATION**
13

14 A. Where shown on the Drawings or required by governmental agencies having jurisdiction, provide
15 "Truebro" insulation system or approved equal on exposed hot
16 and cold water supply piping, waste tailpiece and trap at lavatories requiring ADA compliance.
17

18 **2.11 PIPE INSULATION**
19

20 A. General: Provide composite piping insulation (insulation, jackets, coverings, sealers, mastics,
21 and adhesives) with ratings not exceeding flame spread of 25 and a smoke developed of 50 in
22 active return air plenums. Ratings in all other areas shall not exceed a flame spread of 25 and a
23 smoke developed of 150 (test method ASTM E-84). Comply with all codes regarding the use of
24 foam insulation.
25

26 B. Insulate piping located in interior space, including (but not necessarily limited to) the following
27 services:
28

29 1. Interior cold and hot domestic water piping.
30

31 C. Insulate each piping system with one of the following types and thickness of insulation, except as
32 otherwise indicated (Installer's option where more than one type is indicated).
33

34 1. Fibrous Glass: Minimum density 3 lb./cu.ft., thermal conductivity of not more than 0.23 at
35 75 degrees F mean temperature, suitable for temperatures to 450 degrees F. Kraft-
36 reinforced, foil-vapor barrier, laminate all-service jacket, factory applied to insulation with a
37 self-sealing pressure sensitive adhesive lap, maximum permeance of 0.02 perms and
38 minimum beach puncture resistance of 50 units.
39

40 2. Elastomeric Insulation: Closed-cell type, with minimum nominal density of 5.5 lbs./cu.ft.,
41 thermal conductivity shall be not more than 0.27 at 75 degrees F mean temperature, and
42 maximum water vapor transmission of 0.17 perm/inch. The material shall be suitable for a
43 temperature range from 220 degrees F to minus 40 degrees F.
44

45 D. Insulation Installation Schedule:
46

	<u>Service</u>	<u>Pipe Size</u>	<u>Insulation Thickness</u>
47			
48	1. Hot Water Piping	Less than 1"	1"
49		1-1/4 thru 4"	1"
50	2. Cold Water Piping	Less than 1"	1/2"
51		1-1/4" thru 4"	1"
52			

53 **2.11 FIXTURES AND EQUIPMENT**
54

55 A. General: Provide plumbing fixture, trim, and equipment as shown on the "**Fixture and**
56 **Equipment Schedule**" on the Contract Drawings, and as specified herein.
57

58 B. All vitreous chinaware and porcelain fixtures shall be select quality.
59

- 1 1. All wastes and supplies for fixtures, except as otherwise specified or required, shall turn
2 back into walls.
3
- 4 C. All trim, except as otherwise specified, shall be constructed of brass. Finish shall be polished
5 chrome, except where concealed (inside cabinets, etc.).
6
- 7 D. Faucets shall have replaceable control assemblies or replaceable washers and seats.
8
- 9 E. Exposed waste fittings shall be constructed of 17 gauge tubular brass. Slip joints are permitted
10 only on the fixture side of the trap.
11
- 12 F. All fixtures with non-accessible traps such as bathtubs, showers, floor drains, shall have a
13 completely removable stopper or grate in order to be accessible for cleanout.
14
- 15 G. Quarter-turn (1/4) ball valve type fixture stops shall be installed at each fixture. It is the
16 Contractor's option to install straight or angle type. All stops are to have a minimum of 1/2" inlets
17 with flexible riser and loose key handles where exposed to the public.
18
- 19 1. All shower/bath valves are to have integral stops.
20 2. All loose stops shall be from the same manufacturer.
21
- 22 H. Approved manufacturer's for Vitreous China and enameled Cast Iron Fixtures:
23
- 24 1. American Standard.
25 2. Kohler.
26
- 27 I. Approved manufacturer's for Stainless Steel Sinks:
28
- 29 1. American Standard.
30 2. Dayton/Just.
31 3. Elkay.
32
- 33 J. Approved manufacturer's for Water Closet Seats:
34
- 35 1. Bemis.
36 2. Olsonite.
37
- 38 K. Approved manufacturer's for Sink and Lavatory Fittings:
39
- 40 1. American Standard.
41 2. Chicago faucet.
42 3. Delta.
43 4. T&B Brass.
44 5. Symmons.
45
- 46 L. Approved manufacturer's for Supplies, Stops and Traps:
47
- 48 1. McQuire Manuf.
49 2. Brass Craft.
50 3. Chicago Faucet.
51 4. Dearborn Brass.
52

53 2.12 OTHER MATERIALS

54

- 55 A. Provide other materials, not specifically described but required for a complete and proper
56 installation, as selected by the Contractor subject to the approval of the Architect.
57

58 PART 3 - EXECUTION

59

1
2 **3.01 SURFACE CONDITIONS**
3

- 4 A. Examine the areas and conditions under which work of this Section will be performed. Correct
5 conditions detrimental to timely and proper completion of the Work. Do not proceed until
6 unsatisfactory conditions are corrected.
7

8 **3.02 SITE UTILITIES**
9

- 10 A. Verify all flow lines to the septic system sewer prior to installing any underground sewer piping.
11 Advise the General Contractor of site conditions or inverts inconsistent with the plumbing layout
12 and proposed flow line prior to proceeding.
13

14 **3.03 PLUMBING SYSTEM LAYOUT**
15

- 16 A. Lay out the plumbing system in careful coordination with the Drawings, determining proper
17 elevations for all components of the system and using only the minimum number of bends to
18 produce a satisfactorily functioning system.
19
20 B. Follow the general layout shown on the Drawings in all cases except where other work may
21 interfere.
22
23 C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other than as
24 shown on the Drawings.
25
26 D. Where work is to connect to existing, Plumbing contractor must field verify all connection points
27 before beginning any rough-in work. Verify all connecting invert elevations and flow lines of new
28 work connected to existing gravity drainage.
29

30 **3.04 TRENCHING AND BACKFILLING**
31

- 32 A. Perform trenching and backfilling associated with the work of this Section in strict accordance
33 with the provisions of Division 2 of these Specifications and consistent with the national, state
34 and local plumbing codes.
35
36 B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the
37 pipe.
38
39 C. Bedding and backfilling:
40
41 1. Install piping promptly after trenching. Keep trenches open as short a time as
42 practicable.
43 2. Under the building, install pipes on a 6" bed of damp sand. Backfill to bottom of slab with
44 damp sand.
45 3. Outside the building, install underground piping on a 6" bed of damp sand. Backfill to
46 within 12" of finish grade with damp sand. Backfill remainder with native topsoil.
47 4. Do not backfill until installation has been approved and until Project Record Documents
48 have been properly annotated.
49

50 **3.05 INSTALLATION OF PIPING AND EQUIPMENT, GENERAL**
51

- 52 A. General:
53
54 1. Proceed as rapidly as the building construction will permit.
55 2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until
56 fixtures are installed and final connections have been made.
57 3. Cut pipe accurately, and work into place without springing or forcing properly clearing
58 window, doors, and other openings. Excessive cutting or other weakening of the building
59 will not be permitted.

- 1 4. Show no tool marks or threads on exposed plated, polished, or enameled connections
- 2 from fixtures. Tape all finished surfaces to prevent damage during construction.
- 3 5. Make changes in directions with fittings; make changes in main sizes with eccentric
- 4 reducing fittings. Unless otherwise noted, install water supply and return piping with
- 5 straight side of eccentric fittings at top of the pipe.
- 6 6. Run horizontal sanitary piping at a uniform grade of 1/4" per ft., unless otherwise noted.
- 7 Run horizontal water piping with an adequate pitch upwards in direction of flow to allow
- 8 complete drainage.
- 9 7. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a
- 10 flexible piping system, whether or not shown on the Drawings.
- 11 8. Support piping independently at pumps, coils, tanks, and similar locations, so that weight
- 12 of pipe will not be supported by the equipment.
- 13 9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar
- 14 locations, to spill an open sight drain, floor drain, or other acceptable discharge point,
- 15 and terminate with a plain and unthreaded pipe 6" above the drain.
- 16 10. Securely bolt all equipment, isolators, hangers, and similar items in place.
- 17 11. Support each item independently from other pipes. Do not use wire for hanging or
- 18 strapping pipes.
- 19 12. Provide complete dielectric isolation between ferrous and non-ferrous metals.
- 20 13. Provide union and shut off valves suitably located to facilitate maintenance and removal
- 21 of equipment and apparatus.
- 22

23 B. Equipment access:

- 24
- 25 1. Install piping, equipment, and accessories to permit access for maintenance. Relocate
- 26 items as necessary to provide such access, and without additional cost to the Owner.
- 27 2. Provide access doors where valves, motors, or equipment requiring access for
- 28 maintenance are located in wall or chases or above ceilings. Coordinate location of
- 29 access doors with other trades as required.
- 30

31 **3.06 PIPE JOINTS**

32

33 A. Copper tubing:

- 34
- 35 1. Cut square, remove burrs, and clean inside of female fitting to a bright finish.
- 36 a. Apply solder flux with brush to tubing.
- 37 b. Remove internal parts of solder-end valves prior to soldering.
- 38 2. Provide dielectric unions at points of connection of copper tubing to ferrous piping and
- 39 equipment.
- 40 3. For joining copper tubing, use the following:
- 41 a. Water piping 3" and smaller: 95-5 solder;
- 42 b. Water piping larger than 3": "Sil-fos" brazing;
- 43 c. Underground: "Sil-fos" brazing.
- 44

45 B. Screwed piping:

- 46
- 47 1. Deburr cuts.
- 48 a. Do not ream exceeding internal diameter of the pipe.
- 49 b. Thread to requirements of ANSI B2.1.
- 50 2. Use Teflon tape on male thread prior to joining other services.
- 51 3. Use litharge and glycerin on joint prior to cleaning for air and oil piping.
- 52

53 C. PEX Tube Joints

- 54
- 55 1. Installed per ASTM F-1807 with insert-type fittings with cold memory flaring as
- 56 manufactured by Uponor are approved.
- 57 2. Brass compression type fittings with threaded nut, compression ring and insert will not be
- 58 acceptable.

3. Provide copper type L manifolds, where manifold distribution is used with labeled quarter turn ball valve stops for each service line.
4. Install piping and fittings per manufacturers recommendations.

D. 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:

<u>Pipe size:</u>	<u>Maximum spacing on centers:</u>
1-1/4" and smaller:	8'-0"
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:

<u>Tube size:</u>	<u>Maximum spacing on centers:</u>
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.

1 B. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently
2 plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack
3 with noncombustible asbestos cotton, or fiberglass to within 1/2" of both wall faces, and provide
4 the waterproof compound described above.

5
6 C. Finish and escutcheons:

- 7
8 1. Smooth up rough edges around sleeves with plaster or spackling compound.
9 2. Provide 1" wide chrome or nickel plated escutcheons on all pipes exposed to view where
10 passing through walls, floors, partitions, ceilings, and similar locations.
11 a. Size the escutcheons to fit pipe and covering.
12 b. Hold escutcheons in place with set screw.

13
14 **3.09 CLEANOUTS**

- 15
16 A. Secure the Architect's approval of locations for cleanouts in finished areas prior to installation.
17
18 B. Provide cleanouts of same nominal size as the pipes they serve; except where cleanouts are
19 required in pipes 4" and larger provide 4" cleanouts.
20
21 C. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite
22 the cleanout threads.

23
24 **3.10 VALVES**

- 25
26 A. Provide valves in water and gas systems. Locate and arrange so as to give complete regulation
27 of apparatus, equipment, and fixtures.
28
29 B. Provide valves in at least the following locations:
30
31 1. In branches and/or headers of water piping serving a group of fixtures.
32 2. On both sides of apparatus and equipment.
33 3. For shutoff of risers and branch mains.
34 4. For flushing and sterilizing the system.
35 5. Where shown on the Drawings.
36
37 C. Locate valves for easy accessibility and maintenance.

38
39 **3.11 WATER HAMMER ARRESTORS**

- 40
41 A. Provide water hammer arrestors on hot water lines and cold water lines.
42
43 1. Install in upright position at all quick closing valves, isolated plumbing fixtures, and supply
44 headers at plumbing fixture groups.
45 2. Locate and size as specified, locate in accordance with Plumbing and Drainage Institute
46 Standard WH-201.
47 3. Install water hammer arrestors behind access panels.

48
49 **3.12 BACKFLOW PREVENTION**

- 50
51 A. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing
52 connection, against possible back siphonage.
53
54 B. Arrange for testing of backflow devices as required by the governmental agencies having
55 jurisdiction.

56
57 **3.13 PLUMBING FIXTURE INSTALLATION**

- 58
59 A. Installation:

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41

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 coli-aerogene 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

1 **SECTION 23 00 00 - HEATING, VENTILATING AND AIR CONDITIONING**

2
3
4 **PART 1 - GENERAL**

5
6 **1.01 DESCRIPTION**

7
8 A. Work Included: Provide heating, ventilating, and air conditioning systems where shown on the
9 Drawings, as specified herein, and as needed for a complete and proper installation including,
10 but not necessarily limited to:

- 11
12 1. Exhaust systems including, inline fans, motors, dampers, actuators, controls and related
13 items;
14 2. Air Inlets and Outlets;
15 3. Electric heat;
16 4. Acoustical and thermal insulation of ductwork and related equipment.
17 5. Test, adjust, and balance air systems;
18 6. O&M manuals, warranty work and Owner instructions.

19
20 B. Related Work:

- 21
22 1. Documents affecting work of this Section include, but are not necessarily limited to,
23 General Conditions, Supplementary Conditions, and Sections in Division 1 of these
24 Specifications.
25 2. Equipment structural supports, etc.
26 3. Louvers provided by HVAC Contractor; installed by General Contractor.

27
28 C. Work of Other Sections:

- 29
30 1. Openings for ventilating work in walls, floors, roof, ceiling, etc., will be provided by
31 General Contractor. Location and size of these openings will be the responsibility of the
32 HVAC Contractor.
33 2. Lintels and structural supports for HVAC openings and equipment by the General
34 Contractor.
35 3. Electrical line voltage wiring (110 volts and greater). Wiring diagrams will be furnished to
36 Electrical Contractor by the HVAC Contractor.
37 4. Motor starters not provided integral with HVAC equipment shall be provided by the
38 Electrical Contractor.
39 5. Floor drains and open site drains by Plumbing Contractor.
40 6. Painting HVAC equipment will be the responsibility of General Contractor.
41 7. Roofing, exterior wall and related exterior opens shall be caulked, sealed and patched by
42 the General Contractor.

43
44 **1.02 GENERAL PROVISIONS**

45
46 A. Everything essential for the completion of the work implied to be covered by these Specifications
47 to make the system ready for normal and proper operation must be furnished and installed by this
48 Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of
49 details necessary for the proper installation and operation of the system shall not relieve this
50 Contractor from furnishing such detail in full and proper manner.

51
52 B. The plans show various details indicating the general arrangement of the heating and ventilating
53 work, sizes and locations of pipe work, ducts, units, etc., the said plans with figures, lettering,
54 etc., shall be considered a part of these Specifications and no charge or alternation shall be
55 made in either case unless ordered by the Engineer.

56
57 C. In addition to the heating and ventilating plans, see General Plans of the building, as all heating
58 and ventilating work appearing on the latter plans will be part of this Contract unless especially
59 specified to be done by other contractors, as well as, the said work detailed on the heating and
60 ventilating plans.

1 **1.03 QUALITY ASSURANCE**

2
3 A. Qualifications of Installers:

- 4
5 1. For the actual fabrication, installation and testing of heating and ventilating work, use only
6 thoroughly trained and experienced workmen completely familiar with the items required
7 and manufacturer's current recommended methods of installation.
8 2. In acceptance or rejection of installed work, the Architect or Engineer shall make no
9 allowance for lack of skill on the part of the Workmen.

10
11 B. Reference Standards: The following standards are imposed, as applicable to work in each
12 instances:

13
14 AABC Associated Air Balance Council
15 ARI Air Conditioning and Refrigeration Institute
16 ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
17 ASME American Society of Mechanical Engineers
18 ASTM American Society of Testing and Materials
19 MCA Mechanical Contractors Association
20 MSS Manufacturers Standardized Society
21 NEC National Electric Code
22 NEMA National Electrical Manufacturers Association
23 NFPA National Fire Protection Association
24 SMACNA Sheet Metal and Air Conditioning Contractors National Association
25

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

27
28 Inside: 70 deg. F 74 deg. F 50% RH
29 Outside: -15 deg. F 91 deg. dbF/ 74 deg. wbF
30

31 **1.04 CODES AND PERMITS**

32
33 A. This Contractor must comply with building laws and other ordinances in force where the building
34 is located as far as same apply to his work.

- 35
36 1. IBC 2015.
37 2. IMC 2015; SPS 364.
38

39 B. He must secure permits from proper offices and pay legal fees as may be necessary for fulfilling
40 the requirements of these Specifications.

41
42 C. One (1) copy of all permits must be furnished to the Owner.
43

44 **1.05 COORDINATION**

45
46 A. Cooperate and coordinate with other trades to assure that all systems in the heating and
47 ventilating work may be installed in the best arrangement. Coordinate as required with all other
48 trades to share space in common areas and to provide the maximum of access to each system.
49

50 B. Arrange heating and ventilating work in neat, well organized manner with piping and similar
51 services running parallel with primary lines of building construction, and with minimum of 8 foot
52 overhead clearance where possible.
53

54 C. Locate operating and control equipment properly to provide easy access, and arrange entire
55 heating and ventilating work with adequate access for operation and maintenance.
56

57 D. Give right-of-way to piping which must slope for drainage.
58

59 **1.06 ELECTRICAL PROVISIONS OF HVAC WORK**

- 1 A. Line Voltage Wiring: The Electrical Contractor is to make all line voltage (100 volts and greater)
2 electrical wiring connections for hookup of the units and systems.
3
- 4 B. Control Wiring: Exposed low voltage (less than 100 volts) temperature control wiring in
5 connection with heating and ventilating system shall be in EMT conduit by the Heating Contractor
6 in strict accordance with the applicable sections of the Electrical Specifications. *Concealed*
7 *control wiring* may be routed to equipment without conduit, unless subject to physical damage.
8
- 9 C. This Contractor shall consult with the Electrical Contractor before ordering electrical motors, to
10 ascertain correct electrical current characteristics. HVAC Contractor shall furnish complete list
11 and location of equipment requiring electrical connections and necessary wiring diagrams to
12 Electrical Contractor.
13
- 14 D. Motors: Where not otherwise indicated, comply with applicable provisions of the National
15 Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.
16
- 17 1. Phases and Current: 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-
18 start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA
19 rated 200 volt, three-phase, 60 cycle. Provide two (2) separate windings on 2 speed
20 three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of
21 Specifications.
22 2. High Efficiency Motors: All motors 1 HP and larger shall be high efficiency motors
23 meeting or exceeding values tested in accordance with IEEE Standards 112, Method B
24 procedures as stated in NEMA MG 1-12.53a.
25 3. Service Factor: 1.15 for three-phase; 1.35 for single-phase.
26 4. Construction: General purpose, continuous duty.
27 5. Frames: NEMA Standard for horsepower specified.
28 6. Overload Protection: Built-in thermal, with internal sensing device for stopping motor,
29 and for signaling where indicated.
30
- 31 E. Starter and Switches: Where motor starters and switches are indicated to be an integral part of
32 equipment furnished by Heating installer, they shall meet requirements of Division 16 and shall
33 be connected by the Electrical installer.
34
- 35 F. Wiring Connections: Wired connections in flexible conduit, except where plug-in electrical cords
36 are indicated and permitted by governing regulations.
37
- 38 G. General Wiring: Comply with applicable provisions of Division 16 Section.
39

40 **1.07 PAINTING HVAC WORK**

- 41
- 42 A. General: All field painting of mechanical equipment will be done by the General Contractor
43 unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.
44
- 45 B. All equipment shall be provided with factory-applied prime finish, unless otherwise specified.
46
- 47 C. If the factory shop paint finish on any equipment furnished by the Contractor is damaged in
48 shipment or during construction of the building, the equipment shall be refinished by the
49 Contractor to the satisfaction of the Architect/Engineer.
50
- 51 D. Prime paint all field-fabricated metal work under HVAC work, comply with applicable provisions of
52 Division 9.
53

54 **1.08 IDENTIFICATION**

- 55
- 56 A. General: Provide adequate marking of the HVAC system and control equipment to allow
57 identification and coordination of maintenance activities and maintenance manuals. Tag and
58 label HVAC equipment located in exposed or accessible areas to conform to ANSI A13.1-1981.
59 After painting and/or covering is complete, identify all equipment, piping and ductwork by its
60 abbreviated generic name as shown/scheduled/specified.

- 1
2 B. Equipment. Identify all major HVAC equipment with plastic-laminate signs of 2" high painted
3 stencils and contrasting background. Provide test of sufficient clarity and lettering to convey
4 adequate information at each location and mount permanently. Identify control equipment by 1-
5 1/2" x 4" plastic laminate nameplates with 1/4" high lettering.
6
7 C. Piping and Ductwork: Identify all exposed and accessible piping and ductwork once every 30
8 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow
9 directional arrows at each piping or duct identification. Provide appropriate sized letters to
10 convey information on wrap-around signage, adhesive-backed or paint stenciled labels.
11
12 1. Exposed includes all piping and ductwork above suspended ceiling systems.
13
14 D. Valves: Identify all valves with 1-1/2" diameter minimum polished brass stamp-engraved or
15 plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and
16 submit valve tag schedule, service and tag description, incorporate in Instruction/O&M Manual.
17
18 E. Operational Labels: Where needed for proper or adequate information on operation and
19 maintenance of HVAC systems, provide labels or markers of plasticized or laminated card stock,
20 typewritten of appropriate size to convey the information.
21
22 F. Submit schedule of Identification labels for Architect/Engineer approval.
23

24 **1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS**

- 25
26 A. The General Contractor will be required to leave openings in new ceiling, floors, walls, roof,
27 partitions, etc., as required to install the ventilating work specified or shown on the Drawings.
28 The HVAC Contractor is responsible for correct size and location of his openings. Where
29 penetrations through existing construction are required, they shall be the responsibility of the
30 HVAC Contractor.
31
32 B. The HVAC Contractor shall set sleeves and anchors for all equipment, etc., and shall provide
33 watertight seals on pipes through exterior walls, floors and roof and where noted on the
34 Drawings.
35
36 1. Pipe sleeves: Schedule 40 black steel pipe, 1" larger than the pipe;
37 2. Duct sleeves: 24 gauge galvanized sheetmetal, 1/2" larger than the duct on all
38 sides.
39
40 C. Pack annular space between sleeves and pipe or ducts with fiberglass insulation and seal.
41 Where penetrations through fire rated walls or floors, fill space with fire-resistive insulation similar
42 to US Gypsum Thermafiber batts or other approved fire-resistive insulation material and seal
43 annular openings with a UL approved , fire-stopping sealant/caulk.
44
45 D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be
46 made in advance of construction of such parts of the building.
47
48 E. If the HVAC Contractor should neglect to inform the General Contractor of his opening
49 requirements and that portion of the Building construction has been completed, the HVAC
50 Contractor shall pay the General Contractor for providing these openings.
51
52 F. Make arrangements with various other contractors for all special framing, spacing and chases.
53 Mason will leave chases in mason work, but HVAC Contractor is responsible for correct size and
54 location.
55

56 **1.10 CUTTING AND PATCHING**

- 57
58 A. General: Refer to Division 1 General Requirements.
59

1 B. Perform all cutting and patching required for complete installation of the HVAC systems, unless
2 specifically noted otherwise. Provide all materials required for patching unless otherwise noted.
3

4 1. All cutting and patching necessary of structural members to install any Electrical work
5 shall not be done without permission, and then only carefully done under the direction of
6 the Architect and General Contractor.
7

8 C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or
9 otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by
10 the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled
11 in such cutting and patching to do the work.
12

13 1.11 CONCRETE FOR HVAC WORK

14 A. *General:* Comply with pertinent provisions of Division 1 and Division 3.
15

16 B. None anticipated for project.
17

18 1.12 EQUIPMENT ACCESS

19 A. *General:* All valves, volume dampers, equipment and accessories shall be installed to permit
20 access to equipment for maintenance, servicing or repairs. Relocation of piping, ducts or
21 equipment to accomplish equipment access shall be completed by this Contractor at no
22 additional cost.
23

24 B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations.
25 Access panels shall be furnished by this Contractor and installed by the specific trade
26 responsible for the material in which the access panels are installed.
27

28 C. *Construction:* Access doors shall be of size to provide adequate access to equipment concealed
29 in wall, ceiling and or furred-in spaces. Milcor or approved equal; 14 gauge steel frame and door,
30 prime-coated, except stainless steel in areas subject to excessive moisture.
31

32 1.13 EQUIPMENT SUPPORTS

33 A. *General:* Provide all supporting steel and related materials not indicated on structural drawings
34 as required for the installation of equipment and materials, including angles, channels, beams
35 and hangers.
36

37 1. Prime coat paint all supports.
38 2. Turn over equipment curbs to the General Contractor for installation; structural steel
39 supports under equipment curbs by the General Contractor.
40

41 1.14 EQUIPMENT GUARDS

42 A. *General:* Provide equipment guard over belt-driven assemblies, pump shafts, exposed fans and
43 elsewhere, as indicated in this specification or required by code.
44

45 1. Prime coat paint all supports.
46

47 1.15 GUARANTEE

48 A. All material and workmanship must be new and first class in every respect; the heating,
49 ventilating and air conditioning equipment must be turned over to the owner in complete working
50 order and free from mechanical defects.
51

52 B. The HVAC Contractor must guarantee all labor and materials for one (1) year from the
53 substantial completion and acceptance of the HVAC system and keep or place same in repair for
54 said period, unless such defects are clearly the result of bad management after HVAC system
55 was turned over to the Owner.
56

- 1
2 C. The system must be guaranteed to operate noiselessly and to the satisfaction of the Owner and
3 to supply and exhaust quantities of air shown on the Drawings.
4
5 D. Before final acceptance of this work, the Contractor shall have the entire apparatus and system in
6 complete and satisfactory operation and shall maintain same in satisfactory and continuous
7 operation for a period of ten days prior to the date of acceptance; fuel to be furnished by the
8 Owner.
9
10 E. The HVAC Contractor shall submit to the Engineer in triplicate, at the completion of his work, a
11 certified statement, signed by a principal of the firm, stating that the system has been fully
12 installed and is operating within the intent of the plans and specifications and that all system
13 components have been tested and adjusted. This statement shall be submitted before the
14 system is presented to the Owner for final inspection.
15

16 **1.16 SUBMITTALS**

- 17
18 A. Refer to Division 1 for additional submittal requirements.
19
20 B. The HVAC Contractor will be held responsible for correction of work deemed necessary by the
21 Engineer due to proceeding with the work without shop drawings that have the Engineer's final
22 approval.
23
24 C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and
25 capacities.
26
27 D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings.
28 Approval of shop drawings describing equipment that cannot fit in the space allotted does not
29 relieve this Contractor from providing equipment that will meet the space requirements.
30
31 E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with
32 complete detail for all equipment, materials, etc., to be furnished and installed for this project as
33 follows:
34
35 1. Exhaust fans and accessories;
36 2. Controls;
37 3. Diffusers, grilles, registers and louvers;
38 4. Insulation systems;
39 5. TAB air balance report;
40 6. Instructions and O&M manuals (2 copies);
41 7. As-built drawings.
42
43 F. Marked-up drawings indicated record installation as-built HVAC work.
44

45 **1.17 HOUSEKEEPING AND CLEANUP**

- 46
47 A. Periodically as work progress and/or as directed by the Architect, the Contractor shall remove
48 waste materials from the building and leave the area of the work room clean. Upon completion of
49 work remove all tools, scaffolding, broken and waste materials, etc., from the site.
50

51 **1.18 LUBRICATION**

- 52
53 A. Upon completion of the work and before turning over to the Owner, clean and lubricate all
54 bearings except sealed and permanently lubricated bearings. Use only lubricant recommended
55 by the manufacturer.
56

57 **1.19 INSTRUCTIONS AND MANUALS**

- 58
59 A. Upon completion of the installation, but before final acceptance of the system, this Contractor
60 shall instruct the Owner on the care and operation of all parts of the system.

- 1
2 B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance
3 instructions for all HVAC equipment and installed under this contract. Prepare in bound copies
4 complete with index tabs. Information must include parts lists, equipment warranties, and wiring
5 diagrams. Submit bound copies to the Architect for distribution.
6

7 **1.20 AS-BUILT DRAWINGS**
8

- 9 A. During construction maintain a set of prints showing installed as-built work for the project.
10
11 B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the
12 Architect/Engineer.
13
14

15 **PART 2 - PRODUCTS**
16

17 **2.01 DUCTWORK**
18

- 19 A. Sheet Metal: Furnish, install, fit and secure in place all supply, return, exhaust and vent air ducts,
20 risers, branches, etc., as shown and detailed on plans, built of galvanized iron as hereinafter
21 specified.
22

- 23 1. Above ground, general ductwork: Galvanized steel, lock-forming quality, ASTM A527;
24 1.25 oz. zinc coating each side, mill phosphatized, ASTM A525.
25 2. Steel Ducts: Galvanized steel, lock-forming quality, ASTM A527; 1.25 oz. zinc coating
26 each side, mill phosphatized, ASTM A525.
27

- 28 B. Ductwork Construction:

- 29 1. Sheet metal work shall be constructed according to practices recommended in the HVAC
30 Duct Construction Standards - Metal and Flexible 1st ED. 1985, as published by
31 SMACNA, and hereinafter specified.
32 2. Ductwork Pressure-Velocity Classification: + 2" static pressure class 2,500 FPM velocity
33 level.
34 3. Duct Sealing Requirements: Seal Class B. Transverse and longitudinal joints.
35 4. All duct dimensions noted on the drawings are finished inside dimensions.
36 5. Install ducts, risers, etc., as indicated on plans, making necessary changes in cross
37 section, offsets, etc., whether or not same is specifically indicated. If ducts cannot be run
38 as shown on drawings, install ducts between required points, subject to the approval of
39 Engineer without additional cost to the Owner.
40 6. At all outlets and inlets in rooms, flange ducts for attachment of grilles. Install grilles
41 according to manufacturer's recommendations.
42 7. Sheet metal work throughout shall be assembled and erected in such a manner that no
43 vibration will occur and no noise be transmitted by the moving air due to inappropriate
44 fitting or offsets. *All corrective measures will be determined by the Engineer at the HVAC*
45 *Contractor's expense.*
46 8. All duct turns shall have either an inside radius equal to the duct width or be a miter turn
47 with turning vanes. Turning vanes shall be double wall air-foil type.
48 9. Branch Take-Off Fittings: Round branch take-off fittings shall be low-loss type fittings
49 such as bellmouth or conical type; *no scoops or 90 degree tee fittings allowed.*
50 Square/rectangular branch take-off fittings shall have 45 degree leading edge with 4 inch
51 minimum depth; *no air turns or scoops allowed.*
52

- 53 C. Ductwork Accessories:
54

- 55 1. Volume Dampers: Furnish and install in branches of supply air and exhaust ducts.
56 Substantial volume dampers to be fitted with locking devices for adjusting the air delivery.
57 Damper blades shall not exceed 6" width.
58 2. Access Panels: Install access panels with latches and gaskets in ducts at automatic
59 dampers, coils, fire dampers, louver plenums and other duct mounted equipment.
60 Panels in insulated ducts must be internally insulated.

3. Openings around Ducts: 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. Manufacturers: 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:

<u>Type of Equipment</u>	<u>Isolation Type</u>	<u>Minimum Static Deflection - Inches</u>
Inline Exhaust Fans	Type 'X' Flexible Duct Connector & Type 'D' Hanger	3/4"
		3/4"

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 arc 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. Type X Flexible Duct Connectors:

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

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. J-blades mounted, 1.75" O.C. with rain hooks. Stainless steel screws.

- 1
- 2
- 3 1. Frame: Aluminum extrusions 0.081" 6063-TS
- 4 2. Blades: Z-shaped extruded aluminum 6063-TS.
- 5 3. Bird Screens: 1/2" mesh PVC crated.
- 6 4. Insect Screens where scheduled - aluminum.
- 7 5. Finish: Powder-coat baked-on enamel finish, finish color selection by Architect.

8 **2.05 FANS**

- 9
- 10 A. General: Furnish fans in the size and capacity as shown on the drawings. Shall be
- 11 manufactured by Broan, Carnes, Greenheck, ILG, Penn or approved equal.
- 12
- 13 B. Inline Fan: Furnish duct mounted centrifugal, direct-driven or belt-driven inline fan. Fan shall be
- 14 constructed of heavy gauge steel with acrylic enamel finish over iron phosphate primer. Motor or
- 15 drive compartment shall be isolated from the airstream and be externally ventilated. Bearings
- 16 shall be prelubricated and sealed for 200,000 hours operation. Fan wheel shall be aluminum,
- 17 backward inclined, centrifugal type, dynamically and statically balanced with venturi inlet. One
- 18 side of the housing shall be equipped with a hingeable service door assembly supporting the
- 19 motor, drives, wheel and inlet venturi for servicing without disconnecting the fan connections.
- 20 Fan shall be AMCA certified for air and sound performance.
- 21
- 22 1. Accessories (as indicated on plans and schedules).
- 23
- 24 C. Ceiling Mounted: Furnish ceiling-mounted exhaust fans complete with centrifugal blower, inlet
- 25 grille, gravity back-draft damper, and discharge duct connection as shown on the drawings. Fan
- 26 shall be AMCA certified with a sound rating of less than 4.5 sones. Housing shall be insulated
- 27 with minimum 1/2" acoustic insulation.
- 28
- 29 1. Accessories (as indicated on plans and schedules).
- 30
- 31 D. Motors: 1 HP and larger shall be suitable for 240/60/1 1-phase operation and less than 1 HP
- 32 shall be 115/60/1 with integral thermal overload. Horsepower rating shall be such that motor will
- 33 not be overloaded at rated capacity. Motors in air stream shall be totally enclosed, other shall be
- 34 open type. Motors shall have permanently lubricated ball bearings, mounted on neoprene
- 35 vibration-isolator supports. All units shall have remote disconnect switch.
- 36
- 37 1. ECM motor with local speed control, where scheduled.
- 38

39 **2.06 ELECTRIC HEAT**

- 40
- 41 A. General: Furnish electric heat equipment of the type and capacities as shown on the Drawings
- 42 and schedules.
- 43
- 44 B. Architectural Heavy Duty - Electric Wall Heater: Louvered front cover with aluminum frame and
- 45 recessed tamperproof thermostat control. Back box for recessed mounting, semi-recessed
- 46 mounting or surface mounting, as scheduled. Heating element of 80/20 nickel-chromium
- 47 resistance wire enclosed in a steel sheath with brazed copper plate fins. Fan shall be provided
- 48 with aluminum fan blades with protected electric motor mounted on permanently lubricated
- 49 bearings with totally enclosed rotor. Electric wall heater shall be provided with disconnect switch,
- 50 integral bi-metallic thermostat controller and manual reset thermal cutout.
- 51
- 52 1. 14-gauge cover security cover, as scheduled.
- 53 2. Surface mounting frame-box, as scheduled.
- 54

55 **2.07 TEMPERATURE CONTROLS**

- 56
- 57 A. This Contractor shall be responsible for all automatic electric controls for HVAC equipment as
- 58 indicated on the plans and as described herein.
- 59

- 1 B. Furnish all motorized dampers, thermostats, protected relays, interlocks and transformers as
 2 required; and this Contractor shall mount same in suitable control panels, occupied space, or on
 3 equipment as required or specified herein. Furnish low voltage relays as required for all fans and
 4 motors automatically controlled.
 5
 6 C. All line voltage temperature control wiring by the Electrical Contractor. All exposed low voltage
 7 wire shall be run in EMT metal conduit per Division 16. All low-voltage control wiring by the
 8 HVAC Contractor.
 9
 10 D. Electrical power sources and motor connections for equipment will be provided by the Electrical
 11 Contractor. All power wiring by Electrical Contractor. Furnish necessary wiring diagrams, and be
 12 responsible for obtaining proper working installation. Furnish all starters, multi-speed switches
 13 and control apparatus.
 14
 15 E. Automatic Control Dampers: Automatic Control Dampers(ACD) required but not included with
 16 fan equipment shall be furnished by this contractor.
 17
 18 1. Dampers shall be opposite blade or parallel-type with blades not over 6" wide and with
 19 interlocking edges and brass or nylon bearings.
 20 2. Dampers shall be 16 gauge galvanized iron or heavier. Outdoor dampers (exposed to
 21 ambient conditions) shall be low-leakage type with neoprene blade and edge seals.
 22
 23 F. Control Damper Operators: Provide electric motor operators for all dampers requiring
 24 operators, of the type which meet requirements of operation described in the sequence of control.
 25
 26 1. Acceptable Manufacturer: Belimo or approved equal.
 27 2. Two-position, spring-return: Direct-coupled actuator, 24 VAC, spring-
 28 return, minimum torque 133in-lb(35 SF). Belimo model SF-24.
 29
 30 G. Thermostats:
 31
 32 1. Line-voltage Cooling thermostat: Commercial cooling thermostat with room setpoint
 33 adjustment, LCD display, 20-amp rated contracts for 115 volt service.
 34
 35 H. Relays: Furnish necessary relays, interlock control wiring and related accessories.
 36

37 2.08 SEQUENCE OF CONTROL

- 38
 39 A. Exhaust Fan EF-1:
 40
 41 1. Interlock exhaust fan operation with LCP-1 relay to operate on time schedule.
 42 2. Interlock motorized exhaust air dampers to open upon operation of exhaust fan.
 43
 44 B. Exhaust Fan EF-2:
 45
 46 1. Interlock exhaust fan operation with cooling thermostat to operate upon rise in space
 47 temperature above setpoint.
 48 2. Interlock motorized exhaust and fresh air dampers to open upon operation of exhaust
 49 fan.
 50
 51

52 PART 3 - EXECUTION

53 3.01 JOB CONDITIONS

- 54
 55
 56 A. Examine and check conditions at the actual job site and determine facilities for delivery, storing
 57 and handling of materials and equipment.
 58
 59 B. Drawings show approximate locations of equipment, verify exact locations.
 60

- 1 C. Cooperate as necessary with other trades in order that all systems in the work may be installed in
2 the best arrangement. Coordinate as required with all other trades to share space in common
3 areas and to provide the maximum of access to each system.
4

5 **3.02 DUCTWORK INSTALLATION**

6

- 7 A. Ducts shall be constructed, supported and installed in accordance with the latest low pressure
8 duct standards of SMACNA. Install all turning vanes, access doors, extractors, and accessories
9 as indicated or specified herein.
10
11 B. Fabricate and install all ductwork to be air tight in accordance with SMACNA Class B, seal.
12 Evident air leaks in the ductwork shall be sealed.
13
14 C. Seal exposed outside ductwork joints water tight with mastic sealant.
15
16 D. Install all motor operated dampers per manufacturer's instructions in accordance with control
17 sequence intended.
18

19 **3.03 INSTALLATION OF EQUIPMENT**

20

- 21 A. Locations: Install all equipment in the locations shown on the Drawings, except where
22 specifically otherwise approved on the job by the Owner.
23
24 B. All equipment, as called for on the drawings and herein specified, shall be installed in strict
25 accordance with manufacturer's recommendations.
26
27 C. Interferences: Avoid interference with structure, and with work of other trades, preserving
28 adequate headroom and clearing all doors and passageways.
29
30 D. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are
31 properly furnished and installed, that all items function properly, and that all adjustments have
32 been made.

33 **3.04 TESTING, ADJUSTING, AND BALANCING**

34

- 35 A. Provide all necessary personnel, equipment, and services and perform all tests necessary to
36 demonstrate the integrity of the completed installation to the approval of the Owner and Architect.
37 The air system shall be tested, adjusted and balanced in accordance with the latest edition of the
38 Associated Air Balance Council (AABC) Procedural Standards, NEBB or equivalent by an
39 independent TAB Contractor. TAB work performed by the HVAC Contractor shall not be
40 accepted.
41
42 B. Submit three (3) certified copies of the final report to Architect on applicable AABC reporting
43 forms or equivalent for approval.
44
45 1. Air volume at exhaust inlets and outlets;
46 2. Air volume at each fan/air handler unit for exhaust air;
47 3. Record fan speed, RPM, motor nameplates and amperage/voltage;
48 4. Report all equipment model #'s and related drawing identification on the TAB report;
49
50 C. Upon completion of TAB work, mark equipment settings, including damper control levers, and
51 similar devices to indicate final settings. Plug all holes in insulation, ductwork and housings with
52 acceptable test plugs.
53
54 D. Eliminate noise and vibration and assure proper function of all controls, maintenance of
55 temperature, and operation with the approved design.

56 **3.05 CLEANING**

57

1 A. Ductwork: After the ductwork has been tested and proved tight, thoroughly vacuum and clean all
2 components of the ductwork. Remove all dirt, scale, oil and other foreign substances which may
3 have accumulated during the installation process.

4
5 B. Equipment: After the equipment has been started and proved operational, carefully clean all
6 accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease
7 and other foreign substances.

8
9 **3.06 LUBRICATION**

10
11 A. Upon completion of the work and before turning over to the Owner, clean and lubricate all
12 bearings except sealed and permanently lubricated bearings. Use only lubricant recommended
13 by the manufacturer.

14
15 B. Contractor is responsible for maintaining lubrication of all mechanical equipment under his
16 contract until work is accepted by the Owner.

17
18 C. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and
19 recommended periods of lubrication. Incorporate chart in Instruction Manual.

20
21 **3.07 INSTRUCTIONS**

22
23 A. Instruct owner's representative in the operation and maintenance of all mechanical systems.

24
25 B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance
26 instructions for all mechanical equipment installed under this contract. Prepare in bound copies
27 with index tabs. Information must include parts list and wiring diagrams. Submit to Architect for
28 presentation to the Owner.

29 **3.08 CLOSEOUT OPERATIONS**

30
31 A. Refer to Division 1 for additional project closeout requirements.

32
33 B. Closeout Equipment/System Operations: Sequence operations properly so that work of the
34 project will not be damaged or endangered. Coordinate with seasonal requirements.

- 35
36 1. Operate each item of equipment and each system in a test run of appropriate duration
37 with the Owner's operating personnel present to demonstrate sustained, satisfactory
38 performance.
39 2. Adjust and correct operations as required for proper performance.
40 3. Clean and lubricate each system, and replace dirty filters, especially worn belts and parts
41 and similar expandable items of the work.

42
43 C. Instruction, O&M: Instruct Owner (Owner's personnel) in the proper operation and maintenance
44 of the HVAC systems. Train personnel in the setting and scheduling of programmable
45 thermostats for occupied/unoccupied periods.

46
47 D. Service Organization: At time of substantial completion, Contractor shall provide Owner with a
48 listing of qualified service organizations (including addresses and telephone numbers) for each
49 piece of major equipment.

50
51 E. Turn-Over of Operations: At time of substantial completion, turn over the prime responsibility for
52 operation of HVAC equipment and systems to the Owner's operating personnel. However, during
53 the guarantee period, provide and operating engineer, who is completely familiar with work, to
54 consult with and continue training the Owner's personnel on an as-needed basis.

55
56
57 **END OF SECTION**

1 **SECTION 26 00 00 - ELECTRICAL**

2
3
4 **PART 1 - GENERAL**

5
6 **1.01 DESCRIPTION**

7
8 A. Work Included: Provide complete electrical service and distribution system with equipment and
9 materials where shown on the Drawings, as specified herein, and as needed for a complete and
10 proper installation including, but not necessarily limited to:

- 11
- 12 1. Underground Electric Service (200-amp, 1-phase, 120/240 volt), service disconnect -
13 meter cabinet with service ground, distribution panel with main circuit breaker, SPD
14 device and branch circuit breakers;
- 15 2. Branch circuit wiring, for lighting, receptacles, motors and equipment;
- 16 3. Lighting fixtures;
- 17 4. Wiring system for equipment and controls provided under other Sections of these
18 Specifications including General Construction, Plumbing and HVAC trades;
- 19 5. Lighting Control System;
- 20 6. Power to new site lighting and new lighting and receptacles at existing shelter.
- 21 7. Power to door operators and electric hand dryers by others.
- 22 8. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and
23 equipment;
- 24 9. Demolition and deactivation of electrical systems in existing facilities as noted on Site
25 Drawings.
- 26 10. Other items and services required to complete the electrical systems.

27
28 B. Related Work:

- 29
- 30 1. Documents affecting work of this Section include, but are not necessarily limited to,
31 General Conditions, Supplementary Conditions, and Sections in Division 1 of these
32 Specifications;
- 33 2. Equipment structural supports, etc.;
- 34 3. All line voltage control wiring and starter interlocks, where specified;
- 35 4. Final equipment electrical connections.

36
37 C. Work of Other Sections:

- 38
- 39 1. Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC
40 trades.

41
42 **1.02 GENERAL PROVISIONS**

43
44 A. Everything essential for the completion of the work implied to be covered by these Specifications
45 to make the system ready for normal and proper operation must be furnished and installed by this
46 Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of
47 details necessary for the proper installation and operation of the system shall not relieve this
48 Contractor from furnishing such detail in full and proper manner.

49
50 B. In addition to the electrical plans, see General Plans of the building, as all electrical work
51 appearing on the latter plans will be part of this contract unless especially specified to be done by
52 other contractors, as well as, the said work detailed on the electrical plans.

53
54 **1.03 QUALITY ASSURANCE**

- 1 A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the
 2 necessary crafts and who are completely familiar with the specified requirements and methods
 3 needed for proper performance of the work of this Section.
 4
- 5 B. Without additional cost to the Owner, provide such other labor and materials as required to
 6 complete the work of this Section in accordance with the requirements of governmental agencies
 7 having jurisdiction, regardless of whether such materials and associated labor are called for
 8 elsewhere in these Contract Documents.
 9
- 10 C. Reference Standard: The following standards are imposed, as applicable to the work:
 11
- | | | |
|----|------|---|
| 12 | ASTM | American Society of Testing and Materials |
| 13 | NEC | National Electrical Code |
| 14 | NEMA | National Electrical Manufacturers Association |
| 15 | NFPA | National Fire Protection Association |
| 16 | UL | Underwriters Laboratories |

17

18 **1.04 CODES AND PERMITS**

19

- 20 A. The Contractor must comply with national, state of Wisconsin and city of Kenosha building and
 21 electrical codes and other ordinances in force where the building is located as far as same apply
 22 to his work.
 23
- 24 1. IBC 2015;
 - 25 2. IEEC 2015;
 - 26 3. NEC 2014;
 - 27 4. Wisconsin Electrical Code SPS sections.
- 28
- 29 B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the
 30 requirements of these Specifications.
 31
- 32 C. One (1) copy of all permits must be furnished to the Owner.
 33
- 34 D. Electric Service Fee: Electrical Contractor shall secure and pay all fees for new electrical service
 35 from electric utility, including temporary power services.
 36

37 **1.05 COORDINATION**

38

- 39 A. Cooperate and coordinate with other trades to assure that all systems in the electrical work may
 40 be installed in the best arrangement. Coordinate as required with all other trades to share space
 41 in common areas and to provide the maximum of access to each system.
 42
- 43 B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel
 44 with primary lines of building construction.
 45
- 46 C. Locate operating and control equipment properly to provide easy access, and install entire
 47 electrical systems with adequate access for operation and maintenance.
 48
- 49 D. Give right-of-way to piping which must slope for drainage.
 50

51 **1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK**

52

- 53 A. Line Voltage Wiring: The Electrical Contractor shall make all line voltage (100 volts and greater)
 54 electrical wiring, final connections and motor wiring for Mechanical equipment.
 55

- 1 B. Control Wiring: Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical
2 work shall be by the Mechanical Contractor in strict accordance with the applicable sections of
3 the Electrical Specifications.
4
5 C. Motors, Starters, and Disconnects: All motors starter and disconnects shall be provided by the
6 Electrical Contractor, unless provided with the equipment or indicated otherwise.
7
8 1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and
9 requirements for electrical connections, along with wiring diagrams.

10 11 **1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS**

- 12
13 A. The General Contractor will be required to leave openings in new construction ceiling, floors,
14 walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the
15 Drawings. The Electrical Contractor is responsible for correct size and location of openings.
16
17 B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings
18 and partitions are to be made in advance of construction of such parts of the building.
19
20 C. The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide
21 watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the
22 Drawings.
23

24 **1.08 CUTTING AND PATCHING**

- 25
26 A. General: Refer to Division 1 General Requirements.
27
28 B. Perform all cutting and patching required for complete installation of the Electrical systems,
29 unless specifically noted otherwise. Provide all materials required for patching unless otherwise
30 noted.
31
32 1. All cutting and patching necessary of structural members to install any Electrical work
33 shall not be done without permission, and then only carefully done under the direction of
34 the Architect and General Contractor.
35

36 **1.09 TRENCHING AND BACKFILLING**

- 37
38 A. Comply with pertinent provisions of Division 1.
39
40 B. Perform trenching and backfilling associated with the work of this Section in strict accordance
41 with the provisions of Division 2 of the Specifications.
42

43 **1.10 SUBMITTALS**

- 44
45 A. Comply with pertinent provisions of Division 1.
46
47 B. Shop Drawing Submittals: Submit six (6) copies of shop drawings to the Architect for approval,
48 with complete detail for all equipment, materials, etc., to be furnished and installed for this project
49 as follows:
50
51 1. Electric Service Equipment;
52 2. Distribution Panelboards;
53 3. Starters and Disconnects;
54 4. Light Fixtures;
55 5. Electrical Devices.
56 6. Lighting Controls;

- 57
58 C. Shop Drawings:

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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. O & M Manual: 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 warranties and guaranties.
3. As-built drawings.

E. As-built Drawings: 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. has established standards for such materials, provide only materials bearing the UL label.

2.02 SERVICE ENTRANCES AND METERING

- 1
2 A. New Service: Provide new underground 200A, 120/240 volt, 1-phase, 3-wire electric service
3 from pad-mounted transformer as required by the local electrical utility(MG&E) and as shown on
4 Drawings.
5
6 B. Metering: Provide combination service disconnect with ground and metering socket cabinet for
7 exterior mounting and related metering equipment per local electrical utility requirements(MG&E).
8
9 1. Utility approved metering equipment: Milbank U5784-O-200-5T-CB
10
11 C. Main Switches: Provide a 200-amp main circuit breakers in the service metering cabinet with
12 current limiting capabilities to meet utility AIC requirements.
13
14 D. Service Distribution Panel (Panel 'A'):
15
16 1. Provide 200-amp, 1-phase main distribution panel as indicated on plans complete with
17 200-amp main circuit breaker, 10,000 AIC branch circuit breakers, NEMA 1 enclosure,
18 main service ground and solid neutral buss lugs and other components required for a
19 complete installation.
20 2. SPD service device as specified herein and scheduled on Drawings.
21

22 **2.03 SURGE PROTECTIVE DEVICES**

- 23
24 A. The surge protective device (SPD) shall be designated a location Type 2 device intended for
25 installation on the load side of the service equipment overcurrent device, including SPDs located
26 at the branch panel. The SPD shall be Listed in accordance with UL 1449.
27
28 B. The SPD shall be made up of metal oxide varistors (MOV's), or a combination of MOV's with
29 selenium cells or silicon avalanche diodes, ensuring that all of the performance requirements are
30 met. Gas tubes shall not be used.
31
32 C. The SPD shall have a maximum continuous operating voltage (MCOV) rating not less than 115%
33 of nominal voltage of the system it is protecting.
34
35 1. MCOV = 150 volt.
36
37 D. Protection Modes: The SPD shall have line to neutral (L-N), line to ground (L-G), line to line (L-L)
38 and neutral to ground (N-G) protection modes for grounded wye configured systems. For a delta
39 configured system, the device shall have line to line (L-L) and line to ground (L-G) protection
40 modes.
41
42 E. Voltage Protection Rating (VPR):
43 The UL 1449 Voltage Protection Rating (VPR) for the device shall not exceed the following:
44
45 1. Surge current per phase rating: 80kA
46 2.. 240/120 volt applications: 900V L-N, 1200V L-G, 700V N-G, 1500 L-L
47
48 F. Nominal Discharge Current (In): The SPD shall have a UL 1449 Nominal Discharge Current
49 Rating (In) of not less than 20kA.
50
51 G. Short Circuit Current Rating (SCCR):
52 The SPD shall have a UL 1449 Short Circuit Current Rating (SCCR) of not less than 200kA.
53

54 **2.04 GROUNDING SYSTEM**

- 55
56 A. Ground all equipment, including switches, transformers, conduit systems, motors, and other
57 apparatus, by conduit or conductor to cold water main and to independent electrode, using
58 ground clamps manufactured by Burndy or T&B, and approved by the Engineer.

- 1
2 B. Provide new service grounding electrode system. Add ground rods, foundation rebar ground and
3 water service grounding electrodes as required per NEC 250.50 for a common grounding
4 electrode system.
5
6 C. Provide grounding conductor from service ground to solid ground buss bar at all distribution
7 panelboards.
8
9 D. Provide grounding jumper from electrical devices to the metallic device boxes.
10
11 E. GFI receptacles shall be provided with separate insulated ground wire conductor to the main
12 service ground bar.
13
14 F. Ground all motor and equipment connections with dedicated ground conductor.
15

16 **2.05 IDENTIFICATION**
17

- 18 A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following
19 junction and pull boxes shall be identified using a coded system. Coding shall be submitted to
20 Engineer for approval.
21
22 1. Light and Power - 120/240V;
23
24 B. Label circuit numbers for all accessible line voltage power distribution raceways and junction
25 boxes.
26
27 C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the
28 following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.
29
30 1. Panelboards.
31 2. Lighting Control Panel.
32
33 D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel
34 frame with plastic cover contained on the inside of panel door. These directories shall indicate
35 load served and rooms served by each protective device in the respective panel.
36
37 E. Identify all conductors per NEC:
38
39 120/240V - Phase A - Black
40 - Phase B - Red
41 - Neutral - White
42 - Ground - Green
43

44 **2.06 POWER DISTRIBUTION SYSTEM**
45

- 46 A. See plans for panelboard capacity, voltage ratings, and branch circuit breaker units.
47
48 B. All panelboards to be of the circuit breaker type with bolt-on circuit breakers. AIC rating as
49 scheduled on drawings.
50
51 C. Branch circuit breakers shall be thermal magnetic; quick-make and quick break. Multi-pole
52 breakers to have common trip. Handle ties of any sort not allowed.
53
54 D. Panelboards shall be Square "D" type NQOD with bolt-on branch circuit breakers rated for
55 10,000 AIC.
56
57 1. Square 'D' is the only approved manufacturer for this project.

- 1
2 F. Each panel shall be provided with a typewritten directory mounted on inside of panel door and
3 covered with clear plastic. This directory shall indicate the load supplied by each branch circuit
4 breaker in panel. Room numbers shall be actual room numbers.
5
6 G. Each panelboard shall be securely attached to the building structure on 3/4" AC plywood backer
7 board with non-metallic painted surface.
8
9 H. All panelboards shall be equipped with an equipment grounding bar that is separate from the
10 solid neutral bar.
11

12 **2.07 WIRING DEVICES**

13 A. General:

- 14
15
16 1. Devices shall be provided at each location shown on the plans or called for in the
17 Specifications.
18 2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and
19 Seymour, Hubbell or General Electric.
20 3. Device catalog references herein and on the plans are to be considered as standards of
21 comparison. Comparable devices manufactured by the other manufacturer will be
22 considered as an optional choice.
23 4. Device finish color to be selected by Architect.
24

25 B. Receptacles:

- 26
27 1. Duplex Receptacles: Industrial-specification grade, nylon face and base, NEMA 5-15R,
28 15A, tamperproof, side-wired only, 3-wire grounding type with the third terminal U-shaped
29 and grounded to the conduit system or green wire ground. Use of self-grounding option
30 not permitted.
31 a. 15-amp: Leviton 5262;
32 b. 20-amp: Leviton 5362;
33 2. GFCI Receptacle: Industrial-specification grade, NEMA 5-15R or 20R with indicator light
34 and feed through. Provide tamper resistant devices in public areas.
35 a. 15-amp: Leviton 7599; tamper resistant: Leviton T7599
36 b. 20-amp: Leviton 7899; tamper resistant: Leviton T7899
37

38 C. Switches:

- 39
40 1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C.,
41 industrial-specification grade.
42 2. 15 amp switches shall not to be used unless specifically shown otherwise for special
43 control.
44 3. Switches to be back and side wired, silent or quiet type.
45 4. The following catalog numbers refer to Leviton, Inc.:
46 a. single pole – 1221-2;
47 b. three way – 1223-2;
48 c. four way – 1224-2;
49 d. Single pole with pilot light – 1221-PLR;
50

51 D. Plates:

- 52
53 1. Provide as required for each outlet, single or multiple gang.
54 2. Provide blank covers on all empty boxes or outlets.
55 3. Plates shall be 204 stainless steel construction in all finished areas.
56 4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2"
57 raised with no sharp edges.

- 1 5. Provide single gang die-cast weather resistant in-use covers equal to Leviton M5979 on
2 receptacles in damp areas and exterior locations.
3

4 **2.08 RACEWAY SYSTEM**
5

- 6 A. Steel Conduit. Galvanized or sheradized steel intermediate or rigid metal conduit, or electrical
7 metallic tubing (EMT) with steel set screw or compression ring type fittings.
8

- 9 1. Provide steel conduits as all exposed in the work areas.
10 2. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel
11 conduit, or PVC coated steel conduit is acceptable.
12

- 13 B. Rigid Non-Metallic Conduit. Schedule 40 PVC with solvent welded fittings.
14

- 15 1. Below grade installation only.
16 2. Encase in concrete below drives and roadways.
17

- 18 C. Electrical Non-Metallic Tubing(ENT):
19

- 20 1. Above grade indoor concealed installation only, for branch circuit wiring after the first
21 metallic junction box from the panelboard.
22 2. Not allowed for service conduit and panelboard feeders.
23 3. Provide and install per NEC Article 331 with grounding conductor.
24

- 25 D. Outlets, Junction Boxes and Switch Boxes:
26

- 27 1. Provide standard one-piece units, galvanized or sheradized, of shape and size best
28 suited to that particular location, of sufficient size to contain enclosed wires without
29 crowding.
30 2. Provide deep boxes(2-1/8") with 1" and larger conduit.
31 3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron
32 fixture studs and box hangers where required.
33 4. For switches and receptacles, provide boxes 4" square by 1-1/2" deep minimum with
34 rings and covers as required.
35

- 36 E. Low Voltage Cabling Raceways:
37

- 38 1. Provide 4" square boxes with single device ring and 3/4" raceway stubbed to accessible
39 area at ceiling with insulating bushing.
40 2. In areas with no ceiling, extend raceway to adjacent accessible ceiling space or to
41 telephone backboard or as directed by Owner.
42 3. Provide pull string for all low-voltage raceways.
43

- 44 F. Pull Boxes:
45

- 46 1. Provide galvanized code-gauge sheet units with screw-on covers, of size and shape required
47 to accommodate wires per NEC wire bending requirements, without crowding access and to
48 suit the location.
49

- 50 G. Electrical Hand Hold Splice Boxes:
51

- 52 1. Provide flush at grade splice boxes constructed of fiberglass polymer
53 concrete reinforced with removable access cover labeled "ELECTRIC" and stainless
54 steel cover fasteners. Cover shall be cast iron, bronze or fiberglass polymer UV rated.
55

- 56 1. MacLean Highline CHA121212(12"x12"x12"high) or approved equal.
57 2. Cover assembly shall be load tested per ANSI/SCTE 77 for 12,000 lbs.

1 3. Mount splice box on 6" compacted gravel base and pour 6" concrete collar(4" deep)
2 with reinforcing rod around top for protection.
3

4 H. Provide sleeves and chases where conduits pass through floors and walls.
5

6 **2.09 CONDUCTORS** 7

8 A. Wire and Cable (600 Volt): Provide 600 V insulated copper wire and cable, NEC standard, of
9 types specified below for different applications, with UL label, and color coded as required by
10 governmental agencies having jurisdiction. Use only copper wires and cables.
11

- 12 1. With conductors No. 4 and larger, provide insulating bushings.
- 13 2. Wire and cable shall be THHN or THWN.
- 14 3. Branch circuit wiring installed in wiring channels of continuous row-mounted fixtures shall
15 be provided. UL listed type RHH or other approved 90 degree C wires, rated at 600 V.
- 16 4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be
17 stranded wire.
- 18 5. Wire in conduits subjected to direct sunlight shall be THWN or RHWN.
- 19 6. Provide XHHW/CU wiring in underground exterior conduit.
- 20 7. Identify feeder neutrals with white tape or white paint.
- 21 8. All low-voltage wiring located in accessible areas shall be installed in metallic conduit.
- 22 9. Provide separate identified neutral conductor for emergency and exit lighting circuits.
- 23 10. All branch circuit conductors shall be connected by means of a screw terminal.
24

25 B. Armored Cable (AC) or Metal-Clad Cable (MC):
26

- 27 1. Limit AC and MC usage to concealed only locations, branch-circuit wiring after the first
28 junction box from the panelboards; where approved by NEC, state and local electrical
29 inspecting authorities.
- 30 2. Not allowed for Panelboard feeders or service conduit.
- 31 3. Provide and install per NEC Articles 333 and 334 with grounding conductor.
32

33 **2.10 MOTOR WIRING** 34

35 A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with
36 the contractor that is furnishing the motor driven equipment.
37

38 B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes.
39 Verify all these requirements with contractor concerned and install accordingly under this
40 contract.
41

42 C. Install disconnect means where required by code for motors out of sight of controller. These shall
43 be fusible safety switches, fuse-tron box cover unit, or non-fused switch as indicated on plans. All
44 switches shall be horsepower rated.
45

46 D. All motors will be furnished and installed by others, unless noted otherwise.
47

48 E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise
49 herein or on the plans. See Motor Schedule.
50

51 F. All final connections to motors to be made by this Contractor.
52

53 G. All motors to be connected using flexible metallic conduits extending from motor box to outlet
54 box. Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all
55 motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit
56 shall be stranded. Grounding wires shall be in all cases installed in flexible conduit and not
57 wrapped around the outside of the conduit.

1
2 **2.11 MOTOR STARTERS**
3

4 A. General:
5

- 6 1. Indoor - NEMA Type 1.
- 7 2. Outdoors or where exposed to moisture - NEMA Type 3R, raintight.
- 8 3. Units shall open all ungrounded conductors simultaneously.
- 9 4. All starters shall be from a single manufacturer.
- 10 5. Approved Manufacturers: Allen-Bradley, Cutler Hammer, Square D and Siemens.

11
12 B. Manual Starters:
13

- 14 1. For single-phase starters, provide units of tumbler switch type that clearly indicate ON,
15 OFF and TRIPPED positions.
- 16 2. For three-phase starters, provide pushbutton operated units with START, STOP-RESET
17 button on the enclosure cover.

18
19 C. Magnetic Starters:
20

- 21 1. Provide units with operating coils designed to operate on line voltage or
22 any other auxiliary voltage indicated on the Drawings.
- 23 2. For starters with line voltage operating coils, provide built-in under-voltage release.
- 24 3. Provide units with the accessories and auxiliary contacts needed for automatic or remote
25 operation as shown on the Drawings.
- 26 4. Provide "H-O-A" control switch and "green" run light on unit cover.
- 27 5. Provide thermal overload protection in each phase which if any phase trips causes the
28 starter to drop out.

29
30 **2.12 SAFETY SWITCHES**
31

32 A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break
33 design, externally operated with provision for padlocking, fusible or non-fusible as shown on the
34 Drawings.

35
36 B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:
37

- 38 1. Indoor: NEMA type 1.
- 39 2. Outdoor: NEMA type 3R, raintight.

40
41 C. Approved Manufacturers: Square D, Cutler Hammer or Siemens.
42

43 **2.13 LIGHTING FIXTURES**
44

45 A. Provide fixtures of the types shown on the Drawings, and with the following accessories as
46 applicable.
47

48 B. Light Fixtures:
49

- 50 1. Provide units having a UL label.
- 51 2. Provide local label in addition if so required by governmental agencies having jurisdiction.
- 52 3. Verify all ceiling types as shown on final architectural plans and be responsible for
53 ordering proper fixtures and accessories for the proper ceiling.

54
55 C. LED Lighting:
56

1. The manufacturer of the LED lighting fixture shall utilize high-brightness LEDs and high-efficiency electronic LED drivers, dimmed or no dimmed as required.
2. The LED fixture shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the fixture is to be installed
3. Light output of the LED system shall be the absolute photometry following IESNA LM-79 and IESNA LM-80 requirements and guidelines.
4. Minimum power factor of 0.90.
5. LED lighting fixture shall be mercury-free, lead-free and RoHS compliant.
6. The LED lighting fixture shall maintain 70% lumen output for a minimum of 50,000 hours.
7. All components of the LED lighting fixture shall be replaceable.
8. The LED lighting fixture shall carry a limited 3-year warranty minimum.

D. Acceptable Lighting Fixture Manufacturers:

1. Refer to **Fixture Schedule**. Engineer will evaluate and make final decision on whether submitted fixture is equal to specified light fixture.
2. Other fixture manufacturers who consider their products equal to those specified are required to request pre-approval for bidding as base bid in accord with Instructions to Bidders section.

2.14 OCCUPANCY SENSOR CONTROLS

A. Occupancy Sensors shall be equal to Sensor Switch or approved equal. Refer to Occupancy Sensor schedule on the Drawings for specific types required.

1. All sensors shall be capable of operating normally with electronic fluorescent ballasts and LED driver systems and rated motor loads.
2. 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.
3. 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.
4. 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.

B. Wall Sensors:

1. 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.
2. 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.
3. 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.
4. Wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

C. Passive Infrared Sensors:

1. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
2. 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.

D. Ultrasonic Sensors:

1. 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.
2. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within $\pm 0.005\%$ tolerance, 32 kHz within $\pm 0.002\%$ tolerance, or 40 kHz $\pm 0.002\%$ tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

E. Dual Technology Sensors:

1. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
2. 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.

2.15 PROGRAMMABLE LIGHTING CONTROLLER

A. The programmable lighting controller shall consist of intelligent lighting control panel(s) with programmable digital and analog inputs, integral astronomic time-clock scheduling with flash warn before OFF feature and provision for up to 8 relay outputs. The specified system for this project shall include the following components:

1. Eight(8) Relay digital programmable lighting controller.
2. Programmable digital time clock
3. Two(2) local override manual switches.
4. Photocell input.
5. Alphanumeric key pad programming and LCD display.
7. Communication via LAN internet connection with BACnet standard MSTP protocol.

B. Standard Output relays

1. UL Listed 30 Amp @ 277VAC Ballast and HID and 20 Amp Tungsten at 120 Vac. 347V Ballast and HID at 20 amps Latching Relay wit 18,000A SCCR at 277Vac.
2. Relays shall be individually replaceable. Relay terminal blocks shall be capable of accepting two (2) #8AWG wires on both the line and the load side. Relays to be rated for 250,000 operations minimum at a full 30a lighting load.
3. Standard relay shall default to closed at normal power loss, Normally Closed Latching (NCL).
4. Optional relay types available shall include: Normally Open Latching (NOL) relay rated for 250,000 operations, a 600v 2-pole NO and NC and a Single Pole, Double Throw (SPDT) relay.

C. Low Voltage Switches

1. All switches shall be digital and communicate via RS 485. The programming for a digital switch shall reside in the switch itself, via double EPROM memory. Any digital switch button function shall be able to be changed locally (at the DTC or a PC) or remotely via Internet.
2. Digital low voltage switch shall be a device that sits on the lighting control system bus. Digital switch shall connect to the system bus using the same cable and connection method required for relay panels. Each button shall be able to be enabled or disabled over the bus.
3. Keyed switches shall be similarly programmable and connect to the lighting control system bus.
4. Digital switches for high abuse areas (common areas, gymnasiums, etc.) shall be vandal resistant, contain no moving parts, and be touch sensitive and available with up to two buttons in a single gang.

- 1 5. Touch pads shall be Stainless Steel and capable of handling both high abuse and wash
2 down locations.
3 6. High abuse switches shall connect to the lighting control system digital bus. Each high
4 abuse touch button shall be able to be programmed in the same way as other digital
5 switch buttons.
6
7 D. Programming shall be accomplished through an integral keypad and display on the unit or via PC
8 software using a local LAN connection over internet connection. Software shall be available for
9 download from the manufacturer's web site free of charge.
10
11 1. Local LAN interface network: BACnet protocol LAN connection.
12
13 E. Approved Manufacturer - Model: Leviton Green-MAX series (sole source -no substitution).
14
15 1. Leviton Green-Max R08TC100
16
17 F. Startup and Owner Services: Authorized lighting controller representative shall startup and
18 program lighting controller per Owner's requested schedules.
19
20 1. Submit startup report and final lighting schedules for approval and inclusion in O&M
21 manuals.
22 2. Provide 2 hours of Owner training in the proper operation and maintenance of the
23 lighting control system.
24

25 **2.16 ELECTRIC HEATERS**

- 26
27 A. Electric heaters provided and installed by HVAC Contractor, line voltage wiring by Electrical
28 Contractor.
29
30 B. Low Voltage (less than 100 volts) control wiring by HVAC Contractor.
31

32 **2.17 TELEPHONE SERVICE RACEWAY**

- 33
34 A. Provide 2" service conduit stubbed outside the building 24" below grade and capped from the
35 mechanical room for future telephone or data services. Coordinate locations with Owner.
36

37 **2.18 OTHER MATERIALS**

- 38
39 A. Provide other materials, not specifically described but required for a complete and proper
40 installation, as selected by the Contractor subject to the approval of the Architect.
41
42

43 **PART 3 - EXECUTION**

44 **3.01 SURFACE CONDITIONS**

- 45
46
47 A. Examine the areas and conditions under which work of this Section will be performed. Correct
48 conditions detrimental to timely and proper completion of the Work. Do not proceed until
49 unsatisfactory conditions are corrected.
50

51 **3.02 PREPARATION**

- 52
53 A. Coordination:
54
55 1. Coordinate as necessary with other trades to assure proper and adequate provision in
56 the work of those trades for interface with the work of this Section.
57 2. Coordinate the installation of electrical items with the schedule for work of other trades to
58 prevent unnecessary delays in the work schedule.

1 3. Where lighting fixtures and other electrical items are shown in conflict with locations of
2 structural members and mechanical or other equipment, provide required supports and
3 wiring to clear the encroachment.
4

5 B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but
6 their absolute accuracy is not warranted. The exact locations, distances, levels, and other
7 conditions will be governed by actual construction and the Drawings and Specifications should be
8 used only for guidance in such regard.
9

10 C. Where outlets are not specifically located on the Drawings, locate as determined in the field by
11 the Architect. Where outlets are installed without such specific direction, relocate as directed by
12 the Architect and at no additional cost to the Owner.
13

14 D. Verify all measurements at the building. No extra compensation will be allowed because of
15 differences between work shown on the drawings and actual measurements at the site of
16 construction.
17

18 E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual
19 construction and work of other trades will permit. Where deviations are required to conform with
20 actual construction and the work of other trades, make such deviations without additional cost to
21 the Owner.
22

23 **3.03 INSTALLATION OF ELECTRIC SERVICE**

24

25 A. Coordinate installation with local utility as required for a complete electric service installation.
26

27 B. Installation shall be approved by the local utilities.
28

29 **3.04 TRENCHING AND BACKFILLING**

30

31 A. Perform trenching and backfilling associated with the work of this Section in strict
32 accordance with the provisions of Division 2 of these Specifications.
33

34 B. Cut bottom of trench to grade, make trench 12" wider than the widest dimension of the pipe.
35

36 C. Bedding and backfilling:
37

38 1. Install piping promptly after trenching. Keep trenches open as short a time as
39 practicable.

40 2. *Under the building slab:* Install all pipes on a compacted bed of damp sand 6" deep. Do
41 not lay piping on large stones, rocks or bricks.

42 3. *Outside the building:* Install all underground piping on a compacted bed of damp sand
43 6" deep. Backfill to within 12" of finish grade with damp sand. Backfill the remainder with
44 native topsoil. Backfill in layers and compact sufficiently to prevent settlement.

45 4. Do not start backfill operations until underground plumbing work has been properly
46 inspected and approved by governing authorities.
47

48 **3.05 INSTALLATION OF RACEWAYS AND FITTINGS**

49

50 A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide
51 rigid galvanized conduit or electrical metallic tubing with compression type fittings.
52

53 1. Seal joints to prevent entrance of water.

54 2. Provide ground wire of proper size per NEC 250.

55 3. Use nylon (rather than steel) fish tape.
56

57 B. Use flexible conduit only for short motor connections, or where subject to vibration.

- 1
- 2 C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide
- 3 other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting
- 4 in connection with the Work.
- 5
- 6 D. Where conduit is exposed, run parallel to or at right angle with lines of the building.
- 7
- 8 E. Securely and rigidly support conduits throughout the work.
- 9

10 **3.06 INSTALLATION OF LIGHTING FIXTURES**

- 11
- 12 A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture
- 13 Schedule shown on the Drawings.
- 14
- 15 B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in
- 16 continuous rows, provide conductors in wiring channels of the same size as the circuit wires
- 17 supplying the row of fixtures.
- 18
- 19 C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against
- 20 rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.
- 21
- 22 D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the
- 23 fixture is supported, either directly or indirectly, by a safe and sound structural member of the
- 24 building, using adequate number and type of fastenings to assure safe installation.
- 25
- 26 1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not
- 27 acceptable.
- 28

29 **3.07 INSTALLATION AND START-UP OF PROGRAMMABLE LIGHTING CONTROLS**

- 30
- 31 A. System Start-up: Provide a factory authorized technician to verify the installation, test the system,
- 32 and train the owner on proper operation and maintenance of the system. Before requesting start-
- 33 up services, the installing contractor shall verify that:
- 34
- 35 1. The control system has been fully installed in accordance with manufacturer's
- 36 installation instructions.
- 37 2. Arrange and coordinate network connections for remote communication with Owner.
- 38 Owner will provide internet service to lighting control panel.
- 39 3. Low voltage wiring for overrides and sensors is completed.
- 40 4. Accurate "as-built" load schedules have been prepared for each lighting control panel.
- 41 5. Proper notification of the impending start-up has been provided to the
- 42 Owner's representative.
- 43
- 44 B. Factory Support: Factory telephone support shall be available at no cost to the owner during the
- 45 warranty period. Factory assistance shall consist of assistance in solving programming or other
- 46 application issues pertaining to the control equipment. The factory shall provide a toll-free number
- 47 for technical support.
- 48

49 **3.08 INSTALLATION OF POWER EQUIPMENT**

- 50
- 51 A. Provide power and control wiring for motor starters and safety switches as shown on the
- 52 Drawings.
- 53

54 **3.09 INSTALLATION OF CONDUCTORS**

- 1 A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG
2 conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100
3 feet, use larger wires to limit voltage drops.
4
- 5 B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.
6
- 7 1. Make splices electrically and mechanically secure with pressure-type connectors.
 - 8 2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6
9 AWG and smaller.
 - 10 3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a
11 mechanical tool and die equipment for wire sizes 4 AWG and larger.
 - 12 4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-
13 plastic electrical tape where insulation is required.
14

15 **3.10 INSTALLATION OF PANELBOARDS**

- 16
- 17 A. Unless otherwise shown on the Drawings, install panels with the top of the trim 6'-3" above the
18 finished floor.
19
- 20 B. Mount a typewritten directory behind plastic on the inside of each panel door and on the
21 directory, showing the circuit number and complete description of all outlets on each circuit.
22
- 23 C. Provide two (2) spare 1" conduits, stubbed out of the top of each flush-mounted panel and
24 terminated in accessible ceiling space, with each conduit tagged with panel description.
25

26 **3.11 TESTING AND INSPECTION**

- 27
- 28 A. Provide personnel and equipment, make required tests, and secure required approvals from the
29 Architect and governmental agencies having jurisdiction.
30
- 31 B. Make written notice to the Architect adequately in advance of each of the following stages of
32 construction:
33
- 34 1. Test all parts of the electrical system and prove that all such items provided under this
35 Section function electrically in the required manner.
 - 36 2. Immediately submit to the Architect a report of maximum and minimum voltages and a
37 copy of the recording volt-meter chart.
 - 38 3. Also measure voltages between phases and between phase wires and neutrals and
39 report these voltages to the Architect.
40

41 **3.12 PROJECT COMPLETION**

- 42
- 43 A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the
44 electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material,
45 and using only the type cleaner recommended by the manufacturer of the item being cleaned.
46
- 47 B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the
48 operations and maintenance manual required to be submitted under Article 1.3 of this Section of
49 these Specifications.
50

51 **END OF SECTION**

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

GENERAL REQUIREMENTS

These specifications generally follow the design guidelines established by the "Standard Specifications for Public Works Construction" by the City of Madison, Wisconsin. The standards can be found at <http://www.cityofmadison.com/business/pw/specs.cfm>. Work not specified herein or as directed by the Owner shall follow these standards.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

GENERAL REQUIREMENTS

These specifications generally follow the design guidelines established by the "Standard Specifications for Public Works Construction" by the City of Madison, Wisconsin. The standards can be found at <http://www.cityofmadison.com/business/pw/specs.cfm>. Work not specified herein or as directed by the Owner shall follow these standards.

END OF SECTION 31 20 00

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SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

GENERAL REQUIREMENTS

These specifications generally follow the design guidelines established by the "Standard Specifications for Public Works Construction" by the City of Madison, Wisconsin. The standards can be found at <http://www.cityofmadison.com/business/pw/specs.cfm>. Work not specified herein or as directed by the Owner shall follow these standards.

END OF SECTION 32 13 13

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

GENERAL REQUIREMENTS

These specifications generally follow the design guidelines established by the “Standard Specifications for Public Works Construction” by the City of Madison, Wisconsin. The standards can be found at <http://www.cityofmadison.com/business/pw/specs.cfm>. Work not specified herein or as directed by the Owner shall follow these standards.

END OF SECTION 32 12 16

SECTION 32 33 00 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, shop drawings showing installation and color Samples.
- B. Maintenance Data: Include recommended methods for repairing damage to the powder coat finish.
- C. Store bicycle parking racks in original undamaged packages and containers until ready for installation.
- D. Handle powder coated bicycle parking racks with sufficient care to prevent any scratches or damage to the finish.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, hot-dip galvanized.
- B. Steel Pipe: ASTM A 53/A 53M or ASTM A 13, hot-dip galvanized.
- C. Steel Tubing: ASTM A 500 0, hot-dip galvanized.
- D. Steel Finish: Powder coat, color as selected by City Parks Staff from full line of manufacturer's standard colors.

2.2 SITE FURNISHINGS

- A. Bicycle Racks:
 - 1. Basis of Design: Madrax Spartan
 - 2. Bicycle Rack Construction: Steel galvanized steel tubing
 - 3. Style: Double-side parking
 - 4. Installation Method: Surface mount on concrete slab, anchor with 1/2" stainless steel expansion anchors with 3" embedment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Handle and install bicycle parking racks in accordance with manufacturer's recommendations and installation instructions.
- B. General: Anchor bicycle rack securely, positioned at locations and elevations indicated.

END OF SECTION 32 33 00

SECTION 32 92 00 - TURF AND GRASSES

PART 1 - GENERAL

GENERAL REQUIREMENTS

These specifications generally follow the design guidelines established by the "Standard Specifications for Public Works Construction" by the City of Madison, Wisconsin. The standards can be found at <http://www.cityofmadison.com/business/pw/specs.cfm>. Work not specified herein or as directed by the Owner shall follow these standards.

END OF SECTION 32 92 00

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1 **SECTION 33 11 00 - WATER UTILITY DISTRIBUTION PIPING**

2
3
4 **PART 1 - GENERAL**

5
6 **1.01 SCOPE**

- 7
- 8 A. The work under this section shall consist of providing all work, materials, labor, equipment, and
- 9 supervision necessary to provide water distribution system components and other work, as
- 10 required in these specifications, on the drawings and as otherwise deemed necessary to complete
- 11 the work.
- 12
- 13 1. All materials and methods shall meet the City of Madison public works standards
- 14 Articles 701 thru 704.

15
16 **1.02 REFERENCE**

- 17
- 18 A. Applicable provisions of Division 1 shall govern all work under this Section.

19
20 **1.03 REFERENCE STANDARDS**

- 21
- 22 A. American Society for Testing and Materials (ASTM):
- 23 B88 Standard Specifications for Seamless Copper Water Tube
- 24 C504-00 Rubber-Seated Butterfly Valves
- 25 C509-01 Resilient-Seated Gate Valves for Water Supply Service
- 26 C515-01 Reduced Wall, Resilient Seated Gate Valves for Water Supply Service
- 27 C800-01 Underground Service Line Valves and Fittings
- 28

29 **1.03 SUBMITTALS**

- 30
- 31 A. Provide manufacturers product information (cut sheets) and O&M information for watermain
- 32 materials including:
- 33
- 34 1. Pipe
- 35 2. Fittings
- 36 3. Valves
- 37
- 38 B. Provide reports that document pressure and continuity testing procedures and results.
- 39
- 40 C. Provide copies of record drawings.
- 41

42 **1.04 QUALITY ASSURANCE**

- 43
- 44 A. Maintain and submit record drawings.
- 45
- 46 B. Conduct pressure testing, continuity testing and safe sampling as required in Part 3 – Execution.
- 47

48 **1.05 PERMITS/FEES**

- 49
- 50 A. Contractor shall be solely responsible for obtaining all permits necessary to complete the work.
- 51 Contractor shall pay all fees associated with obtaining permits. These include, but are not
- 52 limited to permits for work within public right-of-way, street opening permits, utility
- 53 connection permits, and plumbing permits.
- 54

55 **1.06 SURVEY AND STAKING**

- 56
- 57 A. Contractor shall be responsible for transferring benchmarks, control points, lines and grades
- 58 necessary to complete his work.

1
2 **1.07 RECORD DOCUMENTS**
3

- 4 A. Maintain record drawings that show the actual locations, sizes and types of utilities and other
5 features encountered.
6
7 1. Note any modifications to proposed watermain size, alignment, or grades.
8 2. Record any other deviations from the original design.
9

10
11 **PART 2 - PRODUCTS**
12

13 **1.01 COPPER WATER SERVICE**
14

- 15 A. Type K, soft copper tubing meeting the requirements of ASTM B88.
16
17 B. Copper watermain 1½" inch diameter and larger shall be provided in straight lengths, not roll
18 stock.
19

20 **1.02 SADDLES**
21

- 22 A. Saddles are required at:
23
24 1. All 1-½-inch and 2-inch service lateral taps.
25 2. All service lateral taps on PVC, HDPE, or CIPP-lined water mains.
26
27 B. Approved saddles:
28
29 1. Ford Series 202B double strap brass saddle.
30 2. A.Y. McDonald - Series 3825 saddles (double strap).
31

32 **1.03 COUPLINGS**
33

- 34 A. Couplings shall be copper-to-copper fittings.
35
36 1. Compression couplings are only permitted when reconnecting existing copper tubing to
37 new copper tubing.
38
39 B. Allowable couplings:
40
41 1. Mueller H15400.
42 2. Mueller HI5405.
43 3. Mueller H5403.
44 4. Mueller P15403.
45 5. Ford C44-33 / 44 / 66 / 77
46

47 **1.04 CORPORATION STOPS & SERVICE FITTINGS**
48

- 49 A. 1½-inch and 2-inch diameter Service Fittings (1/8 bends):
50
51 1. Mueller H – 15470.
52
53 B. Supply all Service Fittings (1/8 bends) with a fiber gasket.
54

55 **1.05 CURB STOPS**
56

- 57 A. 1 ½-inch and 2-inch diameter Curb Stops:
58
59 1. Mueller H15201.

1
2 **1.06 CURB BOXES**
3

4 A. Ensure that all curb boxes are complete, with covers marked "WATER".
5

- 6 1. Mark cover for air blowout connection "AIR CONNECTION".
7

8 B. Curb Box Assemblies shall include the following:
9

- 10 1. Brass screws.
11 2. 2½-inch new style flush fit cover.
12 3. 54-inch rods and guide rings.
13 4. 2½-inch screw type shaft.
14 5. 37-inch bottom section.
15 6. 29-inch top section.
16 7. 16-inch center section.
17

18 C. 1½-inch and 2-inch diameter Curb Boxes:
19

- 20 1. Tyler or Bingham and Taylor (Standard Valve Box).
21 2. No rods or rings.
22

23 **1.07 DISINFECTION CHEMICALS**
24

25 A. Dry chemicals:
26

- 27 1. Chloride of Lime.
28 2. HTH.
29 3. Pittchlor.
30 4. Or equal (65 % available Chlorine), granular form only.
31

32 B. Liquid:
33

- 34 1. Only to be used with Engineer's written authorization.
35 2. Sodium hypochloric.
36

37 **1.08 BOARD INSULATION**
38

39 A. Rigid, closed-cell, extruded polystyrene insulation. Insulation shall be suitable for buried
40 installation.
41

42 B. Individual boards shall have minimum dimensions of 8'x4'x2".
43

44 C. Dow Styrofoam, or approved equal.
45

46 **1.09 LOCATOR TAPE**
47

48 A. Detectable metallic locator tape, specifically manufactured for marking utilities.
49

50 B. Tape shall be a minimum of 6" wide and designed to be detectable at a depth of 18".
51

52 C. Tape shall be marked "WATER" and blue colored.
53

54 **1.10 PIPE JOINT LUBRICANT**
55

56 A. Petroleum free pipe lubricant formulated for use with potable water systems. Product shall meet
57 the requirements of ANSI/NSF Standard #61.
58
59

1 **PART 3 - EXECUTION**

2
3 **3.01 GENERAL**

- 4
5 A. Complete exploratory excavations at utility crossings as shown on the plans and as necessary to
6 complete the work.
7
8 B. Maintain clearances between watermains and existing or proposed sewer lines as follows:
9
10 1. 8' horizontal separation (measured center to center) between watermains and existing or
11 proposed sanitary or storm sewers.
12 2. 6" vertical separation (measured from outsides of pipes) where watermains cross over
13 sanitary or storm sewers.
14 3. 18' vertical separation (measured from outsides of pipes) where watermains cross under
15 sanitary or storm sewers.
16
17 C. Store and handle pipe in accordance with manufacturers recommendations. Keep pipes clean of
18 soil, debris and animals.
19

20 **3.02 EXCAVATION**

- 21
22 A. Construct water mains and appurtenances in open trenches and in a manner to protect the pipe and
23 appurtenances from unusual stresses at all times.
24
25 B. Trench Excavation:
26
27 1. All excavation, sheeting, shoring and bracing shall be done in accordance with the latest
28 edition OSHA regulations and any additional requirements specified in the Plans or
29 Contract Documents.
30 2. Provide all sheeting, bracing and/or shoring necessary to protect the work, existing
31 property, utilities, pavement, etc., and to provide safe working conditions in the trench. All
32 costs of sheeting, bracing and/or shoring is considered incidental to any work which
33 necessitates it.
34 3. When not in use, remove sheeting and bracing, unless permission to leave in-place has
35 been given in writing by the Engineer.
36 4. Excavate trenches in conformity with the required alignment and grades as shown on the
37 drawings and as laid out in the field by the Engineer.
38 5. Remove all vegetation and topsoil along the trench line to the width of the proposed trench
39 before beginning excavation.
40 6. Deposit material excavated from the trench on the sides of the trenches and excavations,
41 beyond the reach of slides. Transport material to spoil banks as an alternative.
42
43 C. Properly dispose of surplus material at no additional cost to the City. Surplus material
44 includes but is not necessarily limited to:
45
46 1. Vegetation from the trench line.
47 2. Excavated rock or cobbles in excess of 6-inches in diameter.
48 3. All other material from excavation not needed or suitable for backfilling trenches.
49
50 D. For water main construction, the width of the trench shall be such as to leave a clear space of not
51 less than 6-inches between the earth wall, or the supporting sheeting or bracing where such is
52 used, and the sides of the pipe. The trench width established by this pipe clearance, measured at
53 the spring line, shall be applicable to that portion of the trench from 1-foot above the top of the pipe
54 to the bottom of the trench.
55
56 E. On streets opened to traffic, on restricted easements, and other specified locations, minimize the
57 width of the trench at the ground surface to the extent possible to accommodate the pipe installation
58 and any necessary sheeting or bracing.
59

- 1 F. The Engineer reserves the right to limit the extent of excavation depending on the nature of the soil
2 and other conditions.
3
4 1. As ordered by the Engineer due to trees, fences, buildings, shrubs, etc., dig trenches by
5 hand.
6

7 **3.03 EXCAVATION IN POOR SOILS**
8

- 9 A. If, in the opinion of the Engineer, an artificial foundation is necessary because of the nature of the
10 excavated material, excavate the unsuitable material and replace with suitable specified material to
11 produce an acceptable pipe foundation.
12
13 B. The undercut depth shall be as directed by the Engineer but shall be a minimum of 1-foot below the
14 bottom of the pipe. Any work involved in forming a satisfactory foundation at depths of 1- foot or less
15 below the bottom of pipe will be considered to be incidental to the work.
16
17 C. Backfill this portion of the trench with specified approved bedding material and mechanically
18 compact the select fill prior to laying the pipe. Limit the width of the trench excavation to the outside
19 diameter of the pipe plus 2-feet, plus the amount necessary for sheeting and/or bracing.
20

21 **3.04 DEWATERING**
22

- 23 A. In accordance with these Specifications, remove by pumping, bailing, or otherwise, any water that
24 may accumulate or be found in the trenches and other excavations.
25
26 B. Form all dams, flumes or other works necessary to keep the trenches or excavations entirely clear
27 of water while the water mains and their appurtenances are being installed.
28
29 1. Direct all water from excavations, so as not to flow over or damage private or public
30 property.
31 2. All costs of dewatering are considered to be incidental to the associated work.
32

33 **3.05 BACKFILL REQUIREMENTS**
34

- 35 A. Backfill trenches and excavations immediately after the water main and appurtenances have been
36 installed.
37
38 B. Close trenches at the end of every day.
39
40 C. Backfill to the original surface elevation or otherwise specified elevation. In the event of a shortage
41 of material to perform this work, including replacement as may be required by rock excavation or
42 removal of boulders, provide the necessary fill material at no cost to the City.
43
44 D. Except as may be necessary in compacting and backfilling, do not walk or work on installed pipe
45 until the trench has been backfilled to an elevation at least 2-feet above the top of the pipe. Do not
46 take backfill material from trench walls below an elevation 2-feet above the top of pipe.
47
48 E. Evenly place backfill material so that no unbalanced pressures are placed upon the water system.
49 Backfill material may be dumped directly into the trench from trucks when the amount of material to
50 be dumped is controlled by proper equipment.
51
52 F. Deposit, spread and level backfill material in layers not exceeding 12-inches in thickness before
53 compacting. Compact each layer to the density specified herein before placing the succeeding
54 layer. When the material being compacted is of a granular nature and the compacting equipment
55 is adaptable for the purpose, the thickness of the layer may be increased to a maximum of 24-
56 inches at the Engineer's discretion, provided the required compaction density is obtained.
57
58 G. Only use heavy equipment in the trench for compaction or other purposes if the pipe is adequately
59 protected and the Engineer approves. Trucks, vehicles, or other equipment are not allowed within

1 the limits of the trench prior to the completion of the backfilling operations.

2
3 H. Dump imported backfill material along the top of the trench beyond the reach of slides. Do not store
4 imported material such that it increases the stresses on the trench section.

5
6 I. Carefully draw and remove any required sheathing and bracing such that it will not disturb the
7 completed work. Carefully fill and compact any voids created by the removal of sheathing and
8 bracing with approved backfill material.

9
10 J. Whenever possible, backfill trenches and other excavations with materials excavated during the
11 course of the work.

12
13 K. Do not include vegetation, stones, or fragments of broken rock in excess of 6-inches in any
14 dimension in the backfill.

15
16 L. Note that the Engineer may reject material due to:

- 17 1. Unacceptable moisture content.
- 18 2. Unacceptable gradation or composition
- 19 3. The presence of frozen material.
- 20 4. Remove all rejected materials from the site.

21 22 23 **3.06 CAMPACTION REQUIREMENTS**

24
25 A. Mechanically compact backfill layers in trenches and excavations to thoroughly consolidate the
26 material to the density specified and to not damage or disturb the pipe or other structures.

27
28 B. Begin mechanical compaction of the backfill material when the depth of the backfill material is 2-feet
29 above the top of the pipe. (In the case of structures, begin compaction of the backfill material with
30 the placing of the first layer of backfill material).

31
32 C. The Engineer will perform compaction testing as necessary to verify uniformity of compaction.

33
34 D. Compaction Density Requirements:

35
36 E. From 2-feet over the pipe to within 3-feet of the bottom of subgrade:

- 37 1. A minimum of 90% of maximum density.

38
39
40 F. Within 3-feet of the bottom of subgrade:

- 41 1. A minimum of 95% of maximum density.

42
43
44 G. Determine maximum density in accordance with the Standard Method of Test for the Moisture-
45 Density Relations of Soils, ASTM Designation: D 1557, Method D, latest revision. Replace the
46 fraction of material retained on a $\frac{3}{4}$ -inch sieve, with No. 4 to $\frac{3}{4}$ -inch material.

47
48 H. Determine the density of compacted backfill in accordance with one of the following: Test for
49 Density of Soil-in-Place by the Sand-Cone Method, ASTM Designation: D 1556, latest revision, or
50 Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods, ASTM Designation: D
51 2922, latest revision.

52
53 I. In the event that the material in the density sample differs in percentage of aggregate retained on a
54 No. 4 sieve from that in the sample upon which maximum density was determined, adjust the
55 maximum density in accordance with approved procedures.

56
57 J. In the event of inadequate moisture in the backfill materials, add water as necessary to obtain the
58 required compaction.

59

1 K. Whenever the work of installing water pipes takes place during freezing weather, follow the
2 specifications for trench compaction above, if practicable. If the specified compaction cannot be
3 achieved, and the Engineer determines that the work may not be suspended until more favorable
4 weather conditions exist, proceed as follows:

- 5
- 6 1. Remove all frozen material in the trench at the beginning of the day's work.
- 7 2. Do not compact frozen materials.
- 8 3. Compact material in 6-inch maximum lifts.
- 9 4. Compact to densities specified herein.

10

11 L. If the top 3-feet of material does not meet 95% of maximum density, remove the material and place
12 Select Fill using 6-inch maximum lifts and compact to 95% of maximum density.

13

14 M. As a guideline, no construction will be permitted when the temperatures are too cold to achieve the
15 specified compaction of the backfill. Ensure that temperatures are at least 15°F and rising, with
16 winds less than 10 mph, before considering working in freezing conditions.

17

18 **3.07 BEDDING AND INITIAL COVER**

19

20 A. Watermain and water service piping shall be provided with 4" of bedding material and 12" of
21 initial cover material (both measured at the bell of the pipe).

22

23 B. Bedding and cover material for various types of pipe shall consist of the following:

- 24
- 25 1. Copper Water Services: Bedding sand or crushed stone screenings.

26

27 **3.08 INSTALLING FITTINGS AND VALVES**

28

29 A. Install fittings and valves at locations shown on the drawings.

30

31 B. Unless otherwise shown, provide mechanical joint connections. Install materials in accordance
32 with manufacturer's recommendations.

33

34 C. Maintain electrical continuity through all fittings, valves and hydrants. Provide and install suitable
35 jumper cables for epoxy coated valves.

36

37 D. tall valve box so that bonnet rests on compacted initial backfill material at the same elevation as
38 the top of the valve stuffing box. Center the valve box over the valve nut.

39

40 E. Install valve box plumb and level, backfilling evenly. Extend valve box to proposed final grade;
41 provide valve box extensions as necessary. Valve boxes that shift during backfilling or restoration
42 shall be excavated and re-set.

43

44 **3.09 INSTALLATION OF COPPER WATER SERVICES AND BRASS FITTINGS**

45

46 A. Connect copper water service piping to watermain, wellhouse, or other supply as shown on the
47 drawings.

48

49 B. Watermain taps shall be made under pressure using a tapping machine specifically designed to
50 tap and install corporation stops. Dry watermain taps are not allowed.

51

52 C. Service saddles shall installed on services where the corporation stop is 1 ½" nominal diameter or
53 greater.

54

55 D. Provide a horizontal offset adjacent to the main for all copper services. Comply with pipe
56 manufacturer's requirements with respect to minimum radius on bends.

57

58 E. Install curb stops as shown on the drawings. If specific curb stop location is not shown on the

1 plans, consult with DFD Construction Representative to determine acceptable location prior to
2 installing.

- 3
- 4 F. Place curb stop box on a 4"x8"x8" solid concrete masonry unit set on compacted ground. Orient
5 box so that no portion of the box bears on the water service or curb stop.
- 6
- 7 G. Install curb stop box plumb and level, backfilling evenly. Extend curb stop box to proposed final
8 grade; provide extensions as necessary. Curb stop boxes that shift during backfilling or restoration
9 shall be excavated and re-set.
- 10
- 11 H. Mark all curb stop boxes with a steel "U" fence post to protect them from damage.
- 12
- 13 I. Install copper water service as shown on the drawings. Limit the number of water service joints,
14 using full lengths of pipe whenever possible.
- 15
- 16 J. Prepare copper pipe joints in accordance with pipe and fitting manufacturer recommendations.
17 Cut pipe squarely, remove burs and round ends as necessary.
- 18
- 19 K. Install fittings in accordance with manufacturers recommendations. Torque compression
20 connections to recommended tightness; do not over-tighten compression joints.
- 21
- 22 L. Provide dead-end copper water services with compression connectors fitted with plugs. Do not tap
23 the ends of copper water services shut. Mark the location of dead-end services with an 8' long
24 4x4 timber and steel "U" fence post.
- 25

26 **3.10 COPPER SERVICE LATERALS**

- 27
- 28 A. Provide and install saddles on all 1-1/2-inch and 2-inch services and at all service lateral taps on
29 new or existing PVC, HDPE, or CIPP-lined water mains. Use a standard valve box in lieu of a curb
30 box, with no rod or rings required, for all 1-1/2-inch and 2-inch services.
- 31
- 32 B. Use a pipe cutter to cut all copper tubing. Hacksaws or other such devices to cut copper tubing are
33 not permitted.
- 34
- 35 C. Excavate and expose the area on the water main for new service connections, as noted on the
36 drawings or as otherwise instructed by the Engineer. Maintain a separation distance of at least 18-
37 inches between adjacent service taps and between a service tap and a pipe joint or fitting. Locate
38 the tap on the upper half of the main at a 45° angle from the vertical plane, perpendicular to the
39 water main and on the side of the main to which the service extends.
- 40
- 41 D. Tap the water main and install the corporation stop using a tapping machine specifically designed to
42 tap water main under pressure. No other method of tapping the water main will be allowed. Repair
43 and replace any cut or removed polyethylene encasement following the tap to ensure that the water
44 main is fully protected.
- 45
- 46 E. After the tap has been made and the corporation stop and bend have been inserted, loop the
47 copper tubing out and then back toward the main, then back away from the main to form the shape
48 of a vertical "S". Ensure that the "S" loop is of sufficient size so that it uses a minimum of 2-feet of
49 copper tubing. Ensure that the highest portion of the loop is not higher than the top of the water
50 main.
- 51
- 52 F. Lay the service flat to the property line or otherwise indicated point of termination. Provide a
53 minimum of 6-feet of cover below finished grade.
- 54
- 55 G. Place at least 1-foot of approved bedding material around the copper service pipe. The bedding
56 material is considered incidental to the cost of backfilling the service lateral trenches. Protect all
57 laterals and appurtenances from damage when backfilling. Stones 3-inches in diameter or larger
58 are not allowed within 18-inches of the copper service. Backfill containing rocks 3-inches or larger
59 may not be placed around curb boxes.

1
2 H. Restore any disturbed terrace or turf areas associated with the lateral installation work. Any terrace
3 or turf restoration work is considered incidental to any work associated with service laterals.
4

5 I. Coordinate with property owners to allow for flushing service laterals both prior to and immediately
6 after any work impacting a service. Resolve any problems with property owners, including but not
7 limited to problems regarding discolored water or low/no water flow.
8

9 **3.11 FILLING WATERMAIN**

10
11 A. Fill watermain after main has been installed and completely backfilled.
12

13 B. Fill main slowly to limit entrapped air and evenly distribute calcium hypochlorite. Open all
14 hydrants completely to allow air to escape and monitor filling.
15

16 C. Once main is full, allow a minimum of 48 hours time for disinfection to occur before flushing.
17

18 **3.12 PRESSURE TESTING**

19
20 A. Pressure test all watermain and copper water services.
21

22 B. Provide all valves fittings, joint restraints, hoses, compressors, and water and power supply as
23 necessary to complete pressure testing. Utilize testing apparatus that is fabricated specifically for
24 testing watermains. Calibrate pressure gauges as necessary.
25

26 C. Flush main as necessary to remove air prior to testing. Comply with the requirements of this
27 section with respect to flushing.
28

29 D. For longer installations or installations consisting of watermain and copper water service, the
30 Contractor may elect to pressure test the system in short segments.
31

32 E. All pressure testing shall be conducted in the presence of the Owner's representative. Provide
33 minimum of 48 hours advanced notice of testing.
34

35 F. Conduct a combined pressure/leakage test for 1 hour at a pressure equal to 150% of system
36 normal operating pressure (as measured at the lowest point in the system), or a minimum
37 pressure of 150 psig.
38

39 G. When conducting test, pressure test equipment shall be set-up as close to the highest point in the
40 line as possible.
41

42 H. Make-up water for the test shall be clean potable water supplemented with ½ oz of dry calcium
43 hypochlorite per 35 gallons of water.
44

45 I. Leakage for test shall not exceed gallons per hour as allowed by the attached formula:
46

$$47 \quad G = (ND\sqrt{P})/7400$$

48

49 Where: G= Allowable leakage (gallons per hour of test)

50 N=Number of joints under test

51 D=Nominal diameter of main (inches)

52 P=Average pressure during test (psig)
53

54 J. Record and document pressure test by recording the following information:
55

56 1. Date of test

57 2. Section tested

58 3. Diameter and length of main under test

59 4. Number of fittings, valves hydrants, etc.

- 1 5. Results of test including test length, pressure, actual water loss
- 2 6. Calculation of allowable leakage
- 3 7. If a failed test, describe actions taken to eliminate leaks and results of re-testing
- 4

5 K. Submit reports documenting pressure testing.

6

7 **3.13 CONTINUITY TESTING**

8

9 A. At the request of the Owner's Representative, conduct continuity test on all ductile iron watermain and copper water services.

10

11

12 B. The continuity test shall be performed using an multi-meter to verify electrical continuity of the watermain system.

13

14

15 C. The Contractor shall furnish all labor and equipment necessary to conduct the continuity test.

16

17 D. Document continuity testing by recording the following information:

- 18
- 19 1. Date of test
- 20 2. Test methods and equipment
- 21 3. Section tested
- 22 4. Diameter and length of main under test
- 23 5. Number of fittings, valves hydrants, etc.
- 24 6. Results of test including resistance
- 25 7. If a failed test, describe actions taken to eliminate leaks and results of re-testing
- 26

27 E. Submit reports documenting continuity testing.

28

29 **3.14 DISINFECTION/FLUSHING**

30

31 A. After filling the main, allow a minimum of 48 hours time for disinfection to occur before flushing.

32

33 B. Flush all sections of watermain and water service. When possible, utilize hydrants or other large diameter orifices to complete flushing and achieve 2.5 fps water velocity. If needed, utilize services or temporary connections to complete flushing.

34

35

36

37 C. All watermain and services shall be flushed for a minimum of 10 minutes, or as necessary to obtain a sediment-free and bacteriologically safe sample.

38

39

40 D. Utilize diffusers, hoses, settling basins and other devices as necessary to limit erosion and other damage to the site and downstream areas.

41

42

43 E. Contractor shall be responsible for providing all necessary fitting, valves, joint restraints, hydrants and other materials necessary to conduct flushing.

44

45

46 F. Submit reports documenting disinfection and flushing.

47

48 **3.15 BACTERIOLOGICAL SAMPLE**

49

50 A. Following all pressure testing and flushing, the contractor shall collect a sample from the newly installed watermain or water service(s). Samples shall be submitted to the State Laboratory of Hygiene, or other licensed testing laboratory for bacteriological (colliform bacteria) analysis.

51

52

53

54 B. The Contractor shall be responsible for all costs associated with sample collection(s) and analysis.

55

56

57 C. Document bacteriological sample collection and analysis by recording the following information:

- 58 1. Date of sample collection
- 59

- 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10
 - 11
 - 12
 - 13
 - 14
2. Sample collection methods and equipment
 3. Person collecting the sample
 4. Location(s) sample was collected
 5. Results of sample analysis
- D. If sample results indicate water is “Unsafe – Colliform Bacteria Present”, Contractor shall re-disinfect watermain and water services by introducing additional chlorine into the line and re-flushing the main. This process shall be repeated as necessary until a clean sample is obtained. The Contractor shall be responsible for all costs associated with all efforts necessary to obtain a “Safe – Coliform Bacteria Not Present” sample.
- E. Submit reports documenting bacteriological sample collection and analysis.

END OF SECTION

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.01 SCOPE

- A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the sanitary sewer work required in these specifications and on the drawings. This specification shall apply to all sanitary sewer work beginning at a point five 5' outside of the building wall, unless otherwise specified. Included are the following topics:
 - 1. All materials and methods shall meet the City of Madison public works standards Articles 501 thru 509.

1.02 REFERENCE

- A. Applicable provisions of Division 1 shall govern all work under this section.

1.03 REFERENCE STANDARDS

- A. Where these specifications do not cover portions of the work to be undertaken, the Standard Specifications for Sewer and Water Construction in Wisconsin, current edition, shall govern the work.
- B. American Society for Testing and Materials (ASTM):
 - D1784-03 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
 - D2564-04 Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
 - D2680-01 Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
 - D3034-04a Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - D3212-96a(2003)e1 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
 - D3350-05 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
 - D4673-02 Standard Classification System for Acrylonitrile-Butadiene-Styrene (ABS) Plastics and Alloys Molding and Extrusion Materials
 - F477-02e1 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - F679-03 Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

1.04 SUBMITTALS

- A. Provide manufacturers product information (cut sheets), shop drawings and O&M information for sewer materials including:
 - 1. Pipe
 - 2. Fittings
- B. Provide reports documenting pressure testing, mandreling, and televising.
- C. Provide copies of record drawings.

1.05 RECORD DRAWINGS

- A. Maintain record drawings that show the actual locations, sizes and types of utilities and other features encountered.
- B. Note any modifications to proposed sewer system size, location or elevation. Record any other deviations from the drawings.

PART 2 - MATERIALS

2.01 GENERAL

- A. Conform all materials to the size and type shown on the plans or as called for in the specifications and to applicable Laws, Codes, and Ordinances.
- B. All products and materials are to be new, undamaged, clean, and in good condition. Existing products and materials are not to be reused unless specifically indicated.
- C. Be responsible for the safe storage and handling of all materials utilized in the work. Store all materials in areas designated by the Construction Representative in cooperation with the Owner.
- D. Perform all work in accordance with any applicable manufacturer's instructions.

2.02 PIPE

- A. Provide the size, type and class/schedule of pipe as indicated on the drawings.
- B. Use only pipe supplied from the same manufacturer, and of the same type, unless otherwise specified or approved in advance by the Engineer.
- C. Only pipe, joints, material and installation approved by Wisconsin Department of Natural Resources and/or the Department of Commerce for the intended use in the State of Wisconsin shall be used.

2.03 PVC PIPE

- A. Conform to ASTM D-3034 with solvent weld or elastomeric joints. Pipe shall be SDR-35, unless otherwise noted. Pipe over 15 inches in diameter shall meet the requirements of ASTM F679-03. Do not mix different manufacturer's products, or fittings.
- B. PVC fitting joint type and SDR shall be same as the pipe that the fitting is connected to.

2.04 HDPE PIPE

- A. Conform to ASTM D-3350 for PE material with a cell classification of 335434C or better. Pipe shall be SDR 11, unless otherwise noted. Joints shall be thermal butt fusion in accordance with the manufacturer's recommendation.
- B. HDPE pipe fittings shall be thermal fusion weld type of the same or greater SDR as the pipe that the fitting is connected to. Provide transition fittings when connecting to existing piping, or where shown on the drawings.

2.05 CONNECTIONS FOR DISSIMILAR PIPE MATERIALS

- A. Where new sewer connects to and existing dissimilar pipe, the connection shall be made with a no hub type coupling meeting the requirements of CISPI 310. Couplings shall have neoprene gaskets with stainless steel shield, and multiple stainless steel clamps with worm gear tightening

device. The couplings shall be made specifically for the type and size of pipe materials being connected. Couplings shall be Fernco Husky or approved equal.

2.06 PIPE INSULATION

- A. Rigid, closed-cell extruded polystyrene insulation. Insulation shall be suitable for buried insulation.
- B. Individual boards shall have dimensions of 8'x4'x2".
Dow Styrofoam, or approved equal.

2.07 SANITARY LATERAL ELECTRONIC MARKERS

- A. Effective Dec. 31, 2006, Act 425, Chapter 182.0175 (2r) of the Wisconsin State Statutes requires that all non-metallic building sewers (including sanitary laterals, private sanitary sewers and storm sewer laterals) installed within the City Right of Way, shall be accompanied by a means of locating the newly installed underground pipe. Sewer mains that have manhole or inlet structures on both ends within the City Right of Way are considered exempt from this legislation.
- B. The City of Madison has selected a marker system that includes the installation of extended range ball markers over the sanitary sewer facilities, which after construction provide a signal that can be located by the city's utility locator after construction is complete.
- C. The 3M ScotchMark Electronic Ball Marker System Extended Range Marker (model #1404-XR) shall be considered an acceptable marker device for this specification. If an alternate equivalent marker is selected, contractor shall provide specifications and data sheets of the selected device to City Engineering prior construction in order for the City to confirm that the proposed marker device is compatible with the City's marking equipment.
 - 1. Markers shall be installed per manufacturer's written instruction. Electronic marker balls shall be installed in the trench directly above the sewer pipe.
 - 2. The key constraint is the maximum depth of the marker. The signal range of the 3M™ Electronic Marker System (EMS) 4" EXTENDED RANGE 5' BALL MARKER - WASTEWATER (MODEL 1404-XR) is 5 feet. However, electronic marker balls shall be installed at 4 feet from finished grade.
- D. The City shall provide the Contractor with the required number of electronic markers for City bid public works contracts. The Contractor shall be responsible for picking up the markers at the Engineering Service Building, 1602 Emil Street in Madison, Wisconsin.
 - 1. Upon completion, the City will test each electronic marker to confirm that it is installed and functioning properly. If it is determined that the marker has not been installed correctly and/or is not functioning properly, the Contractor shall be responsible for all work associated with the installation of a properly functioning marker. This work shall be done with the approval of the Construction Engineer and with no additional reimbursement to the Contractor.

PART 3 - EXECUTION

3.01 NOTIFICATION

- A. Contractor, prior to excavation work, shall notify all utilities, governmental agencies, or entities, known to, or which can reasonably be assumed to, have above or below ground pipe, conduit cables, structures or similar items within limits of project, to locate and mark location of such items. The Contractor shall expose potential pipe conflicts prior to installation of sewers to allow for any field changes to the design to be made.

3.02 GENERAL INSTALLATION OF SEWER PIPE

- A. Install all pipe in accordance with ASTM specifications which pertain to the specified type of pipe material and the installation situation.
 - 1. Do not use any pipe or fittings cracked in cutting or handling or otherwise not free from defects.
 - 2. Clean all pipe of any dirt and/or debris both inside and out prior to placing in the trench.
- B. Make joints in accordance with manufacturer's directions with due care to avoid damaging pipe and/or disturbing previously laid pipe.
- C. Cut pipe only according to manufacturer's directions.
- D. Lay all sewer pipes to horizontal alignment and grade shown on the plans with bell ends up hill. Establish and maintain horizontal alignment using total station, transit or theodolite. Use pipe laser or level to establish and maintain grade of pipe. Discrepancies from the required horizontal alignment or grade at any location shall not be greater than 0.10' or 0.05', respectively.
- E. Do not exceed specified trench widths.

3.03 TRENCH EXCAVATION

- A. Unless otherwise provided in the contract or permitted by the Engineer, the work of constructing sewers and allied works shall be done in open trenches and in a manner to protect the pipe lines or sewers from unusual stresses. When provided in the contract or permitted by the Engineer, the construction of sewers may be done by tunneling and/or jacking in lieu of open trenching; details of construction shall be indicated on the plan, specified in the contract, or established by the Engineer prior to beginning the work of tunneling and/or jacking. All of the work of constructing sewers shall be done in accordance with the applicable provisions of the "Wisconsin Administrative Code".
- B. The trenches shall be excavated in conformity with the required alignment and grades as shown on the plans and as laid out in the field by the Engineer. It shall be understood that the elevations for sewers, as shown on the plans, are subject to such revisions as may be necessary to fit field conditions and that the Engineer reserves the right to adjust the profile grades from those shown on the plan. No adjustment in compensation will be made for the grade adjustments not in excess of one(1) foot above or below the elevations shown on the plans.
- C. The Contractor shall remove all vegetation along the trench line to the width of the proposed trench before beginning excavation. Vegetation removed shall not be used as backfill in the trench, but shall be disposed of by the Contractor at no additional cost to the City. If the trench line is finished with pavement or other structures, removal of those items shall be completed as specified in Article 203 – Removal of Miscellaneous Structures with the exception that the sawcut shall be incidental to the trench excavation.
- D. The materials excavated from the trench shall be deposited on the sides of the trenches and excavations, beyond the reach of slides, or transported to spoil banks. For pipe sewers, the width of the trench shall be such as to leave a clear space of not less than six (6) inches nor more than twelve(12) inches between the earth wall, or the supporting sheeting or bracing where such is used, and the sides of the pipe. The trench width established by this pipe clearance, measured at the spring line, shall be applicable to that portion of the trench from one (1) foot above the top of the pipe to the bottom of the trench. On streets opened to traffic, on restricted easements, and in such other locations as the Engineer directs, the width of the trench at the surface of the ground shall be limited to the outside diameter of the pipe plus two (2) feet plus the amount necessary for sheeting or bracing.
- E. Surplus material shall be considered to include vegetation from the trench line, excavated rock or boulders larger than six (6) inches in diameter, and all other material from excavation not needed or

suitable for backfilling trenches. Unless otherwise specified, surplus material shall be the property of the Contractor, and shall be disposed of at no additional cost to the City. Unless otherwise provided, the Contractor shall provide all the sheeting or bracing needed to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the trench. Such sheeting and bracing shall be according to the Contractor's design and shall comply with the "Wisconsin Administrative Code". Removal of any sheeting or bracing from the trench shall be accomplished in such a manner as to fulfill the above requirements. Sheeting and bracing shall be removed unless specific permission is given by the Engineer to leave it in place. Costs of this work shall be at the Contractor's expense.

- F. The Engineer reserves the right to limit the extent of excavation in advance of pipe laying and backfilling depending on the nature of the soil and other conditions affecting the work.
- G. The Engineer reserves the right to order additional excavation where unsuitable foundation conditions exist. When this condition arises, the excavation shall be carried to such depth as directed by the Engineer. The maximum width of the extra trench excavation shall be the outside of the proposed structure plus two (2) feet plus the amount necessary for sheeting or bracing. Mechanically compacted crushed stone and/or washed gravel shall be installed to replace the excavated materials to subbase grade.
- H. When directed by the Engineer, the Contractor shall uncover utility lines within the proposed construction limits in advance of the construction as specified in Article 508. Work necessary to expose existing underground facilities that are part of the Contractor's statutory obligation during the normal storm sewer, sanitary sewer, electrical conduit or water main installation shall be considered as incidental to those respective items and will not be paid for as utility line openings.

3.04 ROCK EXCAVATION

- A. Rock excavation shall include all hard, solid rock in ledges, bedded deposits and unstratified masses and all conglomerate deposits or any other material so firmly cemented as to present all the characteristics of solid rock; which material is so hard or so firmly cemented that, as determined by the Engineer, it is not practical to excavate and remove same with a power shovel except after thorough and continuous drilling and blasting. Power shovels as referred to above shall be taken to apply to a modern power shovel or backhoe of not less than three-quarters cubic yard manufacturer's rated capacity, having adequate power and being in good running condition in the hands of an experienced operator. Rock excavation shall also include all rock boulders necessary to be removed having a volume of one (1) cubic yard (9 cubic feet) or more. Rock excavation shall not apply to plain or asphaltic bound bases or surface courses of macadam, gravel, or broken stone.
- B. Rock excavation shall be carried to a depth of six (6) inches below the outside of the sewer, and to a width limited to the outside diameter of the pipe plus two (2) feet. Rock excavation shall be carried to a depth of eight (8) inches below the outside of the sewer for sewer access structures up to ten (10) feet deep and twelve (12) inches below the outside of the sewer for sewer access structures over ten feet deep. The horizontal limit for rock excavation shall be the outside dimensions of the sewer access structure plus two (2) feet.

3.05 DEWATERING

- A. The Contractor shall provide and maintain ample means and devices with which to promptly remove all water entering excavations, trenches, and other parts of the work and shall keep said excavations dry until the structures to be built therein are completed. No masonry shall be installed in water nor shall water be allowed to rise over masonry and concrete until the mortar and concrete have attained final set. In no event shall water be allowed to rise over masonry or concrete if there is danger of flotation or of setting up unequal pressures in the concrete until the concrete has set at least twenty- four (24) hours and any danger of flotation has been removed.

3.06 BEDDING OF SEWER PIPES

- A. The bedding, or foundation, for sewer pipes shall be constructed to prevent settlement of the pipes and to avert excessive pressure on the pipes in order to avoid rupture, leakage or deformation of the pipes. Unless otherwise specified in the Special Provisions of the contract, all sanitary and storm sewer pipes, including sanitary sewer laterals and storm sewer leads, shall be constructed with the type of bedding that is specified for the type of pipe installed, as shown on the Standard Detail Drawing 5.2.1, Storm and Sanitary Sewer Beddings.
- B. The width of the bedding shall be equal to the width of the trench. The depth of the bedding shall extend from an elevation at least six (6) inches below the bottom of the pipe to an elevation at least twelve (12) inches above the top of the pipe. All bedding shall be mechanically compacted, including crushed stone and washed gravel. Sand or limestone screenings used for bedding shall conform to the following gradation:

Passing 3/4" sieve	100%
Passing #200 sieve	0-10%
- C. Washed gravel and crushed stone used for bedding shall conform to the following gradation:

Passing 1" sieve	100%
Passing 1/2" sieve	35-60%
Passing #200 sieve	0-10%
- D. Washed gravel or crushed stone shall be used for all pipe sizes over ten (10) inches in diameter, and for smaller sizes when directed by the Engineer. With the approval of the Engineer, the maximum size of the washed gravel or crushed stone may be increased, and screened crushed stone may be substituted for washed gravel.

3.07 BACKFILLING EXCAVATIONS AND COMPACTION OF BACKFILL

- A. Unless otherwise provided, all trenches and excavations shall be backfilled immediately after the sewers and appurtenances have been constructed therein. In covering the sewers and filling around structures, the backfill material shall be brought up evenly on all sides so that no unbalanced pressure is brought to bear upon the pipe and masonry.
- B. The Contractor shall be required to backfill all excavations to the original ground elevation unless otherwise specified in the contract or ordered by the Engineer. In the event of a shortage of material to perform this work, including replacement as may be required by rock excavation or removal of boulders, the Contractor shall provide the necessary material at no additional cost to the City.
- C. Walking or working on the completed pipe sewers, except as may be necessary in compacting and backfilling, shall be prohibited until the trench has been backfilled to an elevation at least two (2) feet above the top of the pipe. No trucks, vehicles, or other equipment shall be allowed within the limits of the trench prior to the completion of the backfilling operations, unless authorized by the Engineer for compaction or other purposes.
- D. Backfill material hauled to the project shall be dumped along the top of the trench beyond the reach of slides and placed in the trench with the proper backfilling equipment. Backfill material may be dumped directly into the trench from trucks when the amount of material to be dumped is controlled by partially opening the tailgates, and only when authorized by the Engineer.
- E. Trenches shall be hand backfilled to an elevation at least one (1) foot above the top of the pipe. The material for this portion of the backfill shall not contain stones, or hard or frozen lumps of earth. For plastic sewer pipes, this material shall be the same classification as the bedding. The equivalent of hand backfill may be accomplished by lowering a clam bucket or material to a point immediately above and approximately one (1) foot from the sewer and slowly releasing the fill; for reinforced concrete pipe or corrugated metal pipe, the material may be deposited on a slope, equal to the angle of repose of the material, and allowed to flow progressively forward in such a

manner as to avoid impact on the pipe and to avoid uneven pressures on either side of the pipe which may disturb its grade or alignment. Backfill material shall not be taken from trench walls below an elevation of two feet above the top of the pipe. The remainder of the trench shall then be filled carefully in a manner satisfactory to the Engineer. The compaction sections are detailed in Standard Detail Drawing 5.2.2, Typical Trench Compaction & Standard Detail Drawing 5.2.3, Typical Trench Compaction (Greenway/Park).

- F. All corrugated metal culverts shall be hand backfilled and mechanically tamped to an elevation at least one (1) foot above the top of the culvert. Extreme care shall be taken so as to assure complete filling and compaction under the culvert and between the culvert and the walls of the trench. If trucks or other heavy equipment used on the project are to travel over the newly installed culvert, then the Contractor shall place a minimum cover of twelve (12) inches of fill over the culvert to protect it during this period. This protective layer of fill shall be thoroughly mechanically compacted.
- G. In the event that excavations have been sheathed or braced, the Contractor shall carefully draw and remove the sheathing and bracing in a manner which will not disturb the completed work. All openings left in removing sheathing and bracing shall be carefully filled with approved backfill material and properly compacted.
- H. Where the grade of the sewer is such that, in the opinion of the Engineer, the top surface of the sewer shall require protection, an embankment of earth or other material, satisfactory to the Engineer, shall be constructed over the sewer by the Contractor. The height of the embankment shall be one (1) foot above the top of the pipe unless otherwise specified or directed by the Engineer. The width at the top of the embankment shall be not less than two (2) feet wider than the external width of the sewer. The sides of the embankment shall slope from the top of the embankment to the existing ground surface in a ratio of not less than two (2) feet horizontally to one (1) foot vertically. The material used to construct the embankment shall be such surplus material excavated from trenches as shall be approved by the Engineer. Such selected material shall be furnished and placed in the embankment by the Contractor at no extra cost to the City. Should more material be needed to complete the embankment than can be obtained from surplus material excavated, such material shall be furnished by the Contractor, and will be paid for as provided herein. The material shall be compacted as provided in Subsection 202.3(b) – Standard Compaction of these Specifications.
- I. All material used for backfilling trenches and other excavations shall be subject to the approval of the Engineer. Unless otherwise specified or directed by the Engineer, the Contractor shall backfill trenches and other excavations with materials excavated in the course of the work. Whenever specified in the contract or directed by the Engineer, trenches and other excavations shall be backfilled with Select Fill. Vegetation and stones or fragments of broken rock in excess of six (6) inches in any dimension shall not be included in the backfill. In the event the Engineer rejects the excavated materials for backfilling due to the character of the material, including excess moisture content, gradation, composition, frozen material, or for whatever cause, the Contractor shall backfill the trenches and other excavations in the specified manner with Select Fill. In the event of lack of moisture in the backfill materials, the Contractor shall add water in quantities deemed necessary to secure the required compaction. In the event the excavated materials contain excess moisture, the Contractor shall, as directed by the Engineer:
 - 1. Suspend all work on the project for that period of time as may be necessary to allow the backfill materials to dry sufficiently prior to backfilling and compacting the backfill material, during which time work days shall not be charged against the Contractor, or
 - 2. Replace the excavated materials, in whole or in part, with Select Fill.
- J. Where the moisture content of the excavated materials is such that drying or adding water is necessary prior to backfilling and compaction, the Contractor may furnish acceptable materials for the backfill and dispose of the excavated materials, all at no additional cost to the City.
- K. Select Fill for backfilling trenches and other excavations shall be material as defined in Subsection 202.2(b) – Select Fill of these Specifications and shall be measured and paid as

defined in Subsection 502.2(g) – Select Backfill for Sewer of these Specifications. Excess excavated material resulting from the above work may be used in backfilling other trench areas, unless the material is declared unsuitable for backfill by the Engineer, in which case the material shall be considered surplus material and shall be disposed of by the Contractor at no additional cost to the City.

- L. Unless otherwise specified or directed by the Engineer, the backfill in all trenches and excavations shall be mechanically compacted in such a manner as to thoroughly consolidate the backfill material and not injure or disturb the pipe or other structure. The compaction of the backfill material shall be in accordance with the following requirements:
1. The material for the backfill shall be deposited, spread and leveled, as herein before provided, in layers generally not exceeding twelve (12) inches in thickness before compaction, except that when the material being compacted is of a granular nature and the compacting equipment is adaptable for the purpose, the thickness of the layer may be increased to a maximum of twenty-four (24) inches provided the required density is obtained. Each layer of the spread and leveled material shall be compacted, by means of suitable compaction equipment, to not less than the specified density before the succeeding layer is placed.
 2. All Pipe Trenches shall be compacted in conformance of Standard Detail Drawings 5.2.2 Typical Trench Compaction and 5.2.3 Typical Trench Compaction (Greenway Park). Compaction of the backfill material shall not begin until the depth of the backfill material is two (2) feet above the top of the pipe. In the case of structures, compaction of the backfill material shall begin with the placing of the first layer of backfill material. Backfills of three feet or less in depth below the proposed or existing subgrade shall be compacted to at least ninety-five (95) percent of maximum density for their full depth.

In city right of ways or as called for by the construction engineer, backfills over three (3) feet in depth below the proposed or existing subgrade shall have the top three (3) feet below the proposed or existing subgrade compacted to not less than ninety-five (95) percent of maximum density, and those portions more than three (3) feet below the proposed or existing subgrade shall be compacted to at least ninety (90) percent of maximum density.

In greenways and parks, in accordance to Standard Detail Drawing 5.2.3, backfills over three(3) feet in depth below the proposed or existing subgrade shall be compacted to at least ninety (90) percent of maximum density. If the proposed pipe is located horizontally within 15' of an existing or proposed asphalt or concrete surface, then the pipe compaction shall be completed in conformance of Standard Detail Drawing 5.2.2.
 3. The maximum density shall be determined in accordance with the Standard Method of Test for the Moisture-Density Relations of Soils, ASTM Designation: D 1557, Method D, with replacement of the fraction of material retained on 3/4-inch sieve with No. 4 to 3/4-inch material. The density of compacted backfill material shall be determined in accordance with the Test for Density of Soil-in-Place by the Sand-Cone Method, ASTM Designation: D 1556, the Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods, ASTM Designation: D 2922, or by other approved methods.
 4. In the event the material in the density sample differs in percentage of aggregate retained on a No. 4 sieve from that in the sample upon which maximum density was determined, the maximum density shall be adjusted in accordance with approved procedure.
 5. The foregoing density requirements will not apply to portions of backfills constructed of materials which, because of numerous large stones or high percentages of material retained on the No. 4 sieve, cannot in the determination of the Engineer be accurately tested in accordance with the above procedures for determining maximum or in place dry density.

- M. Whenever the work of installing sewers takes place during cold weather, the specifications for trench compaction above shall be followed if practicable. If the specified compaction cannot be achieved, and the Engineer directs that the work may not be suspended until more favorable weather conditions exist, then the following procedures shall be followed:
1. All frozen material in the trench shall be removed before beginning the day's work. As a method to achieve this, trenches shall be closed overnight.
 2. Materials shall be unfrozen when being compacted.
 3. The material shall be compacted in six (6) inch lifts in a manner normally done during warm weather construction and to a minimum density of ninety (90) percent compaction below the three (3) foot depth.
 4. If the top three (3) feet of material does not meet ninety-five (95) percent compaction, then pit run sand (hauled in if necessary) shall be compacted in the normal manner using six(6) inch lifts.
 5. The Engineer will have tests performed as necessary to provide uniformity of compaction.
 6. As a guideline, construction should cease when the temperatures are too cold to achieve the above. At least 15F and rising is a reasonable temperature if it is not extremely windy.

3.08 LAYING PIPE

- A. The pipe, fittings and accessories shall be of the size, class, type, and design; and shall be laid at the locations and to the required lines and grades; all as shown on the plans, required by the contract, or directed by the Engineer. Wherever the word "pipe" appears in this Subsection, it shall be understood to include pipe, fittings, and accessories.
- B. The proper installations of structures and fittings, whose locations are shown on the plans and laid out by the Engineer shall be accomplished by the use of random lengths of pipe furnished by the Contractor. All field cuts of all types of pipe, except reinforced concrete pipe, shall be made with an approved mechanical pipe cutter or with a power saw in order to make a straight, true cut without chipping and cracking the pipe. In the event the Contractor is unable to obtain a certain size pipe, as specified on the plans or in the contract, the Contractor shall promptly inform the Engineer, and with the approval of the Engineer, the Contractor will be allowed to furnish and install a larger size pipe. In such case, the additional cost resulting from such substitution shall be at the Contractor's expense and no adjustment in compensation will be allowed.
- C. A flexible watertight connections shall be used for plastic sewer pipe connections to structures as detailed in Standard Detail Drawing 5.7.31, Flexible Pipe to SAS Connector. For concrete pipe connections, a mechanical vibrator shall be used during placement of the concrete collar to assure complete exterior seal of concrete pipes to the new structure.
- D. The laying of pipes in finished trenches shall commence at the lowest point and shall proceed towards the upper end, and the pipe shall be laid so that the spigot or tongue ends point in the direction of flow.
- E. Jointing surfaces shall be carefully cleaned before pipes are lowered into trenches. The pipes shall be lowered so as to avoid unnecessary handling in the trench. Each section shall have a firm bearing throughout its length and shall be true to the line and grade required.
- F. The method of shoving or pulling the pipes together shall be such that there will be no injury to the pipes, and the joints will be properly adjusted and will not be excessively large. The pipes shall be fitted and matched so that when set firmly to line and grade they will form a sewer with a smooth and uniform invert.
- G. After the pipe is installed, lift holes shall be sealed with suitable concrete or other approved plugs.
- H. The pipe shall not be laid within ten (10) feet of the excavating nor within forty (40) feet of blasting operations. The pipe shall not be laid in water or on frozen trench bottoms, or when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for the proper performance of the work.

- I. No length of pipe shall be laid until the previously laid length of pipe has been sufficiently backfilled to hold it securely in place during the jointing operation. If, in making a joint, any previously laid pipe is disturbed, such pipe shall be removed and relaid. Adequate backfill shall be placed on the pipe to prevent floating. Any pipe which has been floated shall be removed and relaid at the expense of the Contractor.
- J. The Contractor shall furnish suitable lifting and handling devices designed to distribute the weight of the pipe over the length of the pipe and prevent high stresses over small areas.
- K. All water must be kept out of the bell hole of the pipe until the joint is completed and water shall not be allowed to rise in or about the pipe until the trench is filled at least one (1) foot above the top of the pipe.
- L. Before leaving the work for the night, or during a storm, or for any reason, care must be taken that the unfinished end of the sewer is securely closed with a tightly fitting iron or wooden plug. Any earth or other materials that may find entrance into the sewer shall be removed by the Contractor at no additional cost to the City.

3.09 SANITARY SEWER LATERALS

A. General.

1. Installation of sanitary sewer laterals shall comply with all the requirements set forth herein for the installation of the sewer main, including excavation, backfilling, bedding, laying and jointing pipe. Sanitary sewer laterals shall be laid with a maximum grade of one-half (1/2) inch per foot and a minimum grade of one-fourth (1/4) inch per foot. Unless otherwise specified, sanitary sewer laterals shall be of the same material as the sewer main pipe. Where laterals are to be connected to risers the Contractor shall furnish and install the required fittings.
2. The typical locations of sanitary sewer laterals to be installed in new developments are detailed in Standard Detail Drawing 5.3.2, Location of Sanitary Laterals. A separate sanitary sewer lateral shall be installed between the public sewer main and the property line to each unit of a split two-family dwelling (i.e., duplex unit).
3. For reconstruction of existing sanitary sewer, the connection of a lateral to a new structure shall be completed under Sanitary Tap and to a new main under Reconnect. For those laterals to be reconnected to a main, the first five (5) feet of the lateral and backfill from the main shall be included in the Reconnect and shall not be included in this item. The trench shall be backfilled with select backfill and shall be completed under Select Backfill for Sewers.
4. For laterals that are in close proximity to terrace trees (as determined by the Engineer), the situation shall be reviewed on a case by case basis by the Engineer and the City Forester. The Contractor shall use construction methods and equipment to minimize tree damage as directed by the Engineer and in accordance with section 107.13 Tree Protection Specification. In extreme cases the Engineer may elect to terminate lateral installation prior to conflict with the tree.
5. The estimated location of the laterals will be marked by the City of Madison on the sidewalk; however, Contractors are encouraged to start at the sanitary main. If the Contractor elects to start at the property line, it shall be at their own risk. No Utility Line Openings will be granted for the inability to locate the lateral at the property line.
6. Prior to the abandonment of any lateral, the Contractor shall definitively prove to the satisfaction of the Construction Engineer that the lateral is not currently in use and has no potential future use. The state of the lateral shall be determined by dye testing, the use of

a push camera, the use of Sonde equipment, or other equipment that will determine where the lateral terminates. Lamping the lateral will only be an acceptable method if a cap or plug is visible.

- B. Size. When the lateral size is not specified, the following guidelines shall be used:
1. For the installation of new lateral in the public right-of-way, unless otherwise specified in the plans or directed by the Engineer, the size of a newly constructed sanitary sewer lateral to be installed between the public sanitary sewer main and the property line shall be four (4) inches in diameter. The Engineer may require the size of the lateral to be six (6) inches or greater depending on the lot size or proposed land use.
 2. For the reconstruction, repair or replacement of sanitary sewer laterals in the public right-of-way, unless otherwise specified in the plans, when a portion of a sanitary sewer lateral in the public right-of-way is to be reconstructed, repaired or replaced, the inside diameter of the new lateral to be installed shall match that of the lateral which is being replaced. For purposes of this requirement, all five (5) inch laterals shall be considered to be six (6) inches in diameter. It shall not be permissible, in any event, to decrease the diameter of a sanitary sewer lateral in the direction of flow.
- C. Alignment. Where a sanitary sewer lateral is being relaid in the public right-of-way and bends are required to reconnect the new lateral to the ends of the existing lateral or sewer main, the Contractor may use standard Poly (Vinyl Chloride) (PVC) bends that provide a change in the direction of flow of 22.5 degrees or less. Bends placed in a lateral shall be separated by straight pieces of pipe such that any two bends are separated by a distance of two (2) feet or more, measured from the center of each bend. The use of 45 degree bends shall be allowed only in connecting to a 45 degree wye at the sewer main in order to orient the lateral perpendicular to the sewer main.
- D. Couplings. Where a lateral is being relaid in the public right-of-way and connected to pipes of differing materials and/or sizes, couplings (SDD 5.3.3) shall be used. The couplings to be used shall provide for a tight fit around the outside diameter of each pipe and shall be securely fastened with two stainless steel clamps at each pipe end. Couplings which reduce the pipe cross sectional area in the direction of the flow shall not be allowed.
- E. Reconnect. Reconnect shall include reconstructing sanitary sewer lateral connections that shall be reconnected to the sanitary sewer main. This item shall include necessary wyes or fittings and PVC pipe, 4" or larger, for the connection of the lateral and shall not exceed a length of five (5) feet. All new laterals shall be a minimum of four (4) inches in diameter. Under no circumstances shall the new lateral be smaller than the existing. Plugging the existing lateral, select backfill and bedding required for the reconnection are included in this item. Sewer laterals that are to be reconnected to new sewer access structures shall be completed as a Sanitary Tap as specified in Subsection 507.3(d) – Sewer Connections. The Contractor shall be responsible for maintaining the normal flow of wastewater during reconnection of the laterals.

3.10 SANITARY LATERAL ELECTRONIC MARKERS

- A. Each sanitary lateral shall have a minimum of 2 electronic markers: one shall be located above the wye on the sewer main and one shall be located above the lateral at the property line. Additional markers shall be placed at each change in horizontal direction.
- B. Sewer access structures are required on the City's sanitary sewer main on every instance that a lateral diameter is 8" or larger or if the proposed lateral size is of equal or larger size than the City's sanitary sewer main.

3.11 JOINTS

- A. New Pipe to New Pipe.

1. Joints shall not be made until the pipe is in the trench and set to true line and grade. Lengths of pipe which are joined together outside of the trench shall be removed from the project immediately.
2. Prior to making joints, the jointing surfaces shall be inspected for chips, cracks, or other defects in the joints and jointing materials. The jointing surfaces shall be carefully cleaned and lubricated with a vegetable lubricant or a lubricating adhesive. Lubricant shall be applied to both the bell and spigot surfaces of the joint. The lubricant shall be that recommended by the gasket manufacturer for the particular type of gasket being installed.
3. Care shall be taken when shoving or pulling the pipes together in order not to damage the pipe or the joints and jointing materials. The pipes shall be in proper alignment and to the proper grade prior to applying the pressure necessary to make the joint.
4. Rubber gaskets for reinforced concrete storm sewer pipe shall be assembled as follows:
 - a. When air temperature is below 32F, gaskets shall be applied one and one-half (1-1/2) hours before installation of the pipe.
 - b. When air temperature is above 32F, gaskets shall be applied fifteen (15) minutes before installation of the pipe.
5. The temperature referred to pertains to the prevailing air temperature at the point of application of the gaskets. This shall be taken to mean the air temperature, either indoor or outdoor, at the time and place the gaskets and cement are being applied to the pipe. It does not refer to the temperature in the trench, or of the bonding cement, or of the pipe.
6. In making mechanical joints, the bolts shall be installed with the heads in reverse direction. The nuts shall be turned on only as far as they can be by using the wrench with one hand, with no extensions on the wrench to give greater leverage. Care shall be taken not to over-tighten the bolts. The bolts shall be tightened equally and diametrically in order to apply the proper pressure on the gasket and joint.

B. New Pipe to Existing Pipe.

1. A coupling shall be required at the junction of a new pipe to an existing pipe as specified on the plan set or as required in the field by the Engineer.
2. It is expected that the Contractor shall saw cut the existing main at the location shown to accommodate a clean joint for the installation of the compression couplings. If the Contractor for his/her convenience deems it more suitable to remove the existing pipe to a full joint, the additional pipe required to connect the new pipe is to be the Contractors responsibility and shall not be compensated.
3. The coupling shall be placed as shown on the plan or as directed by the Engineer and shall be constructed per Standard Detail Drawing 5.3.3, Coupling Details.

3.12 CONNECTIONS TO EXISTING STRUCTURES

- A. Make all necessary openings into existing structures or sewers including the reconstruction of existing inverts or benches, as necessary. Patch all openings permanently watertight with concrete brick and mortar, or hydraulic cement and waterstops, or for sanitary sewers, hydraulic cement and flexible watertight boots.

3.13 PIPE INSULATION

- A. Provide insulation when indicated on the drawings, or where depth of cover is less than 6". Unless otherwise noted, install 2" thick polystyrene boards insulation.
- B. Install insulation on compacted initial cover material, 6" above the top of the pipe. Stagger joints where more than one layer of insulation is required. Provide insulation with a minimum of 1' of initial cover material. Place cover and backfill material in manner that does not damage insulation; replace any damaged insulation.

3.14 DEFLECTION TESTING

- A. Test all PVC sewer pipe in the presence of the DSF Construction Representative by a "go-no-go" deflection test mandrel furnished by the Contractor. Do not perform deflection testing any sooner than 30 days following the installation of the PVC pipe. Pull the mandrel by hand, or hand operated winch so as to avoid any damages to the pipe that may be caused by mechanized pulling equipment.
- B. Size the to test the pipeline for a maximum allowable internal deflection of the pipe (in any direction) of not to exceed five (5) percent of the original internal diameter for the pipelines tested, regardless of how long after installation the testing takes place.
- C. Deflection testing may be done concurrently with any necessary televising of the sewers. When done concurrently with sewer televising, the mandrel may be pulled by mechanized equipment, provided the mandrel is visible in the television picture during the testing and the operation of the mandrel can be quickly halted before damage to the pipe occurs.
- D. Where poor trench soils conditions require the pipe excavation to be undercut and/or over excavated, the Construction Representative reserves the right to require an additional deflection test prior to the expiration of the Contractor's one year performance guarantee. Remove and replace all pipe that fails to pass the five (5) percent vertical deflection testing until the pipe passes the deflection test.

3.15 LEAKAGE TESTING

- A. All new sanitary sewer lines shall be leakage tested in accordance with Chapter 3.7.0 of Standard Specifications for Sewer and Water Construction.

END OF SECTION