

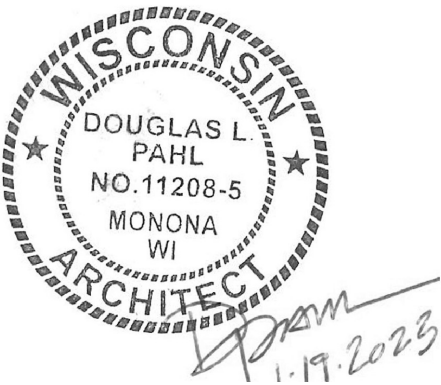
EXHIBIT B - Specifications

**CITY OF MADISON
DOOR CREEK PARK SHELTER
7035 LITTLEMORE DRIVE
MADISON, WISCONSIN**

Contract # 9326 / MUNIS # 14334

**CONSTRUCTION DOCUMENTS
May 10, 2023**

BY



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

12
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, City Plumbing, Madison Fire
47 Department Sprinkler and Madison Fire Department Fire Alarm permits.
48 C. The GC shall provide high quality scanned images of all required permits and inspections and upload them to the
49 Contract Documents-Regulatory Documents Library on the Project Management Web Site.
50

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

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

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

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11 3.3. SUBSTITUTION APPROVAL 2
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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**

32
33 **PART 3 - EXECUTION**

34
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>			
<u>GC Substitution Request:</u>			
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"/>	Phone:	<input type="text"/>
Company:	<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

1.1. 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

<u>Classification:</u>		<u>Foreman</u>	<u>Journeyman</u>	<u>Laborer</u>	<u>Apprt 1</u>	<u>Other</u>	<u>Other</u>	<u>Other</u>
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
<i>Sub-total</i>		\$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
<i>Sub-total</i>		\$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.

- 1 iv. Effect on the construction schedule.
- 2 v. Cost data comparing the proposed substitution with the Product specified.
- 3 vi. Any required license fees or royalties.
- 4 vii. Availability of maintenance service and source of replacement materials.
- 5 3. Submit the Substitution Request Form and all required supporting documentation to the City Project
- 6 Manager and Project Architect.
- 7 i. Submissions to be done as complete PDF files for each product, appropriately titled
- 8 ii. Email submissions to the Project Architect and City Project Manager at the email addresses
- 9 provided on the last page of Section D of the contract documents.
- 10 iii. Submissions must be received by the substitution request deadline specified in Section A
- 11 of the Contract Documents.
- 12 B. Substitutions submitted and approved during the bidding phase shall be announced by the City of Madison by
- 13 addenda prior to the bid due date.
- 14 C. The Owner and Architect may reject any substitution request without providing specific reasons.
- 15

16 **3.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT**

- 17 A. A substitution request will only be considered after award of contract if it meets the qualifying provisions as
- 18 described in 1.1.B.1 and .2 above.
- 19 B. The GC shall submit a substitution request using the digital form on the Project Management Web Site located in
- 20 the Construction Administration-Substitution Request library.
- 21 1. Click on *Add document* to open a new digital form, fill out form, provide required attachments, then click
- 22 the Submit button.
- 23 2. Consulting Staff, Owner and Owners Representatives will review the request and provide the appropriate
- 24 approvals and feed back to the GC.
- 25

26 **3.3. UNAUTHORIZED SUBSTITUTIONS**

- 27 A. Any Contractor who substitutes products without proper authorization by the Owner and Architect will be
- 28 required to immediately remove and replace the product and all costs required to conform to the Contract
- 29 Documents shall be borne by the General Prime Contractor.
- 30
- 31
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- 36

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 to 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

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

1
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3
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5 1.1. SUMMARY 1
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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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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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19
20 **PART 1 – GENERAL**

21
22 **1.1. SUMMARY**

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

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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

14 **PART 1 – GENERAL**

15
16 **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

28 **1.2. RELATED SPECIFICATION SECTIONS**

- 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

35 **1.3. BOARD OF PUBLIC WORKS PROCEDURE**

- 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 **END OF SECTION**
49

**SECTION 01 29 73
SCHEDULE OF VALUES**

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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

16 **PART 1 – GENERAL**

17
18 **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

28 **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

44 **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
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31 **END OF SECTION**
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SECTION 01 29 76
PROGRESS PAYMENT PROCEDURES

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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 with held 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

Progress Payment (PP) Milestone Schedule		
Milestone Description	Due Before	Remarks
* Completion of this closes the contract but not the warranty period/bond.		
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.

- 1 2. The GC shall sign and date the form where indicated.
- 2 3. The GC shall provide the dates from and to for the PP being requested.
- 3 4. The GC shall provide the list of all contractors/sub-contractors that were actively working during the
- 4 dates indicated above.
- 5 a. All contractors/sub-contractors named must be in compliance with all City requirements (Pre-
- 6 qualified, Affirmative Action Plan on file, etc). The PP will be held and not processed by the City of
- 7 Madison until all contractors/sub-contractors are in compliance.
- 8 b. Do not list the names of suppliers or manufacturers, doing so will slow down processing and
- 9 require a re-submittal of the paperwork.
- 10 C. The General Contractor (GC) shall scan all of the documents listed below in the order shown, save the scan as a
- 11 single PDF file for each PP request.
- 12 1. City cover sheet – Application and Certificate for Payment
- 13 2. City tabulation sheet(s)
- 14 3. AIA G702 - Application and Certificate for Payment
- 15 4. AIA G703 - Continuation Sheet(s)
- 16 5. Any miscellaneous documents that may be requested as backup documentation for the pay request.
- 17 a. Lien waivers are not required and shall not be submitted.
- 18 b. Do not provide contractual administrative documents such as pay reports with pay requests.
- 19 c. Do not supply progress deliverables with pay requests.
- 20 F. Upload the pay request PDF to the Contract Documents-GC Partial Pay Apps library on the Project Management
- 21 Web Site.
- 22

23 **3.2. PROJECT ARCHITECT PROCEDURE**

- 24 A. The PA shall review the AIA-continuation sheets provided by the GC to determine if the Schedule of Values
- 25 accurately reflects the work completed for the inclusive dates indicated.
- 26 B. The PA shall advise the CPM of any discrepancies in the schedule of values.
- 27 C. The PA shall work with the GC and the CPM to resolve any issues prior to signing the AIA - Application and
- 28 Certificate for Payment.
- 29 D. When verified, the PA shall digitally sign the original PDF version of the AIA - Application and Certificate for
- 30 Payment on the Project Management Web Site.
- 31

32 **3.3. CITY PROJECT MANAGER PROCEDURE**

- 33 A. The CPM shall review all documents submitted by the GC and work with the PA to ensure the schedule of values
- 34 accurately reflects the work completed to date.
- 35 B. The CPM may elect to hold processing of any progress payment pending submittal of required progress payment
- 36 milestones.
- 37 C. When verified, the CPM shall digitally sign the City Cover Sheet and forward the required documentation to the
- 38 appropriate City agencies for further processing of the payment request.
- 39 D. The CPM shall add a scanned copy of any documents indicating the PP request processing was completed to the
- 40 PMWS.
- 41
- 42

43 **END OF SECTION**

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**SECTION 01 31 13
PROJECT COORDINATION**

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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

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

- 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

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**SECTION 01 31 19
PROJECT MEETINGS**

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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.

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

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

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.

8. The above requirements do not apply to GC/sub-contractor meetings.

3.4. PRE-INSTALLATION MEETINGS

- A. The GCPM shall schedule and conduct all pre-installation meetings, including mockup reviews, before each construction activity that requires coordination with other trades.
- B. The GCPM shall be responsible for the final agenda and meeting minutes.
- C. The GCPM will work with all concerned parties to resolve issues as needed and submit RFI's if necessary.
- D. Required attendance shall be from the list in 3.1.D. above and shall be personnel having a stake in the outcome of the installation or knowledge of the system being installed.
- E. In the event the Contractor installs equipment or materials without a pre-installation meeting the Contractor shall be solely responsible for removing, replacing, repositioning materials and equipment as instructed by the Project Architect or City Project Manager at no additional cost to the City.

3.6 PRE-CONTRACT CLOSEOUT MEETINGS

- A. Two (2) Pre-contract Closeout Meetings shall be held to review the closeout procedures, requirements, and contract deliverables.
 - 1. Pre-contract Closeout Meeting #1 shall be scheduled prior to the 50% Progress Payment Request is being requested. This meeting shall discuss items such as closing out QMO reports, providing O&M drafts and finals, payroll and Affirmative Action documentation, and other contract deliverables.
 - 2. Pre-contract Closeout Meeting #2 shall be scheduled prior to the 80% Progress Payment Request is being requested. This meeting shall discuss, but not be limited to, the status of scheduling final regulatory inspections, cleaning up outstanding QMO's, demonstration and training, attic stock; and finalization review of payroll and other related documents.
- B. The GCPM shall schedule, coordinate, and make physical arrangements for both meetings.
- C. All of the following shall be required to attend both meetings:
 - 1. The GCPM and the GC Field superintendent
 - 2. All Subcontractor Project Managers regardless of the current status of their work.
 - a. The GCPM may excuse a Subcontractor PM if he is confident that all contractual requirements for closeout by the subcontractor have been completed and/or delivered to the GCPM. The list of attendees shall be reviewed and agreed upon with CPM ahead of the meeting.
 - b. At the option of these project managers the field supervisors may also attend.
 - 3. The Project Architect and at least one design consultant from each discipline represented by the plans and specifications to address open QMOs, final tests, reports, etc.
 - 4. The Owner
 - 5. The CPM
 - 6. Quality Management staff as needed to address open QMOs, final tests, reports, etc.
 - 7. The Commissioning Agent
- D. The CPM shall publish an agenda and chair the meeting.

3.7 OTHER SPECIAL MEETINGS

- A. The Contractor shall schedule special meetings per the requirements of the LEED Specification, the Project Quality Management Plan, the Commissioning Plan and as indicated by other specifications.
- B. Special meetings include but are not limited to the following:
 - 1. Waste Management Conference
 - 2. Equipment start up meetings
 - 3. Testing and balancing meetings
 - 4. Commissioning meetings
 - 5. Other meetings as necessitated by the contract documents

END OF SECTION

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

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PART 1 – GENERAL 1
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 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.
- 15

16
17 **END OF SECTION**
18

**SECTION 01 32 19
SUBMITTALS SCHEDULE**

1
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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 **1.5. SUBMITTAL REQUIREMENTS**

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

14
15 **1.6. ADMINISTRATIVE SUBMITTALS**

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

24
25 **PART 2 – PRODUCTS – THIS SECTION NOT USED**

26
27 **PART 3 - EXECUTION**

28
29 **3.1. OVERALL RESPONSIBILITIES OF ALL CONTRACTORS**

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

41

Title	Specification	Critical Path (Y or N)	Date provided	Date required	Remarks
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	

42
43 **3.2. GENERAL CONTRACTORS RESPONSIBILITIES**

- 44 A. The General Contractor shall be responsible for all of the following:
45 1. Consolidating all submittal lists from individual contractors into one master list.
46 2. Reviewing all submitted lists for completeness, timing with the overall contract, etc. The GC shall meet
47 with individual contractors to make changes as necessary.
48 3. Upload the completed Submittals Schedule to the Submittal Library on the Project Management Web Site
49 for review as SD 003.0. See Specification 01 33 23 Submittals for more information on this procedure.
50 4. Resubmit the schedule as needed after initial reviews have been completed.
51 B. The GC shall work with other contractors to amend the Submittals Schedule throughout the execution of the
52 project based on changes and modifications as needed.
53 C. The GC and Project Architect shall be responsible for reviewing and briefing the submittal schedule and
54 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

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**SECTION 01 32 23
SURVEY AND LAYOUT DATA**

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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

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**SECTION 01 32 26
CONSTRUCTION PROGRESS REPORTING**

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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**

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8 PART 2 – PRODUCTS 1
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10 2.1. TIME LAPSE CONSTRUCTION CAMERA (TLCC) 1
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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

PART 1 – GENERAL

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

1.2. RELATED SPECIFICATION SECTIONS

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

1.3. SUBMITTALS

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

PART 2 – PRODUCTS

2.1. DIGITAL CAMERA

- 39
40
41 A. All digital photographs shall be taken with a good quality digital camera, cell phone, tablet, and other such digital
42 device.
43 B. Digital photographs shall be formatted to achieve a good, clear, and detailed image where the final file size is
44 between 600 KB and 3.0 MB (3000KB).
45
46

2.1. TIME LAPSE CONSTRUCTION CAMERA (TLCC)

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

- 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

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**SECTION 01 33 23
SUBMITTALS**

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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

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

1.3. SUBMITTAL REQUIREMENTS

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

- 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.

1 **3.2. SUBMITTAL REVIEW**

- 2 A. Upon completion of the submittal upload by the GC the PMWS automatically notifies the appropriate
3 Architect/Engineer and Owner Representative, including CxA, by Division/Specification number that there is a
4 submittal for review.
5 B. The submittal shall be reviewed internally by the required Architect/Engineer and Owner Representative and
6 CxA in a timely fashion and provide commentary on missing items, incorrect information, or incomplete shop
7 drawings, etc as needed.
8 C. When the internal review is completed the PMWS will notify the Project Architect the submittal is ready for final
9 review.

10
11 **3.3. PROJECT ARCHITECTS REVIEW**

- 12 A. Upon completion of the internal review the Project Architect shall review all internal review comments, confer
13 with the CPM and CxA as needed and determine the appropriate disposition status for the submittal (approved
14 or resubmit).
15 C. The Project Architect shall summarize final internal review comments onto the submittal cover sheet, provide a
16 final disposition of the submittal and update the review status of the submittal to "Complete..." (with or w/o
17 comments) or "Rejected".
18 D. A completed Final Review status initiates the PMWS to notify the GC and appropriate sub-contractor(s) that the
19 review of the submittal has been completed.
20
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23 **END OF SECTION**
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SECTION 01 45 16
FIELD QUALITY CONTROL PROCEDURES

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15 3.4. QMO CLOSEOUT PROCEDURE..... 3
16 3.5. CONSTRUCTION CLOSEOUT 3
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

42 PART 3 - EXECUTION

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.

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54 **END OF SECTION**

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SECTION 01 45 29
TESTING LABORATORY SERVICES

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PART 1 – GENERAL

1.1. REQUIREMENTS INCLUDED

- 17
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

- 26
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

- 33
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

- 40
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.

- 1 vii. One slump test shall be made for each set of test cylinders taken following the procedure
- 2 in ASTM C 143.
- 3 b. Test Cylinders for all Concrete
- 4 i. Each test shall consist of a minimum of four cylinders.
- 5 ii. Make test cylinders in conformity with ASTM C 31.
- 6 iii. After 24 hours three cylinders to be carefully transported to the testing laboratory for
- 7 moisture curing and one cylinder to be field cured.
- 8 iv. One field cured cylinder to be tested at 7 days and two laboratory cured cylinders to be
- 9 tested at 28 days. Reserve one cylinder for further testing.
- 10 v. The average of all strength tests representing each class of concrete, as well as the average of
- 11 any three consecutive strength tests for each class of concrete, shall be equal to or
- 12 greater than the specified strength.
- 13 vi. If the A/E has reason to believe that cylinder strength tests are not representative of the
- 14 strength of concrete in place, A/E shall require drilled cores to be cut and tested at the
- 15 Contractor’s expense. Coring and testing shall be in accordance with ASTM C 42 Standard
- 16 Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- 17 B. **Section 05 12 00: Structural Steel Framing**
- 18 1. Welding:
- 19 a. Provide inspection of shop and field welding in accordance with Section 6 of AWS D1.1.
- 20 b. Visually inspect all welds, perform appropriate non-destructive tests on apparent defective welds.
- 21 Verify conformance with Specifications.
- 22 c. Non-destructive testing shall be performed on 20 percent of the total length of all full penetration
- 23 welds. If a sufficient number of welds are deficient, additional testing may be performed at the
- 24 discretion of the testing lab, at no cost to Owner.
- 25 2. Bolting:
- 26 a. Visually inspect all connections for proper number, size and type of bolt.
- 27 b. Review all bolted connections for compliance with “snug tight” requirements of AISC.
- 28 c. No Slip-critical (SC) connections/bolts are required for this project.
- 29 d. Shear Connectors, Headed/Deformed Bar Concrete Anchors:
- 30 i. Verify pre-production test records for installation of shear connectors, concrete anchors
- 31 and threaded studs.
- 32 ii. Shear connectors shall be struck with a hammer. Those not producing a “clean” pinging
- 33 sound indicative of a fully attached shear connector shall be bent 15 degrees off vertical
- 34 towards the nearest support by striking with a hammer. If shear connector does not
- 35 become loose and weld is not broken, it shall be considered acceptable, and shall be left in
- 36 the bent position. Replace failing shear connectors and test as before.
- 37 iii. A visual inspection shall be made of shear connectors and headed/deformed bar concrete
- 38 anchors after installation. If visual inspection reveals that a sound weld and a 360 degree
- 39 flash has not been obtained, the connector/anchor shall also be tested by bending a
- 40 minimum of 15 degrees off vertical opposite to the missing weld/flash, irrespective of the
- 41 results of the “ping” test required for shear connectors. If the connector/anchor does not
- 42 become loose it shall be considered acceptable and shall be left in this position. Replace
- 43 failing connector/anchors and inspect as before.
- 44 C. **Section 05 40 00: Cold Formed Steel Framing**
- 45 1. As directed by A/E, Contractor’s testing agency may inspect the maintenance of a quality control program
- 46 including spot checking weldments and welding procedures in accordance with AWS standards.
- 47 D. **Section 31 20 00: Soil Compaction Control and Trenching and Backfilling**
- 48 1. Soils Engineer to be onsite during excavation operation.
- 49 2. Visually inspect, test, and certify that exposed undisturbed underlying soil is suitable for required footing
- 50 bearing capacity and placement of fills.
- 51 3. Maximum and minimum density of fill soil for compaction percentage of relative density and moisture
- 52 density shall be determined in accordance with ASTM Designation D 1557. Testing agency will test
- 53 compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937,
- 54 as applicable.
- 55 4. Number of tests as follows:
- 56 a. Subgrade, Undisturbed and Demolition Surfaces: Visual inspection and probe; test if required.
- 57 b. Interior Fills: One test per 2,500 sq. ft for each two foot or less lift.
- 58 c. Exterior Fills: One test per 2,500 sq. ft for each two foot or less lift.

1 d. Utility Trenches: One test per 50 lineal feet for each two foot or less lift.
2

3

PART 2 – PRODUCTS – THIS SECTION NOT USED

4

5

6

PART 3 – EXECUTION – THIS SECTION NOT USED

7

8

9

END OF SECTION

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 installation cost and consumption costs) the following:
9 1. Electrical power and metering.
10 2. Water supply
11 B. General:
12 1. No existing facilities on 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. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization through
33 construction closeout.
34 B. Telecommunications services shall include:
35 1. Windows-based personal computer dedicated to project telecommunications.
36 2. Shared access to the internet via WIFI or similar wireless connection.
37 a. Access must be capable to support minimum of 10 wireless devices.
38 3. Email Account/address dedicated for GC Project Manager of GC Supervisor on site.
39

40 **1.6. TEMPORARY SANITARY FACILITIES**

- 41 A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
42 B. Temporary toilets: Comply with regulations and health codes for the type, number, location, operation, and
43 maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
44 1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide
45 covered waste containers for used material.
46 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
47 C. Maintain daily in clean and sanitary condition
48 D. Water: Provide potable water approved by local health authorities
49

50 **1.7. BARRIERS**

- 51 A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be
52 hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from
53 construction operations and demolition.
54

55 **1.8. FENCING**

- 56 A. Construction: Refer to Plan Documents and Specification Section 01 76 00: Fencing Materials and Barricades
57

1 **1.9. EXTERIOR ENCLOSURES**

- 2 A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions
3 and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures
4 identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors
5 with self-closing hardware and locks.
6

7 **1.10. SECURITY**

- 8 A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized
9 entry, vandalism, or theft.
10

11 **1.11. VEHICULAR ACCESS AND PARKING**

- 12 A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for
13 emergency vehicles.
14 B. Coordinate access and haul routes with governing authorities and Owner.
15 C. Provide and maintain access to fire hydrants, free of obstructions.
16 D. Existing parking areas located at 7035 Littlemore Drive may be used for construction parking until Door Creek
17 Park Shelter is occupied by Owner.
18

19 **1.12. WASTE REMOVAL**

- 20 A. See Section 01 74 19 - Waste Management, for additional requirements.
21 B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
22 C. Provide containers with lids. Remove trash from site periodically.
23 D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible
24 containers; locate containers holding flammable material outside the structure unless otherwise approved by the
25 authorities having jurisdiction.
26 E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
27

28 **1.13. PROJECT IDENTIFICATION**

- 29 A. Provide project identification sign of design and construction indicated in Section 01 58 13.
30 B. Erect on site at location determined by Owner.
31 C. No other signs are allowed without Owner permission except those required by law.
32

33 **1.14. FIELD OFFICES**

- 34 A. Office: Weather tight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy
35 furniture, drawing rack and drawing display table.
36 B. Field Office shall be located on project site.
37 C. Provide space for Project Meetings with table and chairs to accommodate a minimum of 15 persons.
38

39 **PART 2 - PRODUCTS**

40
41 **2.1. TEMPORARY PARTITIONS**

- 42 A. Provide dustproof partitions to limit dust and dirt migration and to separate occupied areas from fumes and
43 noise.
44 1. Non-fire rated partitions, standard
45 a. Wood stud framing, 6-mil polyethylene
46

47 **2.2. EQUIPMENT**

- 48 A. Temporary Lifts and Hoists: Contractors requiring temporary lifts and hoists shall provide facilities for hoisting
49 materials and employees.
50 B. Electrical Outlets: Electrical Contractor shall provide properly configured NEMA polarized outlets to prevent
51 insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault
52 circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
53 C. Electrical Power Cords: Contractors requiring power cords shall provide grounded extension cords; use "hard-
54 service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate
55 lengths of electric cords, if single lengths will not reach areas where construction activities are in progress. Do
56 not exceed safe length-voltage ratio.

- 1 D. Lamps and Light Fixtures: Electrical Contractor shall provide general service incandescent lamps of wattage
- 2 required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to
- 3 breakage. Provide exterior fixtures where exposed to moisture.
- 4 E. Heating Units: General Contractor shall provide temporary heating units that have been tested and labeled by
- 5 UL, FM or another recognized trade association related to the type of fuel being consumed.
- 6 F. First Aid Supplies: General Contractor shall provide first aid supplies complying with governing regulations.
- 7 G. Fire Extinguishers: General Contractor shall provide hand-carried, portable UL-rated, fire extinguishers of NFPA
- 8 recommended classes for the exposures, extinguishing agent and size required by location and class of fire
- 9 exposure.

10
11 **PART 3 - EXECUTION**

12
13 **3.1. TEMPORARY FIRE PROTECTION**

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

29
30 **3.2. COLLECTION AND DISPOSAL OF WASTE**

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

38
39 **3.3. ENVIRONMENTAL PROTECTION**

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

46
47 **3.4. REMOVAL OF TEMPORARY UTILITIES, FACILITIES, AND CONTROLS**

- 48 A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion inspection.
- 49 B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
- 50 C. Clean and repair damage caused by installation or use of temporary work.
- 51 D. Restore existing facilities used during construction to original condition.
- 52 E. Restore new permanent facilities used during construction to specified condition.

53
54
55
56 **END OF SECTION**

**SECTION 01 58 13
TEMPORARY PROJECT SIGNAGE**

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14

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. One painted sign, 32 sq ft area, bottom 6 feet above ground.
B. Content:
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

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**SECTION 01 60 00
PRODUCT REQUIREMENTS**

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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

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

46

47 **PART 3 - EXECUTION**

48

49 **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.

2. After installation, free/open ends shall remain protected with taped plastic sheathing and or temporary filters as specified by division or Trade specifications.

3.8. OWNER PROVIDED, CONTRACTOR INSTALLED EQUIPMENT

- A. Section 3.8.A. shall apply to all equipment being provided to any contractor directly from the Owner for installation under the contract.
 1. The Owner or Owners Representative shall do the following:
 - a. Inspect all deliveries upon receipt and notify manufacturer of any issues directly.
 - b. Review the received shipment with the contractor.
 - i. Only provide products or materials to the contractor that were not damaged through shipping or handling.
 - ii. Confirm missing products or materials and anticipated delivery schedule if known.
 2. The Contractor responsible for the installation of Work associated with Owner provided materials or products shall “take ownership” and provide safe and secure storage and handling as previously described within this specification.
 - i. The Contractor shall be liable for the repair or replacement of any material or product damaged after taking ownership of the product from receipt through final acceptance.
- B. Section 3.8.B. shall apply to all equipment being provided by the Owner but shipped directly to any sub-contractor or the project site for installation under the contract.
 1. The GC and/or Contractor responsible for the Work associated with the Owner provided materials or products shall do the following:
 - a. Inspect all deliveries upon receipt and notify the Owner or Owners Representative of any issues directly.
 - i. Owner or Owners Representative shall notify manufacturer of any issues directly.
 - b. Review the received shipment with the Owner or Owners Representative
 - i. Confirm missing products or materials and anticipated delivery schedule if known.
 2. The Contractor shall “take ownership” and provide safe and secure storage and handling as previously described within this specification.
 - i. The Contractor shall be liable for the repair or replacement of any material or product damaged after taking ownership of the product from receipt through final acceptance.

END OF SECTION

**SECTION 01 71 23
FIELD ENGINEERING**

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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

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**SECTION 01 73 29
CUTTING AND PATCHING**

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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 B. All cutting and patching work performed under this contract shall be warranted like new work as defined by the
5 Specification governing the work.
6

7 **PART 2 - MATERIALS**

8
9 **2.1. GENERAL**

- 10 A. Comply with requirements specified within other sections of the Specifications.
11 B. In-Place Materials: Use materials identical to existing in-place materials. For exposed surfaces use materials that
12 visually match in-place adjacent surfaces to the fullest extent possible.
13 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the
14 visual and functional performance of in-place materials.
15

16 **PART 3 - EXECUTION**

17
18 **3.1. EXAMINATION**

- 19 A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
20 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including
21 compatibility with in-place finishes or primers.
22 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
23

24 **3.2. PREPARATION**

- 25 A. Temporary Support: Provide temporary support of Work to be cut.
26 B. Protection: Protect in-place construction and existing conditions during cutting and patching to prevent damage.
27 Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting
28 and patching operations. If the failure to protect, or the lack of protection, of in-place construction and/or
29 existing conditions results in damage, the contractor shall be responsible for repair to previous condition.
30 C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
31 D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be
32 removed, relocated, or abandoned, bypass such services/systems before cutting to eliminate interruption to
33 occupied areas.
34

35 **3.3. PERFORMANCE**

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

- 1 D. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of
2 installation.
3

4 **3.4. CLEANUP AND RESTORATION**

- 5 A. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a
6 manner that will eliminate evidence of patching and refinishing.
7 1. Clean piping, conduit, and similar features before applying paint or other finishing materials.
8 2. Restore damaged pipe covering to its original condition.
9 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another,
10 patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish,
11 color, texture, and appearance. Remove in-place floor and wall coverings and replace with new
12 materials, if necessary, to achieve uniform color and appearance.
13 4. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch
14 and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats
15 until patch blends with adjacent surfaces.
16 5. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even-plane surface of
17 uniform appearance.
18 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight
19 condition.
20 7. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint,
21 mortar, oils, putty, and similar materials.
22 8. Any smoke and fire caulking that has been disturbed must be replaced by the Contractor as required by
23 code.
24
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28

END OF SECTION

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**SECTION 01 74 13
PROGRESS CLEANING**

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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.

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- iii. Mop heads shall be rinsed often and replaced as necessary.
 - iv. Mop heads and buckets shall be thoroughly rinsed with each change of water.
 - v. Only new mop heads shall be used for rinsing.
- E. Refer to all other specifications in this contract for specific requirements regarding final cleaning of finishes, fixtures, equipment, etc.
- F. Exterior Cleaning shall include but not be limited to the following:
1. All exterior glazing surfaces have been professionally cleaned and are free of dust and streaking.
 2. Metal roofs, siding, and other surfaces shall be clean of dirt and free of splashed or excess materials such as sealants, mortar, paint, etc.
 3. All exterior furnishings shall be clean, waste receptacles shall be empty.
 4. Paved areas shall be clean, free of dirt, oily stains and other such blemishes
 5. Exterior lights and diffusers are clean and free of dust.
- G. Interior Cleaning shall include but not be limited to the following:
1. Remove all labels, stickers, tags, and other such items which are not required by code as permanent labels.
 2. All interior glazing surfaces, including mirrors, have been professionally cleaned and are free of dust and streaking.
 3. All interior surfaces have been cleaned of excess materials such as paint, sealants, etc and have been wiped free of dust.
 4. Interior metals, fixtures, and trim have been cleaned free of dust and oily residues
 5. Carpet flooring has been thoroughly cleaned; vacuumed free of dust, excess glues and other stains removed per manufacturers use and care instructions.
 6. Resilient flooring has been thoroughly cleaned; vacuumed free of dust, excess glues and other stains removed, mopped and buffed per manufacturers use and care instructions.
 7. Interior non-occupied concrete floors shall be broom cleaned, vacuumed free of dust, excess glues and other stains removed per manufacturers use and care instructions.
 8. Light fixtures, lamps, diffusers and other such items have been dusted and cleaned as necessary.

3.5. CALL BACK WORK

- A. The GC shall be responsible for ensuring that any contractor returning to the project site for completion or correction work has re-cleaned and restored the area to the levels described in section 3.4 above upon completion of the work. This shall include but not be limited to the following:
1. The immediate area(s) where work was completed.
 2. Adjacent areas where dust or debris may have traveled.
 3. Other areas occupied during the completion of the call back work.
 4. Path of entrance/exit, to/from the area(s) of work.

END OF SECTION

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

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20

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

1.7. QUALITY ASSURANCE

- 23
- 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

1.8. WASTE MANAGEMENT PLAN

- 41
- 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 iii. Designated locations on the project site for waste material containers.
- 2 B. If project requires demolition incorporate the ordinance required (MGO 28.185) Recycling and Reuse Plan into
- 3 the Waste Management Plan.
- 4 C. Provide all of the following for the Waste Management Coordinator:
- 5 1. Name, employer, employer address, phone number, and email address of the designated coordinator.
- 6 a. The GC shall also provide this information with the required Project Directory Submittal at the
- 7 beginning of the project.
- 8 D. If at the option of the GC, he/she chooses to contract with a Waste Management Disposal Company that allows
- 9 comingled and unsorted waste materials, the GC shall include with his/her Waste Management Plan the
- 10 following:
- 11 1. Name, address, phone number, state permitting information, and other pertinent information about the
- 12 disposal company.
- 13 2. Documentation from the disposal company indicating company policies and procedures regarding
- 14 comingled and unsorted waste materials to include:
- 15 a. GC responsibilities on the project site.
- 16 b. Disposal company procedures for receiving, sorting, recycling, and disposing of comingled and
- 17 unsorted waste material.
- 18

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

20

21 **PART 3 - EXECUTION**

22

23 **3.1. PLAN IMPLEMENTATION**

- 24 A. Implement the approved waste management plan. Provide adequate containers, storage space, signage,
- 25 transportation and other items required to implement the plan during the execution of this contract.
- 26 B. The GC and Waste Management Coordinator shall be responsible for monitoring and reporting the status of the
- 27 Waste Management Plan and shall monitor the waste management practices on site as frequently as needed.
- 28 C. Train all workers, sub-contractors, and suppliers on proper waste management procedures as appropriate for
- 29 the work being conducted on the project site.
- 30 1. Distribute the waste management plan to everyone concerned within seven (7) days of submittal
- 31 approval.
- 32 2. Distribute the waste management plan to new workers, sub-contractors, and suppliers when they first
- 33 appear on the project site.
- 34 3. Conduct additional training as needed during the execution of the contract to keep a positive focus on
- 35 the waste management plan.
- 36 D. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways,
- 37 and other adjacent and used facilities.
- 38 1. Designate and label specific areas on the project site necessary for separating materials to be salvaged,
- 39 recycled, reused, donated, and sold.
- 40 2. Comply with any specification or regulatory requirements pertaining to dust, dirt, environmental
- 41 protection, and noise control.
- 42

43 **3.2. HAZARDOUS AND TOXIC WASTE**

- 44 A. The Owner shall be responsible under separate contract for the removal of any asbestos related materials. All
- 45 other materials shall be removed by the GC.
- 46 B. All hazardous and toxic waste shall be separated, stored, and disposed of according to all applicable regulations.
- 47 C. All hazardous and toxic materials on site shall have a Material Safety and Data Sheet (MSDS) available that
- 48 indicates storage requirements, emergency information, and disposal requirements as necessary.
- 49

50 **3.3. GENERAL GUIDELINES FOR ALL WASTES**

- 51 A. Recycle all paper and beverage containers used by workers, sub-contractors, suppliers and visitors to the project
- 52 site.
- 53 B. All revenues, savings, rebates, tax credits, and other such incentives received from recycling, reusing, or
- 54 salvaging waste materials shall accrue to the GC unless specified otherwise in the contract documents.
- 55 C. Separate recyclable, reusable, and salvageable waste from other waste materials, trash, and debris except where
- 56 Waste Management Disposal Company allows comingled waste materials, see section 1.8.D above.
- 57 1. Separate by type in appropriate containers or designated areas according to the approved waste
- 58 management plan away from the construction area. Do not store within the drip lines of existing trees.

- 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. Except where noted in other areas of the construction documents, the responsible contractor shall provide a six
20 foot galvanized chain link fence including full height mesh screen at the project lines as shown on the
21 Architectural Drawings. For temporary barricade situations, the responsible contractor may provide one of the
22 following that sufficiently provide a sturdy physical barrier and/or visual barrier as necessary for the intended
23 application.
- 24 1. Standard orange construction barrels each with a standard rubber base ring and reflective tape
25 a. Provide flashing amber lights as needed to increase night time visibility
26 2. Steel “T” style fence posts
27 3. 4’0” high standard orange construction fence
28 4. Traffic barricades
29 5. Jersey barriers
30 6. Other types of fencing or barricades typically used in the construction industry
- 31 B. The contractor responsible for providing the fencing materials and barricades shall also be responsible for
32 maintaining them. This shall include but not limited to fixing damaged fencing, standing up barrels that have
33 been knocked over, realigning barrels, and ensuring flashing lights are fully operational at all times.
- 34 C. The following fencing and barricade designations, and their use descriptions shall be used throughout this
35 specification to provide uniformity in describing protection requirements.
- 36 1. Type A, Jersey Barriers, to be used as permanent blocking devices to deny access to alternate project site
37 entrances or exits.
38 2. Type B, Traffic Barricades, to be used as temporary blocking devices to deny access to alternate project
39 site entrances or exits.
40 3. Type C, Construction Barrels without construction fencing shall be used for lane closures, temporary
41 blocking devices to deny access and the protection of single locations (I.E. identify the location of an
42 access structure) that do not require fencing.
43 4. Type D, Construction Barrels with construction fencing where it becomes necessary to surround an object
44 with a complete visual barricade and it is impractical or unacceptable to install fence posts. The surround
45 shall be constructed in such a manner as to provide a buffer zone around and access to the item being
46 protected.
47 5. Type E, Steel “T” Fence Posts shall be used at the project lines, as indicated on the Architectural
48 Drawings, with six foot galvanized chain link fencing to surround an object with a complete visual
49 barricade and it is practical to install fence posts. The surround shall be constructed in such a manner as
50 to provide a buffer zone around and access to the item being protected. All posts shall be driven
51 installed. Surface mounted posts to only be used for temporary barricades.
52 6. Type X, Other fencing or barricade types that may be designated and detailed within the construction
53 documents shall use additional alpha numeric designations.
54

55 **2.2. EROSION CONTROL PROTECTION**

- 56 A. Refer to City of Madison Standard Specification 210.2 for authorized materials associated with erosion control
57 materials.
58

1 **2.3. INTERIOR FINISH PROTECTION MATERIALS**

- 2 A. Except where noted in other areas of the construction documents or this specification the responsible
3 contractor:
4 1. Shall not provide the cheapest or least effective method as an effort to meet any protection requirement.
5 2. Shall provide materials of sufficient quality, and durability to provide adequate protection based on the
6 seasonal conditions and the anticipated duration at the time the protection will be needed.
7 3. Shall provide sufficient quantity of protection material to protect the construction as needed.
8 B. Prior to installing protective measures the responsible contractor shall propose to the GC, Project Architect (PA)
9 and City Project Manager (CPM) the proposed plan for protection, materials to be used and samples as
10 necessary.
11 1. The PA and CPM reserve the right to disapprove any proposed method and/or material and/or make
12 alternate proposals.
13

14 **PART 3 - EXECUTION**

15
16 **3.1. GENERAL EXECUTION REQUIREMENTS**

- 17 A. The GC shall be responsible for ensuring all of the following procedures and requirements are implemented as
18 needed for the duration of the Work performed under this contract.
19 B. The GC shall also be responsible for the following:
20 1. Reporting any incident of damage to existing property, right-of-way, or utility to the CPM immediately
21 upon rendering the incident safe, and notifying emergency response teams, and emergency utility crews
22 as needed.
23 2. Conduct a site walk through prior to leaving at the end of each day to assess:
24 a. Protection measures are properly in place, provide correction actions as necessary.
25 b. Note damage to existing completed work and schedule repair/replacement as needed.
26 3. Ensure all contractors and workers are being diligent in protecting existing work, and newly installed
27 construction.
28

29 **3.2. PROTECT ADJACENT PROPERTIES**

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

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3.3. PROTECT LANDSCAPING FEATURES

- A. Except where specifically stated in other areas of the construction documents the following minimal protection requirements shall apply under this section.
 - 1. Whenever possible do not install new landscape features until exterior building construction has been completed, equipment such as scaffolding and lifts are no longer needed and have been removed, and heavy equipment operation is no longer required.
 - 2. Whenever possible remove and temporarily store all existing landscape features such as benches, waste receptacles, signage, and other such features that will be within the area of Work that can be removed.
 - 3. Landscape features that cannot be removed such as flag poles, light poles, light bollards, etc. shall be protected with Type D fencing for areas on pavement or Type E fencing for areas on soil.
 - 4. Planting beds shall be protected using Type E fencing around the exposed perimeter of the planting bed as needed.
 - 5. The City of Madison Standard Specification 107.13 shall apply to all tree protection in and around the project site at all times.

3.4. PROTECT UTILITIES

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

3.5. PROTECT PUBLIC RIGHT OF WAY

- A. Except where specifically stated in other areas of the construction documents the following minimal protection requirements shall apply under this section.
 - 1. All public right-of-way (area from behind the sidewalk to the centerline of the street) shall remain open and accessible except during periods of active work. At such times the public right of way shall be properly closed and signed as referenced in City of Madison Standard Specification 107.9.
 - 2. Bus stops and bus stop structures shall remain accessible at all times.
 - 3. Traffic signage and traffic signals, traffic control boxes shall be protected with Type D fencing for areas on pavement or Type E fencing for areas on soil.
 - a. Protection at traffic signage/signals shall not obstruct the viewing of the sign/signal for its intended purpose at any time.

- 1 B. When additional protection for traffic control is required, the use of barricades, guardrails, lane closures and
2 other such procedures will be detailed within the construction documents.
3 C. When additional protection for overhead sidewalk cover is required the contract documents shall indicate the
4 specific location and structural requirements of the protective structure.
5

6 **3.6. PROTECT STORED MATERIALS**

- 7 A. All contractors shall refer to Specification 01 60 00 Product Requirements for all storage and protection
8 requirements of building materials and products delivered to the site.
9

10 **3.7. PROTECT WORK - EXTERIOR**

- 11 A. Provide all temporary services that may be required to protect the installed material from heat, cold, humidity,
12 etc, while materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.
13 B. Open trenches, pits, and other such excavations shall be properly covered, lined, or shored as needed during
14 periods of inclement weather to prevent the caving of soils onto existing work in progress. Refer to the
15 appropriate specifications and/or regulatory requirements governing this type of work as necessary.
16 C. Provide adequate protection at all openings with heavy duty tarps, plastic sheathing, or wood framing and
17 sheathing as needed to protect interior work in progress from inclement weather as needed.
18 D. Protect exterior finishes of all kinds with heavy duty tarps or plastic sheathing as needed while landscaping is
19 being installed through full germination of seeded areas or installation of filter fabric and mulches to keep dust,
20 dirt, and mud off of finished exterior surfaces.
21 E. Designate specific curb mounting points and provide wood blocking where small vehicles, skid loaders and other
22 such equipment may need access to areas being landscaped.
23 F. Provide plywood turning pads for skid loaders to turn on to prevent tire marking on new pavement.
24 G. Do not permit the parking of vehicles with any kind of fluid leaks to park on new pavement.
25 H. The contractor shall be responsible for cleaning, repairing, or replacing any completed work or work in progress
26 under this specification as deemed necessary by the CPM without additional cost to the contract.
27

28 **3.8. PROTECT WORK - INTERIOR**

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

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- ii. Repair tears immediately, replace worn areas with like materials as necessary.
3. Protect counter tops, cabinets, and other finished surfaces with large sheets of thick cardboard or Ramboard products. Do not allow toolboxes, finish materials, parts and other such items to be placed on finished materials.
- C. All protection shall stay in place until the CPM, PA, and GC mutually deem the project is ready for Final Cleaning. The contractors responsible for protecting the work shall be responsible for removing the protection and removing any adhesive residue at that time. Contractors shall only use manufacturer authorized cleaning materials for removing adhesives, etc.
- D. Contractors doing work in un-protected areas of finished work shall be required to provide drop cloths and other protection as noted within this specification for the duration of their work.
- 1. Finished areas shall be sufficiently covered to accommodate all equipment, and materials being used to complete the work being done.
 - 2. Finished areas shall be sufficiently covered to prevent splatters, over spray, etc when doing touch-up work.
 - 3. Contractors who do not provide sufficient protection under this sub-section shall be responsible for any costs associated with cleaning, repairing or replacing already finished construction at no additional cost to the contract.

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

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

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PART 1 – GENERAL 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

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**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_Project name_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. *Project Name* represents the title of the project or contract. A shortened version of the
- 54 title may be identified by the City Project Manager to be used by all contractors.
- 55 iv. *Contract number* is the specific identification number the Work was bid under and appears
- 56 on the plan set title sheet and in each sheet title block
- 57 v. *Year* represents the year the contract will be closed out
- 58 b. Examples of file names

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

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

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

<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	

26
27 **3.3. O&M DATA FINAL SUBMITTAL**

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

44 **3.4. CONSTRUCTION CLOSEOUT**

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

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SECTION 01 78 36
WARRANTIES

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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
24 on 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:

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

1.4. GENERAL CONTRACTORS RESPONSIBILITIES

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

- 1 or replace defective materials and workmanship associated with the installation of the product
2 within one (1) year of the warranty date.
3 5. Special Letters of Warranty shall be required from any contractor, supplier, installer or manufacturer who
4 agrees to provide warranty services required by any Division Specification in excess of their Standard
5 Product Warranty.
6

7 **3.3. STANDARD PRODUCT WARRANTY**

- 8 A. All contractors shall be responsible for collecting and providing copies of all standard product warranties for
9 commercially available products purchased and installed under this contract.
10 B. Only one copy of the manufacturers' standard warranty needs to be submitted as representative for all
11 quantities of the same model number used throughout the Work.
12 C. Provide the manufacturers certificate, letter, or other standard documentation for each Standard Product
13 Warranty submitted as follows:
14 1. Whenever possible a PDF version of the document shall be used.
15 a. If a PDF version is used all additional information shall be completed using simple PDF editing
16 tools such as text boxes, highlight, etc.
17 b. If a PDF version is not available and an original document is furnished the additional information
18 shall be neatly hand written and highlighted on the document in such a fashion so that it does not
19 obscure any part of the written warranty.
20 2. Provide the following additional information on each warranty document:
21 a. Contract warranty date.
22 b. Provide the manufacturer name and model number of the product if not specified within the
23 warranty.
24 i. Where the manufacturer name and model number is specified within the warranty it shall
25 be highlighted for visibility.
26 c. Provide the plan identifier (LAV-1, WC-2, etc) when applicable.
27 D. Each completed warranty shall be saved as a digital PDF. The file shall be named using the specification number
28 and item description. I.E. 22 42 00 Toilet (WC-1).pdf
29 a. Where an original certificate was furnished provide a high quality colored scan of the completed
30 document with the additional information. Save the scanned image in PDF format and use the
31 same naming convention as indicated above.
32 E. Provide all PDF files and any original documents to the GC for final consolidation to be provided to the Owner.
33

34 **3.4. FINAL WARRANTY SUBMITTAL**

- 35 A. The GC shall receive all required warranties (digital PDF and any original documents) from all contractors,
36 suppliers, installers and manufacturers.
37 B. The GC shall inventory all received warranties with the Warranty Submittal List to ensure all required warranties
38 have been received and all warranty periods are correct according to the specifications.
39 C. Provide with each Operation and Maintenance Manual a complete copy of any associated warranty.
40 D. Scan all warranties into a single organized electronic PDF file as follows:
41 1. Organize the PDF file into an orderly sequence based on the table of contents of the Specifications.
42 2. Provide a typed Table of Contents for the entire file at the front of the document.
43 3. Provide bookmarks and links to each individual PDF to enable quick navigation through the PDF
44 document.
45 E. Upload the warranty submittal to the appropriate document library on the Project Management Web Site for
46 review by the PA and CPM.
47 F. Correct any deficiencies or omissions and resubmit as necessary.
48

49 **3.5. WARRANTY NOTIFICATION, RESPONSE, EXECUTION AND FOLLOW-UP**

- 50 A. Warranty Notification:
51 1. The City of Madison, Project Management Web Site, uses an email notification system for all warranty
52 related issues. The GC will be required to provide, and keep current during the warranty period, a
53 minimum of two (2) email addresses and phone numbers of current employees to receive email
54 notifications and provide response regarding Work associated with these construction documents.
55 a. In the event a Warranty Issue is deemed by the City of Madison to be an emergency, the GC shall
56 first receive a phone call with a follow-up email from the Project Management Web Site.
57 b. The Contract Closeout-Warranty Issue Library on the Project Management Web Site uses a form
58 for each warranty issue that is logged into the system.

- 1 i. The GC shall open each warranty issue form, review the issue description and any attached
2 documentation or photos.
3 ii. The GC shall also notify any other sub-contractor, supplier, or installer that may be
4 required to review the warranty issue.
- 5 B. Warranty Response:
- 6 1. The GC shall upon notification by the City of Madison provide warranty response as follows:
- 7 a. Critical Systems or equipment: Where damage to equipment and other building components, or
8 injury to personnel is probable provide immediate emergency shut-down information and an on-
9 site response team as soon as possible but in no case shall on-site response exceed 24 hours.
10 b. For non-critical responses where damage or injury is unlikely provide on-site response no later
11 than the next business day.
12 c. Where Technical Assistance support is part of the written warranty provide all assistance
13 necessary via phone, text, or internet systems as indicated by the warranty. If issues cannot be
14 resolved provide on-site response no later than the next business day.
15 d. If the request cannot be supported in sufficient time as outlined above the Owner (or Owner
16 Representative) reserves the right to contact other contractors or service companies having
17 similar capability to expedite the repair or replacement and shall invoice all associated costs to
18 the Owner back to the GC.
- 19 C. Warranty Execution:
- 20 1. The GC shall provide all repairs or replacements as necessary to restore broken or damaged Work to the
21 original level of acceptance as intended by the Contract Documents.
- 22 a. Provide all materials, equipment, products, and labor necessary to complete the repair or
23 replacement associated with the Warranty Issue.
24 b. Provide all cleaning services as may be required before, during, and after the repair or
25 replacement as per Specification 01 74 13 Progress Cleaning.
26 c. Provide any protection necessary for existing construction as per Specification 01 76 00 Protecting
27 Installed Construction
28 d. Provide new letters of warranty when required.
- 29 D. Warranty Follow-up:
- 30 1. Logged Warranty Issues:
- 31 a. The GC shall provide complete documented responses of all logged Warranty Issues. Responses
32 shall provide a description of work completed, by who, inclusive dates, and photos of completed
33 or repaired work.
34 i. Provide call back response if work is not acceptable.
35 b. The City Project Manager shall review the submitted response documentation and do a field
36 inspection if necessary.
37 i. If work is not acceptable, contact GC to review details and expectations of the repair as
38 needed.
39 ii. If work is acceptable close the Warranty Issue.
- 40 2. Quarterly Warranty Reviews:
- 41 a. The GC shall be responsible for scheduling quarterly on-site review with all of the following:
- 42 i. City Project Manager, and other City staff as needed
43 ii. Owner and Owner Tenant Representative
44 iii. Commissioning Agent (CxA)
45 iv. Plumbing, Heating, Electrical Sub-contractors
46 v. Other Sub-contractors that may be responsible for open Warranty issues
- 47 b. Quarterly reviews shall be scheduled at 3 months, 6 months, and 11 months after the effective
48 date of the warranty. The review meetings shall:
- 49 i. Review the status of all open Warranty Issues, determine course of action and estimated
50 date of completion.
51 ii. In the appropriate quarter, provide shut-down, start-up, testing, and training of off-season
52 equipment as required by the contract documents.
53 iii. The 11th month review shall review all open Warranty Issues, final plan for resolution, and
54 all Warranty Issues where a new letter of warranty may have been issued.
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END OF SECTION

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**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 **2.1. OFFICE SUPPLIES**

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

38 **PART 3 - EXECUTION**

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

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

- 1 d. Note whether horizontal runs are below slab or above ceiling, include dimensions above or below
- 2 finished floor elevation.
- 3 E. All contractors shall be responsible for transferring the information from their field set of documents to the
- 4 Master As-Built Plan Set kept in the GC job trailer. See Section 3.3.D. below for the proper procedure.
- 5 F. All contractors shall update the GC Master Plan Set as often as necessary, but not less than once per work week.
- 6

7 **3.2. SITE SURVEY AS-BUILT**

- 8 A. The Land Surveyor Sub-Contractor shall provide digital as-built information including but not be limited to the
- 9 following:
 - 10 a. For underground buried utility laterals and services of all types locate all of the following that may
 - 11 apply:
 - 12 i. Connection points at all mains
 - 13 ii. Storm discharge points to open air
 - 14 iii. All corners and bends regardless of angle, large radius sweeps shall have multiple point
 - 15 locations sufficient to define the sweep.
 - 16 iv. All vertical drops
 - 17 v. All wells
 - 18 vi. Private buried utilities such as buried electrical cables, irrigation systems, etc.
 - 19 v. Other information that may need to be located in the future by the owner prior to digging
 - 20 b. Record all surface features including but not limited to the following:
 - 21 i. Building corners, pavement edges, and other permanent structural features.
 - 22 ii. All surface covers for inlets, catch basins, cleanouts, access structures, curb stops and
 - 23 other such devices.
 - 24 iii. Other permanent surface features such as hydrants, lamp posts, and other permanent site
 - 25 amenities.
 - 26 c. The following data shall be recorded while locating items in sub-sections 3.2.a and 3.2.b above:
 - 27 i. Flow lines at both ends of pipes
 - 28 ii. Pipe sizes and material types
 - 29 iii. Rim elevations for all covers
 - 30 iv. Sump elevations and invert elevations of all structures
 - 31 v. Spot elevations for all pads, driveways, walks, stoops, and floors
- 32 B. The Surveyor shall provide the final digital as-built on a media and in a format specified in Specification 00 31 21
- 33 Survey Information to the GC for turn in to the Project Architect and the Civil Engineer.
- 34 C. The Surveyor shall provide two printed as-built site plans to the GC for inclusion in the Master As-Built Plan Set
- 35 as follows:
 - 36 1. One sheet to show all features (but not contour information) with text neatly organized for each item
 - 37 identified.
 - 38 2. One sheet showing contours, contour labels, and features from item 1 above, but with no additional text.
- 39

40 **3.3. MASTER AS-BUILT DOCUMENT SET**

- 41 A. The GC shall be responsible for maintaining the Master As-Built Document Set in the job trailer at all times.
 - 42 1. The Master As-Built Plan Set (Plan Set) shall begin with one complete bid set of drawings and any
 - 43 additional sheets that were supplied by published addenda during the bidding process. The cover sheet
 - 44 shall be titled as the “Master As-Built Plan Set” in large bold red letters approximately 2” in height and
 - 45 shall not be used for any other purpose.
 - 46 a. The Plan Set shall be kept dry, legible, and in good condition at all times.
 - 47 b. The Plan Set shall be kept up to date with new revisions within two (2) working days of
 - 48 supplemental drawings being issued. Revisions shall be posted as follows:
 - 49 i. Insert new, revised sheets into the plan set. Void old sheets but do not remove them from
 - 50 the plan set. Indicate date received and what document (RFI, CB, CO, etc) caused the
 - 51 change.
 - 52 ii. Insert new, revised individual details into the plan set. Void old details, tape new details
 - 53 over the old details with a “tape hinge” to allow them to be viewed. Indicate date
 - 54 received and what document (RFI, CB, CO, etc) caused the change.
 - 55 iii. Add new details in appropriate white space on relevant sheets. If no space is available use
 - 56 the back side of the previous sheet or insert a new sheet. Indicate date received and what
 - 57 document (RFI, CB, CO, etc) caused the change.

- 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.
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3.5. CHANGES AFTER ACCEPTANCE

- A. No Contractor shall be responsible for making changes to the As-Built record documents after acceptance by the PA and CPM except when necessitated by changes resulting from any Work made by the Contractor as part of his/her guarantee.

END OF SECTION

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**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

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**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 manufacturers 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.

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

3.6. CLOSEOUT PROCEDURE

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

END OF SECTION

SECTION 01 81 13
SUSTAINABLE DESIGN REQUIREMENTS – LEED FOR NEW CONSTRUCTION V4.0

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PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Comply with Wisconsin Commercial Building Codes/International Building Code (IBC).
- C. Comply with Americans with Disabilities Architectural Guidelines, and ICC/ANSI A117.1-Latest Edition.
- D. Comply with USGBC LEED prerequisites and credits shown in the attached checklist for Project to obtain certification based on USGBC’s LEEDv4.0 BD&C: New Construction and Major Renovations” Process.
- E. Refer to attached LEED v4.0 for BD+C: New Construction and Major Renovations checklist, with LEED credits clearly marked yes or no.

1.2 SUMMARY

- A. Project registration and review fees associated with GBCI and leedonline.com are paid by the City.
- B. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain certification based on USGBC’s LEED BD&C: New Construction and Major Renovations” Version 4.0.
 - 1. Other LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 2. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.
 - 3. A copy of the LEED Project checklist is attached at the end of this Section.
 - 4. Specific requirements for LEED are included in greater detail in other Sections.
- C. A significant portion of the credits required for certification are the responsibility of the A/E and Owner (design credits). These credits are not explicitly outlined in this specification section, however many aspects of the construction documents reflect intent to document and achieve the design credits. This section documents requirements of the contractor to meet the requirements for documenting the construction credits.
- D. Related Sections: Divisions 01 through 32 Sections for LEED requirements specific to the work of each of these Sections. Requirements may or may not include reference to LEED.

1
2 **1.3 DEFINITIONS**

- 3 A. Albedo (a.k.a. solar reflectance): The ratio of the reflected electromagnetic energy to the incoming
4 electromagnetic energy.
- 5 B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products
6 was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC
7 Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified
8 for chain of custody by an FSC-accredited certification body.
- 9 C. Emissivity (a.k.a. infrared emittance): A parameter between 0 and 1 that indicates the ability of a material to shed
10 infrared radiation.
- 11 D. Environmental Product Declarations: (EPD) is a transparent, objective report that communicates what a product
12 is made of and how it impacts the environment across its entire life cycle.
- 13 E. Health Product Declaration (HPD) is a material ingredient reporting standard developed under the guidance of the
14 HPD Collaborative.
- 15 F. Hydrofluorocarbons (HFCs): Refrigerants used in building equipment that do not deplete the stratospheric ozone
16 layer.
- 17 G. LEED: Leadership in Energy and Environmental Design. Green Building Rating System representing the US Green
18 Building Council's effort to provide a national standard for what constitutes a "green building". The standard
19 requires quantitative and technical documentation to demonstrate compliance with goals described in the US
20 Green Building Council's Green Building Rating System, Version 3.0.
- 21 H. LEED Project Administrator: LEED Certified Professional hired by the project owner to review LEED submittals.
- 22 I. Locally-Manufactured: Refers to the final assembly of components into the building product that is furnished and
23 installed by the trades people. For example, if the hardware comes from Seoul, South Korea, the lumber from
24 Vancouver, British Columbia, and the joist is assembled in Kent Washington, then the location of the final assembly
25 is Kent, Washington.
- 26 J. Post-Consumer Recycled Content: The percentage of waste material by weight available from consumer use
27 incorporated into a building material.
- 28 K. Pre-consumer (aka Post-Industrial Recycled) Content: The percentage of waste material by weight available from
29 industrial use incorporated into a building material. Post-industrial recyclable materials are different from
30 industrial scrap, a by-product of industrial processes that can easily be reused as a feedstock.
- 31 L. Potable Water: Water that is suitable for drinking and is supplied from wells or municipal water systems.
- 32 M. Recycling: The collection, reprocessing, marketing and use of materials that were recovered or diverted from the
33 solid waste stream. Note that LEED uses the term "pre-consumer" rather than "post-industrial." Also note that
34 when manufacturers and trade associations use the term "post- industrial" it often includes spills, scraps, and
35 damaged and surplus materials that are fed back into the same manufacturing process and that these materials
36 are not considered recycled content by the LEED rating systems.
- 37 N. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled
38 fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. "Post-
39 consumer" material is defined as waste material generated by households or by commercial, industrial, and
40 institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
41 "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process.
42 Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being
43 reclaimed within the same process that generated it.
- 44 O. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within
45 500 miles of Project site. If only a fraction of a product or material is extracted/harvested/recovered and
46 manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
- 47 P. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles from Project
48 site. Manufacturing refers to the final assembly of components into the building product that is installed at Project
49 site.
- 50 Q. Regionally Extracted and Manufactured Materials: Regionally manufactured materials made from raw materials
51 that are extracted, harvested, or recovered within a radius of 500 miles from Project site.
- 52 R. Solar Reflectance: See "Albedo."
- 53 S. Sustainable Forestry: The practice of managing forest resources to meet the long-term product needs of humans
54 while maintaining the biodiversity of forested landscapes. The primary goal is to restore, enhance, and sustain a
55 full range of forest values, both economic and ecological.
- 56 T. Type A Finishes: Material and finishes with potential for short-term levels of off gassing from chemicals inherent
57 in their manufacturing process, or which are applied in form requiring vehicles or carriers for spreading which
58 release high level of particulate matter in process of installation and/or curing. Including, but not limited to:

- 1 1. Composite wood products, specifically including particleboard from which millwork, wood paneling, doors,
2 or furniture may be fabricated.
- 3 2. Adhesives, sealants, and glazing compounds, specifically those with petrochemical vehicles or carriers.
- 4 3. Wood preservatives, finishes, and paint.
- 5 4. Control and/or expansion joint-fillers.
- 6 5. Hard finishes requiring adhesive installation.
- 7 6. Gypsum board and associated finish processes.
- 8 U. Type B Finishes: Fuzzy material and finishes which are woven, fibrous, or porous in nature and tend to adsorb
9 chemicals off-gassed by Type A finishes or may be adversely affected by particulates. These materials become
10 "sink" for deleterious substances which may be released much later, or collectors of contaminants that may
11 promote subsequent bacterial growth. Including, but not limited to:
 - 12 1. Carpeting and padding.
 - 13 2. Fabric wallcovering.
 - 14 3. Insulation exposed to air stream.
 - 15 4. Acoustic ceiling materials.
 - 16 5. Fabric covered acoustic wall panels.
 - 17 6. Upholstered furnishings.
 - 18 7. Materials that can be categorized as both Type A and Type B.
- 19 V. Ventilation: The process of supplying and removing air to and from interior spaces by natural or mechanical means.
- 20 W. Volatile organic compounds (VOCs): Chemical compounds based on carbon and hydrogen structures that are
21 vaporized at room temperatures. VOCs are one type of indoor air contaminant.
- 22 X. Waste Materials: Large and small pieces of materials indicated which are excess to contract requirements and
23 generally include materials salvaged from existing construction and items of trimmings, cuttings, and damaged
24 goods resulting from new installations which cannot be effectively used in Work.

25 26 **1.4 ADMINISTRATIVE REQUIREMENTS**

- 27 A. Respond to questions and requests from Architect and the Green Building Certification Institute (GBCI; an agent
28 of USGBC that handles the review process) regarding LEED credits that are the responsibility of the Contractor,
29 that depend on product selection or product qualities, or that depend on Contractor's procedures until GBCI has
30 made its determination on the project's LEED certification application. Document responses as informational
31 submittals.

32 33 **1.5 ACTION SUBMITTALS**

- 34 A. General: Submit additional LEED submittals required by other Specification Sections.
- 35 B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with
36 other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED
37 requirements.
- 38 C. LEED Submittals: Submit LEED related information under a separate Tab within each product submittal. The LEED
39 submittal shall include:
 - 40 1. Summary Sheet: A summary, on General Contractors letterhead, of all LEED information requested in
41 specifications shall include:
 - 42 a. Project name.
 - 43 b. LEED Submittal List: A list of all materials being submitted. For products com- posed of multiple
44 materials the submittal shall include a list of all materials composing the product.
 - 45 c. For Products in Divisions 2 - 10, include the following information:
 - 46 i. Material costs, for each material on the LEED submittal list, excluding labor costs, delivery
47 cost, cost of installation, as well as profit and overhead.
 - 48 ii. The preconsumer and post-consumer recycled content of each material on the LEED
49 submittal list.
 - 50 iii. List of all material manufacturing locations.
 - 51 iv. Provide distance between manufacturing and construction site.
 - 52 d. All other LEED information required in specification.
 - 53 2. Manufacturer's literature with information highlighted that confirm the figures used in the summary
54 report.
 - 55 a. If a range is used in the manufacturer's literature, the summary report shall use the lowest number
56 in the range.
 - 57 b. For VOC Submissions: Submit MSDS sheets or manufacturer's literature with VOC figure highlighted.

- 1 D. Project Material Costs Data: Provide a statement, on Contractor’s letterhead, documenting the total material for
2 the project. Include a spreadsheet tallying the material cost for all materials specified in Divisions 2 - 32. The total
3 in the material cost data will be used in the LEED Online template to be completed by the Contractor as the actual
4 material cost of the project.
- 5 E. LEED Action Plan: Provide preliminary submittal within 30 days of Notice to Proceed that contains:
6 1. Example spreadsheets for each construction credit identified in this section.
7 2. Contact information for Contractor’s LEED coordinators.
8 3. Brief description of how the following requirements will be met.
9 a. SS Prerequisite: Construction Activities Pollution Prevention complying with Section 31 25 00,
10 Erosion Control.
11 b. MR Prerequisite: Construction and Demolition Waste Management Reporting
12 c. MR Credit: Building Product Disclosure – Environmental Product Disclosures
13 d. MR Credit: Building Product Disclosure – Source Materials
14 e. MR Credit: Building Product Disclosure – Material Ingredients
15 f. MR Credit: Construction and Demo Waste Management complying with Section 01 74 19
16 Construction Waste Management and Disposal. Include a sample spreadsheet showing how the
17 tipping information is going to be recorded to comply with LEED requirements.
18 g. IEQ Credit: Low-Emitting Materials
19 h. IEQ Credit: Construction IAQ Management Plan
20 i. IEQ Credit: Indoor Air Quality Assessment
21 4. After CPM approval of the Preliminary Action Plan the Contractor shall update the plan monthly with LEED
22 information collected to date and be submitted as part of a monthly progress report.
- 23 F. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing the actual
24 construction and purchasing activities with LEED requirements for the following:
25 1. SS Prerequisite: Construction Activities Pollution Prevention
26 2. MR Prerequisite: Construction and Demolition Waste Management Reporting
27 3. MR Credit: Building Product Disclosure – Environmental Product Disclosures
28 4. MR Credit: Building Product Disclosure – Source Materials
29 5. MR Credit: Building Product Disclosure – Material Ingredients
30 6. MR Credit: Construction and Demo Waste Management
31 7. IEQ Credit: Low-Emitting Materials
- 32 G. LEED Documentation Online Submittals: The Contractor shall be responsible for completing the following LEED
33 submissions using the LEED online tool for credit submission to USGBC. The LEED Project Administrator will
34 determine if the information prepared by the Contractor is satisfactory for USGBC submission.
35 1. SS Prerequisite: Construction Activities Pollution Prevention
36 2. MR Prerequisite: Construction and Demolition Waste Management Reporting
37 3. MR Credit: Building Product Disclosure – Environmental Product Disclosures
38 4. MR Credit: Building Product Disclosure – Source Materials
39 5. MR Credit: Building Product Disclosure – Material Ingredients
40 6. MR Credit: Construction and Demo Waste Management
41 7. IEQ Credit: Low-Emitting Materials

42 43 **1.6 INFORMATIONAL SUBMITTALS**

- 44 A. Qualification Data: For LEED coordinator.
45 B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude
46 labor, overhead, and profit. Include breakout of costs for the following categories of items:
47 1. Furniture.
48 2. Plumbing.
49 3. Mechanical.
50 4. Electrical.
51 5. Specialty items such as elevators and equipment.
52 6. Wood-based construction materials.

53 54 **1.7 QUALITY ASSURANCE**

- 55 A. LEED Coordinator: The Contractor is to engage an experienced LEED-Accredited Professional to coordinate LEED
56 requirements. LEED coordinator may also serve as waste management coordinator.
57

1 **1.8 CONTRACTOR RESPONSIBILITIES**

- 2 A. This project has been registered with USGBC via LEED Online. The Contractor shall provide all necessary
3 documentation for LEED BD&C v4.0 certification in accordance with the specifications. Format and content of all
4 construction documentation must be in accordance with the LEED Reference Guide requirements for supporting
5 data required in event of USGBC audit of the particular credit. Contractor is required to coordinate all requirements
6 for credits stated in this section to assure assembled data is acceptable to USGBC and respond to USGBC requests
7 for additional construction data in the course of preparing the project for certification.
8

9 **PART 2 – PRODUCTS**

10
11 **2.1 MATERIALS, GENERAL**

- 12 A. Provide products and procedures necessary to obtain LEED credits required in this Section. Although other Sections
13 may specify some requirements that contribute to LEED credits, the Contractor shall determine additional
14 materials and procedures necessary to obtain LEED credits indicated.
15 B. Refer to LEED Guidebook for further information.
16

17 **2.2 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION**

- 18 A. MR Credit Product Disclosure and Optimization - Environmental Product Declarations (EPD)
19 1. At least 20 different products from at least five different manufacturers shall have Environmental Product
20 Declarations that comply with LEED requirements. Industry-wide (generic) Environmental Product
21 Declarations shall be valued as one-half of a product.
22 B. MR Credit Product Disclosure and Optimization – Sourcing of Raw Materials
23 1. At least 20 different products from at least five different manufacturers shall have publically released
24 reports that comply with LEED requirements for raw material source and extraction reporting. Self-
25 declared reports by manufacturers shall be valued as one-half of a product.
26 C. MR Credit Product Disclosure and Optimization – Material Ingredients
27 1. At least 20 different products from at least five different manufacturers shall comply with LEED
28 requirements for material ingredient reporting.
29

30 **2.3 LOW-EMITTING MATERIALS**

- 31 A. Paints and Coatings
32 1. For field applications that are inside the weatherproofing system, paints and coatings shall comply with
33 VOC content limits of authorities having jurisdiction and the following VOC content limits:
34 i. Flat Paints and Coatings: 50 g/L.
35 ii. Non-flat Paints and Coatings: 50 g/L.
36 iii. Dry-Fog Coatings: 150 g/L.
37 iv. Primers, Sealers, and Undercoaters: 100 g/L.
38 v. Rust-Preventive Coatings: 100 g/L.
39 vi. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
40 vii. Pretreatment Wash Primers: 420 g/L.
41 viii. Clear Wood Finishes, Varnishes: 275 g/L.
42 ix. Clear Wood Finishes, Lacquers: 275 g/L.
43 x. Floor Coatings: 50 g/L.
44 xi. Shellacs, Clear: 730 g/L.
45 xii. Shellacs, Pigmented: 550 g/L.
46 xiii. Stains: 100 g/L.
47 2. For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall
48 comply with the requirements of the California Department of Public Health's "Standard Method for the
49 Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental
50 Chambers."
51 B. Adhesives and Sealants
52 1. For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with
53 VOC content limits of authorities having jurisdiction and the following VOC content limits:
54 i. Wood Glues: 30 g/L.
55 ii. Metal-to-Metal Adhesives: 30 g/L.
56 iii. Adhesives for Porous Materials (Except Wood): 50 g/L.
57 iv. Subfloor Adhesives: 50 g/L.
58 v. Plastic Foam Adhesives: 50 g/L.

- 1 vi. Carpet Adhesives: 50 g/L.
- 2 vii. Carpet Pad Adhesives: 50 g/L.
- 3 viii. VCT and Asphalt Tile Adhesives: 50 g/L.
- 4 ix. Cove Base Adhesives: 50 g/L.
- 5 x. Gypsum Board and Panel Adhesives: 50 g/L.
- 6 xi. Rubber Floor Adhesives: 60 g/L.
- 7 xii. Ceramic Tile Adhesives: 65 g/L.
- 8 xiii. Multipurpose Construction Adhesives: 70 g/L.
- 9 xiv. Fiberglass Adhesives: 80 g/L.
- 10 xv. Contact Adhesives: 80 g/L.
- 11 xvi. Structural Glazing Adhesives: 100 g/L.
- 12 xvii. Wood Flooring Adhesives: 100 g/L.
- 13 xviii. Structural Wood Member Adhesives: 140 g/L.
- 14 xix. Single-Ply Roof Membrane Adhesives: 250 g/L.
- 15 xx. Special-Purpose Contact Adhesives (That Are Used to Bond Melamine-Covered Board,
16 Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch or Less in Thickness to Any
17 Surface): 250 g/L.
- 18 xxi. Top and Trim Adhesives: 250 g/L.
- 19 xxii. Plastic Cement Welding Compounds: 250 g/L.
- 20 xxiii. ABS Welding Compounds: 325 g/L.
- 21 xxiv. CPVC Welding Compounds: 490 g/L.
- 22 xxv. PVC Welding Compounds: 510 g/L.
- 23 xxvi. Adhesive Primer for Plastic: 550 g/L.
- 24 xxvii. Sheet-Applied Rubber Lining Adhesives: 850 g/L.
- 25 xxviii. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
- 26 xxix. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
- 27 xxx. Special-Purpose Aerosol Adhesives (All Types): 70 percent by weight.
- 28 xxxi. Other Adhesives: 250 g/L.
- 29 xxxii. Architectural Sealants: 250 g/L.
- 30 xxxiii. Non-membrane Roof Sealants: 300 g/L.
- 31 xxxiv. Single-Ply Roof Membrane Sealants: 450 g/L.
- 32 xxxv. Other Sealants: 420 g/L.
- 33 xxxvi. Sealant Primers for Nonporous Substrates: 250 g/L.
- 34 xxxvii. Sealant Primers for Porous Substrates: 775 g/L.
- 35 xxxviii. Modified Bituminous Sealant Primers: 500 g/L.
- 36 xxxix. Other Sealant Primers: 750 g/L.
- 37 2. For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants
38 shall comply with the requirements of the California Department of Public Health's "Standard Method for
39 the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
40 Environmental Chambers."
- 41 E. Flooring
- 42 1. Flooring shall comply with the requirements of the California Department of Public Health's "Standard
43 Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
44 Environmental Chambers."
- 45 F. Composite Wood
- 46 1. Composite wood, agrifiber products, and adhesives shall be made using ultra-low emitting formaldehyde
47 resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce
48 Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- 49 G. Ceilings, Walls, and Thermal Insulation
- 50 1. Ceilings, walls, and thermal insulation shall comply with the requirements of the California Department of
51 Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions
52 from Indoor Sources Using Environmental Chambers."

PART 3 – EXECUTION

3.1 NONSMOKING BUILDING

- A. Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

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3.2 CONSTRUCTION ACTIVITIES POLLUTION PREVENTION

- A. SS Prerequisite - Construction Activities Pollution Prevention:
 - 1. Follow LEED instructions in LEED NCv4.0 Reference Guide and complying with Section 31 25 00, Erosion Control. Comply with EPA Construction General Permit (CGP) standard 2012.
 - 2. Contractor is responsible for completing the LEED online credit template and attaching the following information to the template:
 - a. Provide record of compliance with Erosion and Sediment Control Plan:
 - i. Monthly photographs of barriers and containment.
 - ii. Monthly photographs of dust control measures
 - iii. Records of inspections by agency in charge of overseeing compliance.
 - iv. Include dust control measures
 - b. Several early, a middle and several near end prevention plan checks and reports will be required as an upload to LEED Online – assume 6 checks and reports over the duration of the project.
 - 3. The LEED Project Administrator will determine if the information prepared by the Contractor is satisfactory for GBCI submission.

3.3 BUILDING PRODUCT DISCLOSURE AND OPTIMIZATION

- A. MR Credits Building Product Disclosure Optimization – EPDs, Sourcing and Ingredients
 - 1. Environmental Product Declarations – comply with one or both of the following Options:
 - a. Option 1: Environmental Product Declarations (1 point)
 - 2. Sourcing of Raw Materials – comply with one or both of the following Options:
 - a. Option 1: Raw Material Source and Extraction Reporting (1 point)
 - 3. Material Ingredients - comply with one or two of the following Options:
 - a. Option 1: Material Ingredient Reporting (1 point)
 - b. Option 3: Product Manufacturer Supply Chain Optimization (1 point) including products from manufacturers with validated and robust safety, health, hazard and risk programs that document 99% by weight of the ingredients used to make the product.
 - 4. Contractor to complete and submit the MR building product disclosure and optimization calculator, available with the project in LEED Online
 - 5. Contractor to submit supporting documentation including EPD and LCA reports, corporate sustainability reports, product declarations, labels, REACH, GreenScreen Benchmark, LT scores or other compliance summary documents. LEED project administrator and/or GBCI may require revisions and additions to this documentation and Contractor should plan accordingly.
 - 6. The LEED Project Administrator will determine if the information prepared by the Contractor is satisfactory for GBCI submission.

3.4 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLANNING

- A. MR Prerequisite and Credit: Comply with Division 1 Section “Construction Waste Management and Disposal”.
 - 1. Contractor is required to create a Construction Waste Management Plan that includes:
 - a. Establishing waste diversion goals for the project by identifying at least five material streams targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.
 - b. Specifying whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the material will be taken and how the recycling facility will process the material.
 - c. A final report detailing all major waste streams generated, including disposal and diversion rates.
 - 2. Contractor is required to meet the following minimum goal:
 - a. Option 1 Path 2 – Divert 75% and four material streams
 - i. A material stream can be a specific material category that is diverted in a specific way or a mixture of several material categories that are diverted in a specific way.
 - ii. Best practice is that a material stream should constitute at least 5% (by weight or volume) of total diverted materials.
 - iii. Examples of material streams include Plastic, Carpet, Paper/Cardboard, Wood, metal, Sheetrock, Brick, Concrete, Shingles, deconstructed materials, commingled waste, reuse of deconstructed materials onsite, source separation where each material is sent to a specific facility or suppliers take-back of materials.

- 1 b. Option 2 – Do not generate more than 2.5 pounds of construction waste per square foot of the
- 2 buildings floor area (2 points).
- 3 3. Contractor is responsible for completing the LEED online credit template. Attached documentation in
- 4 support of the credit shall include:
- 5 a. Monthly photographs of waste recycling sorting area including:
- 6 i. Debris control fencing.
- 7 ii. Signage clearly identifying the containers content.
- 8 b. Spreadsheet containing the following information:
- 9 i. Diverted materials description.
- 10 ii. Diverted materials/waste hauler name.
- 11 iii. Date of each haul.
- 12 iv. Quantity of material in each haul.
- 13 c. Copies of recycling venter and waste hauler tipping receipts.
- 14 4. The LEED Project Administrator will determine if the information prepared by the Contractor is satisfactory
- 15 for GBCI submission.

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 17 **3.5 ENHANCED INDOOR AIR QUALITY STRATEGIES**

- 18 A. IEQ Credit – Enhanced Indoor Air Quality Strategies: Intent is to promote occupants comfort, well-being and
- 19 productivity by improving indoor air quality.
- 20 1. Install new air filtration media, with a MERV 13 Rating, in regularly occupied areas prior to occupancy.
- 21 2. This is in addition to the set of filters required for the building flushout. These filters are to be installed
- 22 after the flush out is completed.

23
 24 **3.6 LOW EMITTING MATERIALS**

- 25 A. IEQ Credit - Low Emitting Materials: Intent is to reduce concentrations of chemical contaminants that can damage
- 26 air quality, human health, productivity and the environment.
- 27 1. Follow LEED instructions in LEED NCv4 Reference Guide.
- 28 2. Contractor is required to complete and upload the following documentation to LEED Online:
- 29 a. USGBC low-emitting materials calculator (available at the project resources in LEED Online)
- 30 b. Product information (e.g., MSDS, third party certifications, testing reports, etc) for relevant
- 31 materials
- 32 3. Contractor is responsible for one of the following point options:
- 33 a. Option 1: Product Category threshold compliance in), 4 of the following categories (2 points)
- 34 i. Interior paints and coatings applied onsite: 90% by volume for emissions, 100% VOC content
- 35 ii. Interior adhesives and sealants applied onsite (including flooring adhesive): 90% by volume
- 36 for emissions and 100% for VOC content
- 37 iii. Flooring: 100% emissions
- 38 v. Ceilings, walls, thermal and acoustic insulation: 100% emissions
- 39
- 40 4. Composite Wood Evaluation - Composite wood, agrifiber products, and adhesives shall be made using
- 41 ultra-low emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic
- 42 Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made
- 43 with no added formaldehyde. Salvaged and reused architectural millwork more than one year old at the
- 44 time of occupancy is considered compliant, provided it meets the requirements for any site-applied paints,
- 45 coatings, adhesives, and sealants.
- 46 5. Furniture Evaluation - New furniture and furnishing items must be tested in accordance with ANSI/BIFMA
- 47 Standard Method M7.1–2011. Comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard,
- 48 sections 7.6.1 and 7.6.2, using either the concentration modeling approach or the emissions factor
- 49 approach. Model the test results using the open plan, private office, or seating scenario in ANSI/BIFMA
- 50 M7.1, as appropriate. USGBC-approved equivalent testing methodologies and contaminant thresholds are
- 51 also acceptable. Salvaged and reused furniture more than one year old at the time of use is considered
- 52 compliant, provided it meets the requirements for any site-applied paints, coatings, adhesives, and
- 53 sealants.
- 54 6. The LEED Project Administrator will determine if the information prepared by the Contractor is satisfactory
- 55 for GBCI submission. Revisions and time to answer review questions should be assumed.
- 56

1 **3.7 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT PLAN**

- 2 A. IEQ Credit Construction IAQ Management Plan: Intent is to promote the well-being of construction workers and
3 building occupants by minimizing indoor air quality problems associated with construction and renovation.
4 Contractor to include at a minimum the following elements into the plan:
5 1. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
6 2. Prohibit the use of tobacco products inside the building and within 25 feet of the building entrances during
7 construction.
8 3. Protect absorptive materials stored on-site and installed from moisture damage.
9 4. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period
10 as specified in Division 1 Section "Temporary Facilities and Controls", install filter media having a MERV 8
11 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
12 5. Replace all air filters immediately prior to occupancy.
13 B. Provide record of compliance with Indoor Air Quality Management Plan:
14 a. Monthly photographs of equipment and ductwork protection.
15 b. Monthly photographs of filters used to protect air distribution and equipment.
16 c. Contractor's report documenting that MERV 8 filters were used to protect equipment during
17 construction and filters meeting final design requirements were installed prior to occupancy.
18

19 **3.8 INDOOR AIR QUALITY ASSESSMENT**

- 20 A. IEQ Credit – Indoor Air Quality Assessment: Intent is to establish better quality indoor air in the building after
21 construction and during occupancy.
22 B. Contractor is required to implement one of the following options:
23 1. Option 2 (2 points) - Air-Quality Testing: If the Contractor chooses to test for compliance with this credit
24 following is required, including contracting with an industrial hygienist to conduct testing:
25 a. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using
26 testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air
27 Pollutants in Indoor Air," and as additionally detailed in the USGBC's "Green Building Design and
28 Construction Reference Guide".
29 b. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
30 i. Formaldehyde: 27 ppb.
31 ii. Particulates (PM10): 50 micrograms/cu. m.
32 iii. Particulates (PM2.5): 15 micrograms/cu. m.
33 iv. Ozone: 0.075 ppm
34 v. Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m.
35 vi. Target chemicals listed in CDPH Standard Method v1.1, Table 4-1, except formaldehyde -see
36 *supplement at end of this specification for table*
37 vii. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
38 c. For each sampling point where the maximum concentration limits are exceeded, conduct additional
39 flush-out with outside air and retest the specific parameter(s) exceeded to indicate the
40 requirements are achieved. Repeat procedure until all requirements have been met. When
41 retesting non-complying building areas, samples are to be taken from the same locations as the
42 first test.
43 d. Air-sample testing shall be conducted as follows:
44 i. All measurements shall be conducted prior to occupancy but during normal occupied hours
45 and with building ventilation system starting at the normal daily start time and operated at
46 the minimum outside air flow rate for the occupied mode throughout the duration of the
47 air testing.
48 ii. Building shall have all interior finishes installed including, but not limited to, millwork, doors,
49 paint, carpet, acoustic tile
50 iii. Number of sampling locations will vary depending on the size of building and number of
51 ventilation systems. For each portion of building served by a separate ventilation system,
52 the number of sampling points shall not be less than one per 25,000 sq. ft. or for each
53 contiguous floor area, whichever is larger, and shall include areas with the least ventilation
54 and greatest presumed source strength.
55 iv. Air samples shall be collected between 3 and 6 feet from the floor to represent the breathing
56 zone of occupants, and over a minimum four- hour period.
57 4. The LEED Project Administrator will determine if the information prepared by the Contractor is satisfactory
58 for GBCI submission.

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3.9 SUPPLEMENT

- A. The supplement listed below, up to “End of Section,” is a part of this Specification:
 - 1. LEED BD&C v4.0 Project Checklist.
 - a. All credits listed for reference
 - b. Only **Bold, Italic** credits or prerequisites listed with a “C” are in the Scope of the Contractor
 - c. All identified construction Prerequisites are required to be achieved to complete the certification process and are the responsibility of the Contractor. Care needs to be taken to ensure all prerequisites are awarded to the project.
 - d. All identified construction Credits are required to be achieved and are the responsibility of the Contractor. Given certain point totals and project specific circumstances as the project progresses, with proper notice to the CPM, certain credits or credit point thresholds can be eliminated from the project. Written notice and approval is required.
 - 2. Target CREL VOCs, Table 4-1 for Indoor Air Quality Testing



LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name: Door Creek Park Shelter
Date: 01.19.23

Y ? N

1			Credit	Integrative Process	1
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3	2	11	Location and Transportation		16
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			Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
1		4	Credit	Surrounding Density and Diverse Uses	5
	1	4	Credit	Access to Quality Transit	5
		1	Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

7	2	1	Sustainable Sites		10
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Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
1	1		Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
3			Credit	Rainwater Management	3
	1	1	Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

4	2	5	Water Efficiency		11
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Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	1		Credit	Outdoor Water Use Reduction	2
2	1	3	Credit	Indoor Water Use Reduction	6
		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

26	2	5	Energy and Atmosphere		33
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Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2		Credit	Enhanced Commissioning	6
18			Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
		1	Credit	Enhanced Refrigerant Management	1
		2	Credit	Green Power and Carbon Offsets	2

6	3	4	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
1		4	Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1	1		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

12	3	1	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
		1	Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
2	1		Credit	Daylight	3
1			Credit	Quality Views	1
1			Credit	Acoustic Performance	1

2	1	3	Innovation		6
1	1	3	Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

1	1	2	Regional Priority		4
1			Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
		1	Credit	Regional Priority: Specific Credit	1
		1	Credit	Regional Priority: Specific Credit	1

62	16	32	TOTALS		Possible Points: 110
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110					

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Table 4-1 Target CREL VOCs and their maximum allowable concentrations

No.	Compound Name	CAS No.	Allowable Conc. ^a (µg/m ³)
1	Acetaldehyde	75-07-0	70
2	Benzene	71-43-2	30
3	Carbon disulfide	75-15-0	400
4	Carbon tetrachloride	56-23-5	20
5	Chlorobenzene	108-90-7	500
6	Chloroform	67-66-3	150
7	Dichlorobenzene (1,4-)	106-46-7	400
8	Dichloroethylene (1,1)	75-35-4	35
9	Dimethylformamide (N,N-)	68-12-2	40
10	Dioxane (1,4-)	123-91-1	1,500
11	Epichlorohydrin	106-89-8	1.5
12	Ethylbenzene	100-41-4	1,000
13	Ethylene glycol	107-21-1	200
14	Ethylene glycol monoethyl ether	110-80-5	35
15	Ethylene glycol monoethyl ether acetate	111-15-9	150
16	Ethylene glycol monomethyl ether	109-86-4	30
17	Ethylene glycol monomethyl ether acetate	110-49-6	45
18	n/a	n/a	n/a
19	Hexane (n-)	110-54-3	3,500
20	Isophorone	78-59-1	1,000
21	Isopropanol	67-63-0	3,500
22	Methyl chloroform	71-55-6	500
23	Methylene chloride	75-09-2	200
24	Methyl <i>t</i> -butyl ether	1634-04-4	4,000
25	Naphthalene	91-20-3	4.5
26	Phenol	108-95-2	100
27	Propylene glycol monomethyl ether	107-98-2	3,500
28	Styrene	100-42-5	450
29	Tetrachloroethylene	127-18-4	17.5
30	Toluene	108-88-3	150
31	Trichloroethylene	79-01-6	300
32	Vinyl acetate	108-05-4	100
33-35	Xylenes, technical mixture (m-, o-, p-xylene combined)	108-38-3, 95-47-6, 106-42-3	350

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a) Refer to http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html. All maximum allowable concentrations are one-half the corresponding CREL adopted by Cal/EPA OEHHA with the exception of formaldehyde. For any future changes in the CREL list by OEHHA, values in Table 4.1 shall continue to apply until these changes are published in the Standard Method.

END OF SECTION

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**SECTION 01 91 00
COMMISSIONING**

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PART 1 – GENERAL

1.1. SUMMARY

- 26 A. Purpose: Define the responsibilities of the parties involved and the procedures related to the commissioning
27 process
28

1.2. RELATED SPECIFICATIONS

- 30 A. Section 01 31 13 Project Management and Coordination
31 B. Section 01 31 19 Project Meetings
32 C. Section 01 31 23 Project Management
33 D. Section 01 32 26 Construction Progress Reporting
34 E. Section 01 33 23 Submittals
35 F. Section 01 45 16 Field Quality Control
36 G. Section 01 77 00 Closeout Procedures
37 H. Section 01 78 23 Operation and Maintenance Data
38 I. Section 01 78 39 As-Built Drawings
39 J. Section 01 79 00 Demonstration and Training
40 K. Section 01 81 13 Sustainable Design Requirements
41 L. Section 01 95 00 Measurement & Verification
42 M. Section 23 05 93 Testing, Adjusting, and Balancing for HVAC
43 N. Section 23 09 00 Instrumentation and Control for HVAC
44 O. Section 23 09 23 Direct Digital Control (DDC) System for HVAC
45 P. Section 23 09 93 Sequence of Operations for HVAC DDC
46

1.3. REFERENCES

- 48 A. ASHRAE Guideline 1.1-2007, "HVAC&R Technical Requirements for The Commissioning Process".
49 B. ASHRAE Guideline 0-2013, "The Commissioning Process".
50 C. ASTM E2947-16: Standard Guide for Building Enclosure Commissioning
51 D. ASTM E2813-12: Standard Practice for Building Enclosure Commissioning
52 E. NEBB – Procedural Standards for Building Systems Commissioning.
53

1.4. DEFINITIONS

- 55 A. Acceptance Phase. Phase of construction after startup and initial checkout when functional performance tests
56 are performed.
57 B. Commissioning Authority (CxA). An independent entity, not otherwise associated with the A/E team members or
58 the Contractor and reports directly to the Owner. The CxA directs and coordinates the commissioning activities.

- 1 C. Commissioning Plan (Cx Plan). An overall plan, developed before or after bidding, that provides the structure,
2 schedule and coordination planning for the commissioning process. The Cx Plan is included in the bid documents
3 and is to be reviewed by all contractors before submitting their bid.
- 4 D. Contract Documents. The documents binding on parties involved in the construction of this project (drawings,
5 specifications, change orders, amendments, contracts, Cx Plan, etc.).
- 6 E. Construction Checklist (CC). a list of items to inspect and test equipment and components to verify proper
7 installation of equipment. The CCs are provided by the CxA to the Sub.
- 8 F. Datalogging. - Monitoring flows, currents, status, pressures, etc. of equipment using stand-alone dataloggers
9 separate from the control system.
- 10 G. Deferred System Performance Tests. SPT's that are performed later, after substantial completion, due to partial
11 occupancy, equipment, seasonal requirements, design or other site conditions that prevent the tests from being
12 performed earlier.
- 13 H. Deficiency. A condition in the installation or function of a component, piece of equipment or system that is not in
14 compliance with the Contract Documents (that is, does not perform properly or is not complying with the
15 Owner's Project Requirements).
- 16 I. Factory Testing. Testing of equipment on-site or at the factory by factory personnel with an Owner's
17 representative present.
- 18 J. Indirect Indicators. Indicators of a response or condition, such as a reading from a control system screen
19 reporting a damper to be 100% closed.
- 20 K. Manual Test. Using hand-held instruments, immediate control system readouts or direct observation to verify
21 performance (contrasted to analyzing monitored data taken over time to make the "observation").
- 22 L. Monitoring. Recording parameters (flow, current, status, pressure, etc.) of equipment operation using
23 dataloggers or the trending capabilities of control systems.
- 24 M. Over-written Value. Writing over a sensor value in the control system to see the response of a system (e.g.,
25 changing the outside air temperature value from 75F to 50F to verify economizer operation). See also "Simulated
26 Signal."
- 27 N. Owner's Project Requirements (OPR). A document that describes what the Owner and stakeholders want to
28 achieve with this project and what expectations they have of the completed project.
- 29 O. Sampling. Reviewing or testing only a fraction of the total number of identical or near identical pieces of
30 equipment.
- 31 P. Seasonal Performance Tests. SPT's that are deferred until the system(s) will experience conditions closer to their
32 design conditions.
- 33 Q. Simulated Condition. Condition that is created for the purpose of testing the response of a system (e.g., applying
34 a hair blower to a space sensor to see the response in a VAV box).
- 35 R. Simulated Signal. Disconnecting a sensor and using a signal generator to send an amperage, resistance or
36 pressure to the transducer and DDC system to simulate a sensor value.
- 37 S. System Performance Test (SPT). Dynamic testing of entire systems (rather than just components of the system)
38 under full operation.
- 39 T. Trending. Monitoring of control points using the building automation system.

40 41 **1.5 DESCRIPTION**

- 42 A. General: Commissioning (Cx) is a systematic process of verifying that all building systems perform interactively to
43 meet the Owner's Project Requirements (OPR). This is achieved by beginning in the planning phase with
44 documenting the OPR and continuing through design, construction, acceptance, and the warranty period with
45 verification of performance. The Cx process shall encompass and coordinate the traditionally separate functions
46 of system documentation, equipment startup, control system calibration, testing and balancing, performance
47 testing and training. Cx during the construction phase is intended to achieve the following specific objectives
48 according to the Contract Documents:
 - 49 1. Verify that applicable equipment and systems are installed according to the manufacturer's
50 recommendations and to industry accepted minimum standards and that they receive adequate
51 operational checkout by installing contractors.
 - 52 2. Verify and document proper performance of equipment and systems.
 - 53 3. Verify that O&M documentation is complete.
 - 54 4. Verify that the Owner's operating personnel are adequately trained.
- 55 B. The Cx process does not take away from or reduce the responsibility of the system designers or installing
56 contractors to provide a finished and fully functioning product.
- 57 C. The commissioning authority (CxA) has no authority to change, modify or direct any work. The CxA can only
58 provide comments and suggestions.

- 1 D. Commissioning Plan. The Cx Plan provides guidance in the execution of the Cx process. The CxA will update the
2 Cx Plan regularly as the project progresses. The Drawings and Specifications will take precedence over the Cx
3 Plan.
4

5 **1.6 RESPONSIBILITIES**

6 A. General Contractor (GC) and Subcontractors (Subs)

7 1. Construction and Acceptance Phase

- 8 a. Provide assistance to the Construction Manager CM in the coordination of the Cx work by
9 the CxA, and with the CM and CxA ensure that Cx activities are being scheduled into the
10 master schedule.
11 b. Provide an updated construction schedule to the CxA any time the schedule changes.
12 c. Include the Cx activities in the contract.
13 d. Furnish a copy of all submittals and shop drawings pertaining to the commissioned
14 systems for review concurrently with the Architect and Engineers.
15 e. Furnish a copy of all construction meeting agendas and minutes to the CxA.
16 f. In each purchase order or subcontract written, include requirements for submittal data,
17 O&M data, Cx tasks and training.
18 g. GC will ensure that all Subs execute their Cx responsibilities according to the Contract
19 Documents and schedule.
20 h. A representative from the GC and each sub associated with the Cx process shall attend the
21 Cx pre- construction meeting and the regular Cx meetings scheduled by the CxA to
22 facilitate the Cx process.
23 i. Coordinate and execute the training of Owner personnel.
24 j. Prepare O&M manuals, according to the Contract Documents, including clarifying and
25 updating the original sequences of operation to as-built conditions.
26 k. Prepare and submit draft forms, including but not limited to start-up procedures, Testing
27 and Balancing (TAB) forms, calibration forms, etc. for review by the CxA before execution.
28 l. Submit test reports to the CxA of all tests performed on components and equipment to be
29 commissioned that are not included as part of the Construction Checklist and SPT
30 procedures.
31 m. Complete all construction checklist and functional performance test forms as required by
32 the Cx process.
33 n. Support the CxA with verification of the completion of construction checklist and
34 functional performance tests as outlined in PART 3.
35 o. Complete and inspect all installations. Certify that all components and systems are
36 operating as intended per Contract Documents.
37 p. Remedy all deficiencies immediately as they are identified throughout construction.
38 q. Demonstrate functionality of all systems and equipment.
39 r. Maintain an updated set of record drawings (on a daily basis) on the construction site.
40 s. Provide support and instrumentation to verify TAB reports, start-up reports, calibration
41 reports, and any other report pertinent to the commissioned equipment and systems.
42 t. Notify the CxA no less than 21 days before all testing, start-up, and training.
43 u. Update the CxA on a weekly basis on the progress of the Cx activities.
44 v. Submit trend data in electronic format or allow access to trending data by internet
45 connection as requested by the CxA.
46 w. Install access points by every sensor such that the sensor can be calibrated without
47 removal (P/T plugs, plugged holes in ducts etc.).

48 2. Warranty Period

- 49 a. Execute seasonal or deferred functional performance testing, witnessed by the CxA,
50 according to the specifications.
51 b. Correct deficiencies and make necessary adjustments to O&M manuals and record
52 drawings for applicable issues identified in any seasonal testing.

53 B. Equipment Suppliers

- 54 1. Provide all requested submittal data, including detailed start-up procedures and specific
55 responsibilities of the Owner to keep warranties in force.
56 2. Assist in equipment testing per agreements with Subs.
57 3. Include all special tools and instruments (only available from vendor, specific to a piece of
58 equipment) required for testing equipment according to these Contract Documents in the base

- 1 bid price to the Contractor, except for stand-alone data logging equipment that may be used by
2 the CxA.
3 4. Provide information requested by CxA regarding equipment sequence of operation and testing
4 procedures.
5 5. Review test procedures for equipment installed by factory representatives.
6

7 **1.7 SYSTEMS TO BE COMMISSIONED**

- 8 A. The entire Heating, Ventilation and Air Conditioning (HVAC) system
9 B. Building Automation System (BAS) for the HVAC system
10 C. Domestic Hot Water
11 D. Building envelope and roofing system
12 E. Lighting and Lighting Controls
13 F. Solar electric (PV) System
14

15 **PART 2 – PRODUCTS**

16
17 **2.1 TEST INFORMATION**

- 18 A. All instruments needed to verify sensor readings, component performance, and system performance will be
19 provided by GC and Subs and be available to the CxA. These instruments will not be beyond what the contractors
20 need to complete the work specified in these construction documents. Any data logging equipment required in
21 addition to the BAS will be provided by the CxA.
22 B. All instruments shall be of sufficient quality and accuracy to test and/or measure system performance with the
23 tolerances specified in the Contract Documents. Refer to specification section 23 05 93- Testing, Adjusting, and
24 Balancing for required instrument tolerances.
25

26 **PART 3 - EXECUTION**

27
28 **3.1 COMMISSIONING TEAM**

- 29 A. The members of the commissioning team consist of the Commissioning Authority (CxA), the Owner's Project
30 Manager (PM), the designated representative of the Owner's Construction Management team (CM), the General
31 Contractor (GC or Contractor), the architect and design engineers, the Mechanical Contractor, the Electrical
32 Contractor, the TAB Contractor, the Controls Contractor, any other installing subcontractors or suppliers of
33 equipment.
34 B. Each Cx Team member shall designate one person who is responsible for coordinating the commissioning efforts
35 with the CxA.
36

37 **3.2 SCHEDULING AND MEETINGS**

- 38 A. Scheduling. The CxA will work with the other members of the Cx Team according to established protocols to
39 schedule the Cx activities. The CxA will provide sufficient notice to the Cx Team for scheduling Cx activities. The
40 GC will integrate all Cx activities into the master schedule. All parties will address scheduling problems and make
41 necessary notifications in a timely manner in order to expedite the Cx process.
42 B. The CxA will provide the initial schedule of primary Cx events at the Cx pre-construction meeting. The Cx Plan
43 provides a format for this schedule. As construction progresses more detailed schedules are developed by the
44 CxA. The Cx Plan also provides a format for detailed schedules.
45 C. Pre-Construction Meeting. Within 60 days of selection of the GC, the CxA will schedule, plan, and conduct a Cx
46 pre-construction meeting with the entire Cx team in attendance. Meeting minutes will be distributed to all
47 parties by the CxA. Information gathered from this meeting will allow the CxA to revise the Cx Plan which will
48 also be distributed to all parties.
49 D. Meetings. The Cx meetings will be scheduled approximately once a month during construction. These meetings
50 will be scheduled directly before or after the regular construction meetings if practical. These meetings will cover
51 coordination, deficiency resolution and planning issues with particular Subs. The CxA will plan these meetings
52 and will minimize unnecessary time being spent by Subs
53

54 **3.3 REPORTING**

- 55 A. The CxA will provide regular reports to the Owner as construction and Cx progresses. Standard forms are
56 provided and referenced in the Cx Plan.
57 B. The CxA will regularly communicate with all members of the Cx team, keeping them apprised of Cx progress and
58 scheduling changes through memos, progress reports, etc.

- 1 C. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and
2 testing as described in later sections.
3

4 **3.4 RECORD DRAWINGS**

- 5 A. The CxA will verify that the record drawings are updated throughout the construction. If a discrepancy is found
6 between the record drawings and the installations, the CxA will notify the GC immediately. It is the GC and
7 subcontractors responsibility to then inspect the installations and immediately and completely update the record
8 drawings such that they accurately reflect the installation.
9

10 **3.5 CONSTRUCTION COMMISSIONING PROCEDURES**

- 11 A. The following procedures apply to all equipment to be commissioned.
12 B. General. Construction checklists are important to ensure that the equipment and systems are hooked up and
13 operational. It ensures that system performance testing (in-depth system checkout) may proceed without
14 unnecessary delays. Each piece of equipment receives full checkout. No sampling strategies are used. All
15 construction checklists for a given system must be successfully completed prior to formal system performance
16 testing of equipment or subsystems of the given system.
17 C. Construction Checklists.
18 1. The primary purpose of the construction checklists is to provide the individual workers with the
19 key criteria for a successful installation. The secondary purpose is to track the progress of the
20 delivery and installation.
21 2. The CxA will develop construction checklists for all commissioned equipment and distribute these
22 to the responsible contractor. The GC and Subs will review the construction checklists for each
23 equipment type and provide comments to the CxA. The CxA will then print and distribute the
24 construction checklist for each individual component.
25 3. The GC and Subs are responsible for all requirements in the specification, not only the
26 requirements listed on the checklists.
27 4. The checklists answer format will be to circle yes /no or provide a brief answer such as providing
28 the model or serial numbers.
29 5. These checklists are provided by the CxA to the GC. The GC determines which trade is responsible
30 for executing and documenting each of the line item tasks and notes that trade on the form. Each
31 form may have more than one trade responsible for its execution.
32 6. The construction checklists shall be completed as delivery is completed and the installation
33 progresses.
34 7. Only individuals who have direct knowledge and witnessed that a line item task on the
35 construction checklist was actually performed shall initial or check that item off. It is not
36 acceptable for supervisors without direct knowledge or who have not witnessed the line item task
37 on the construction checklist to fill out these forms.
38 8. Any negative response shall immediately be brought to the attention of the CxA. All negative
39 replies shall be explained in detail on the construction checklist.
40 9. The GC and Subs are responsible for recording the completion of the checklists. Checklists shall be
41 submitted electronically to SharePoint in .pdf format in separate files by Division. Each file shall be
42 bookmarked by checklist tag.
43 10. Non-itemized installations such as wiring, ductwork, piping etc. will not have checklists to be
44 completed, but the GC and Subs will be provided the key criteria for successful installation.
45 11. The CxA will verify the construction checklist completion by a sampling of the delivered and
46 installed equipment. The sampling process will be described in the Cx Plan.
47 D. Sensor Calibration. Calibration of all sensors shall be included as part of the construction checklists performed by
48 the Contractors. Calibration information is provided in specification Section 23 09 23 - Direct Digital Control
49 System for HVAC
50 E. Deficiencies, Non-Conformance and Approval in Checklists and Startup.
51 1. The Subs shall clearly list any outstanding items of the construction checklist that were not
52 completed successfully, at the bottom of the procedures form or on an attached sheet. The
53 procedures form and any outstanding deficiencies are provided to the CxA within two days of task
54 completion.
55 2. The CxA reviews the report and submits either a non-compliance report or an approval form to
56 the Sub or CM. The CxA shall work with the Subs and vendors to correct deficiencies or
57 uncompleted items. The CxA will involve the CM and others as necessary. The installing Subs or
58 vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a

- 1 timely manner, and shall notify the CxA as soon as outstanding items have been corrected and
2 include a Statement of Correction on the original non-compliance report. When satisfactorily
3 completed, the CxA recommends approval of the completion of the checklists to the CM using a
4 standard form.
- 5 3. Items left incomplete, which later cause deficiencies or delays during functional testing may result
6 in back charges to the responsible party.
- 7 F. System Performance Tests (SPT). SPTs shall be performed to demonstrate that each system is operating
8 according to the documented OPR and Contract Documents. System testing differs to the tests required in the
9 Construction Checklist in that they facilitate bringing all the individual components together to verify that they
10 operate collectively on a system level to provide the required design conditions.
- 11 1. Development of Test Procedures. The CxA shall prepare the SPT forms and procedures in
12 accordance with the criteria defined in the Cx Plan. The GC and Subs shall assist the CxA in the
13 preparation of these procedures by answering queries and forwarding site-specific information. A
14 sample System Performance Test form is provided at the end of this specification section.
- 15 2. Participation: The GC and the Subs are responsible for testing all systems to be commissioned
16 such that they function as described in the contract documents. The CxA will verify the
17 performance of the systems. The CxA will direct, witness and document the SPT verification and
18 GC and Subs will execute the verification tests.
- 19 G. Problem Solving. The CxA will recommend solutions to problems found, however the burden of responsibility to
20 solve, correct and retest problems is with the GC, Subs and A/E.
- 21 H. Seasonal Testing. During the warranty period, seasonal testing (tests delayed until weather conditions are closer
22 to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests
23 will be executed, documented and deficiencies corrected by the appropriate Subs, with facilities staff and the
24 CxA witnessing. Any final adjustments to the O&M manuals and record documents due to the testing will be
25 made.
- 26 I. Unforeseen Deferred Tests. If any check or test cannot be completed due to the building structure, required
27 occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon
28 approval of the PM. These tests will be conducted in the same manner as the seasonal tests.

3.6 SENSOR AND ACTUATOR CALIBRATION

- 31 A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure
32 sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors
33 installed in the unit at the factory with calibration certification provided need not be field calibrated.
- 34 B. Calibrate using the methods described below; alternate methods may be used, if approved by Owner
35 beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Construction
36 Checklist or other suitable forms, documenting initial, intermediate and final results.
- 37 C. All Sensors:
- 38 1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
39 2. Verify that sensors with shielded cable are grounded only at one end.
40 3. For sensor pairs that are used to determine a temperature or pressure difference, for
41 temperature make sure they are reading within 0.2 degree F (0.1 degree C) of each other, and for
42 pressure, within tolerance equal to 2 percent of the reading, of each other.
43 4. Tolerances for critical applications may be tighter.
- 44 D. Sensors without Transmitters - Standard Application:
- 45 1. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
46 2. Verify that the sensor reading, via the permanent thermostat, gage or building automation
47 system, is within the tolerances in the table below of the instrument-measured value.
48 3. If not, install offset, calibrate or replace sensor.
- 49 E. Sensors with Transmitters - Standard Application.
- 50 1. Disconnect sensor.
51 2. Connect a signal generator in place of sensor.
52 3. Connect ammeter in series between transmitter and building automation system control panel.
53 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
54 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
55 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum
56 and verify at the building automation system.
57 7. Record all values and recalibrate controller as necessary to conform with specified control ramps,
58 reset schedules, proportional relationship, reset relationship and P/I reaction.

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8. Reconnect sensor.
 9. Make a reading with a calibrated test instrument within 6 inches (150 mm) of the site sensor.
 10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
 11. If not, replace sensor and repeat.
 12. For pressure sensors, perform a similar process with a suitable signal generator.
- F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
 2. Pressure, Air, Water, Gas: 3 percent of design.
 3. Air Temperatures (Outside Air, Space Air, and Duct Air): 0.4 degrees F (0.2 degree C).
 4. Relative Humidity: 4 percent of design.
 5. Barometric Pressure: 0.1 inch of Hg (340 Pa).
 6. Flow Rate, Air: 10 percent of design.
 7. Flow Rate, Water: 4 percent of design.
 8. Flow Rate, Steam: 3 percent of design.
 9. AHU Wet Bulb and Dew Point: 2.0 degrees F (1.1 degrees C).
 10. Hot Water Coil and Boiler Water Temperature: 1.5 degrees F (0.8 degrees C).
 11. Cooling Coil, Chilled and Condenser Water Temperatures: 0.4 degrees F (0.2 degree C).
 12. Combustion Flue Temperature: 5.0 degrees F (2.8 degrees C).
 13. Oxygen and CO2 Monitors: 0.1 percentage points.
 14. CO Monitor: 0.01 percentage points.
 15. Natural Gas and Oil Flow Rate: 1 percent of design.
- G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 2. Set pump/fan to normal operating mode.
 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 5. Command valve/damper to a few intermediate positions.
 6. If actual valve/damper position does not reasonably correspond, replace actuator
- I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
 2. Use an ultra-sonic flow meter to detect flow or leakage.

3.7 NON-CONFORMANCE

- A. All deficiencies or non-conformance issues shall be noted and reported by the GC to the CM on a standard non-compliance form.
- B. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
- C. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the CM and the Owner.
- D. As tests progress and a deficiency is identified, the CxA discusses the issue with the executing contractor.
 1. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
 - a. The CxA documents the deficiency and the Sub's response and intentions and they go on to another test or sequence. After the day's work, the CxA submits the non-compliance reports to the CM for signature, if required. A copy is provided to the Sub and CxA. The Sub corrects the deficiency, signs the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and sends it back to the CxA.
 - b. The CxA reschedules the test and the test is repeated.
 2. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
 - a. The deficiency shall be documented on the non-compliance form with the Sub's response and a copy given to the CM and to the Sub representative assumed to be responsible.

- 1 b. Resolutions are made at the lowest management level possible. Other parties are brought
2 into the discussions as needed. Final interpretive authority is with the A/E. Final
3 acceptance authority is with the Project Manager.
- 4 c. The CxA documents the resolution process.
- 5 d. Once the interpretation and resolution have been decided, the appropriate party corrects
6 the deficiency, signs the statement of correction on the non-compliance form and provides
7 it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory
8 performance is achieved.
- 9 3. Cost of Retesting.
 - 10 a. The cost incurred by the Subs to retest a construction checklist item or functional test, if
11 they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost
12 recovery for retesting costs shall be negotiated with the GC.
 - 13 b. For a deficiency identified, not related to any construction checklist or start-up fault, the
14 following shall apply: The CxA and CM will direct the retesting of the equipment once at no
15 "charge" to the GC for their time. However, the CxA's and CM's time for a second retest
16 will be charged to the GC, who may choose to recover costs from the responsible Sub.
 - 17 c. The time for the CxA and CM to direct any retesting required because a specific
18 construction checklist or start-up test item, reported to have been successfully completed,
19 but determined during functional testing to be faulty, will be backcharged to the GC, who
20 may choose to recover costs from the party responsible for executing the faulty
21 installation or test.
 - 22 d. The Contractor shall respond in writing to the CxA and CM at least as often as Cx meetings
23 are being scheduled concerning the status of each apparent outstanding discrepancy
24 identified during Cx. Discussion shall cover explanations of any disagreements and
25 proposals for their resolution.
 - 26 e. The CxA retains the original non-conformance forms until the end of the project.
 - 27 f. Failure Due to Manufacturer Defect. If 10%, or three, whichever is greater, of identical
28 pieces (size alone does not constitute a difference) of equipment fail to perform to the
29 Contract Documents (mechanically or substantively) due to manufacturing defect, not
30 allowing it to meet its submitted performance spec, all identical units may be considered
31 unacceptable by the CM or PM. In such case, the Contractor shall provide the Owner with
32 the following:
 - 33 g. Within one week of notification from the CM or PM, the Contractor or manufacturer's
34 representative shall examine all other identical units making a record of the findings. The
35 findings shall be provided to the CM or PM within two weeks of the original notice.
 - 36 h. Within two weeks of the original notification, the Contractor or manufacturer shall provide
37 a signed and dated, written explanation of the problem, cause of failures, etc. and all
38 proposed solutions which shall include full equipment submittals. The proposed solutions
39 shall not significantly exceed the specification requirements of the original installation. The
40 CM or PM will determine whether a replacement of all identical units or a repair is
41 acceptable.
 - 42 i. Two examples of the proposed solution will be installed by the Contractor and the CM will
43 be allowed to test the installations for up to one week, upon which the CM or PM will
44 decide whether to accept the solution.
 - 45 j. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical
46 items, at their expense and extend the warranty accordingly, if the original equipment
47 warranty had begun. The replacement/repair work shall proceed with reasonable speed
48 beginning within one week from when parts can be obtained.
- 49 E. Approval. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the
50 functional test is made later after review by the CxA and by the CM, if necessary. The CxA recommends
51 acceptance of each test to the CM using a standard form. The CM gives final approval on each test using the
52 same form, providing a signed copy to the CxA and the Contractor.
- 53
- 54
- 55

END OF SECTION

**SECTION 01 95 01
MONITORING-BASED COMMISSIONING**

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PART 1 – GENERAL

1.1 SUMMARY

- 26 A. Purpose: This section includes general requirements that apply to implementation of monitoring-based
27 commissioning (MbCx). MbCx is a component of the LEED v4.1 Rating System and the Commissioning Process.
28 This process replaces the Measurement and Verification process that was used in the LEED v3 Rating System.
29 B. RELATED WORK AND REQUIREMENTS
30 1. Section 01 31 13 Project Coordination
31 2. Section 01 31 19 Project Meetings
32 3. Section 01 31 23 Project Management Web Site
33 4. Section 01 91 00 Commissioning
34 5. Section 23 09 00 Instrumentation and Control for HVAC
35 6. Section 23 09 23 Direct Digital Control (DDC) System for HVAC
36 7. Section 23 09 93 Sequence of Operations for HVAC DDC
37 8. Section 26 24 13 Switchboards
38 9. Section 26 24 16 Panelboards
39

1.2 DEFINITIONS

- 41 A. BAS - Building Automation System
42 B. Cx - Commissioning
43 C. DHW - Domestic Hot Water
44 D. MbCx Monitoring-Based Commissioning
45 E. kW - Electric power read from utility meter
46 F. KWh - Electric energy consumption read from utility meter
47 G. Plug Loads – Electric power and consumption from wall receptacles
48

1.3 MECHANICAL CONTRACTOR RESPONSIBILITIES

- 50 A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them
51 to participate in and perform MbCx activities including, but not limited to, the following:
52 1. Follow activities identified in the Cx Plan.
53 2. Coordinate connection of gas and DHW monitoring equipment with BAS.
54 3. Cooperate with the Cx Agent, owner, Electrical Contractor and Controls Contractor for resolution of
55 issues related to data collection.
56 4. Attend team meetings during construction and post-construction MbCx period (1 year). Attend quarterly
57 meetings.
58 5. Followup training or repairs needed to maintain performance.

1
2 **1.4 ELECTRICAL CONTRACTOR RESPONSIBILITIES**

- 3 A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them
4 to participate in and perform MbCx activities including, but not limited to, the following:
5 1. Follow activities identified in the Cx Plan.
6 2. Coordinate connection of electrical monitoring equipment with BAS
7 3. Cooperate with the Cx Agent, owner, Mechanical Contractor and Controls Contractor for resolution of
8 issues related to data collection.
9 4. Attend team meetings during construction and post-construction MbCx period (1 year). Attend quarterly
10 meetings.
11 5. Followup training or repairs needed to maintain performance.
12

13 **1.5 CONTROLS CONTRACTOR RESPONSIBILITIES**

- 14 A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them
15 to participate in and perform MbCx activities including, but not limited to, the following:
16 1. Follow activities identified in the Cx Plan.
17 2. Coordinate connection of electrical monitoring equipment with BAS
18 3. Coordinate connection of gas and DHW monitoring equipment with BAS.
19 4. Coordinate connection of measurement requirements (points, data access) with BAS.
20 5. Cooperate with the Cx Agent, owner, Mechanical Contractor and Electrical Contractor for resolution of
21 issues related to data collection.
22 6. Attend team meetings during construction and post-construction MbCx period (1 year). Attend quarterly
23 meetings.
24 5. Followup training or repairs needed to maintain performance.
25

26 **1.6 MBCX PROVIDERS RESPONSIBILITIES**

- 27 A. The Cx Agents responsibilities related to MbCx include:
28 1. Organize and lead the MbCx team.
29 2. Provide a Cx plan that includes the following procedures and information:
30 a. roles and responsibilities as they relate to MbCx;
31 b. measurement requirements (meters, points, metering systems, data access);
32 c. the points to be tracked, with frequency and duration for trend monitoring;
33 d. the limits of acceptable values for tracked points and metered values (where appropriate,
34 predictive algorithms may be used to compare ideal values with actual values);
35 e. the elements used to evaluate performance, including conflict between systems, out-of
36 sequence systems components, and energy and water usage profiles;
37 f. an action plan for identifying and correcting operational errors and deficiencies;
38 g. training to prevent errors;
39 h. planning for repairs needed to maintain performance; and
40 i. the frequency of analyses in the first year of occupancy (at least quarterly).
41 3. Convene MbCx meetings as needed, but at least quarterly for 1 year post construction.
42 4. Cooperate with the Mechanical Contractor, Electrical Contractor, and Controls Contractor for
43 resolution of issues related to establishing connection between BAS and monitoring meters and
44 equipment.
45 5. Provide a final MbCx report at 1 year post construction.
46 6. Update the systems manual with any modifications or new settings, and give the reason for any
47 modifications from the original design.
48

49 **PART 2 – PRODUCTS**

50
51 **2.1 METERS AND SUB-METERS**

- 52 A. Monitoring meters and sub-meters, both gas and electric, to have the ability to connect to the BAS and provide
53 data to BAS at a minimum of 15 minute intervals. It is acceptable to use the utility for this purpose if allowable by
54 utility company.
55

56 **PART 3 - EXECUTION**

1 **3.1 ELECTRIC METER**

- 2 A. Provide real-time monitoring of the whole building electricity kW and kWh use by using a signal from the
3 building utility meter serving the HVAC, lighting, and plug loads and provide the data input to the Building
4 Automation System (BAS). The BAS must be capable of trending this kW and kWh data. Data is to be collected in
5 15 minute intervals. Storage of at least 3 months of 15 minute data is required on the BAS. Data older than 3
6 months is to be automatically saved and archived on the BAS computer without being overwritten. Data older
7 than 5 years can be overwritten. It is the responsibility of the electrical contractor to coordinate this work.
8

9 **3.2 ELECTRIC SUB-METERS**

- 10 A. Provide real-time monitoring of the building electricity kW and kWh use by using a signal from the building panel
11 sub-meters at each floor and provide the data input to the BAS. The BAS must be capable of trending this kW
12 and kWh data. Data is to be collected in 15 minute intervals. Storage of at least 3 months of 15 minute data is
13 required on the BAS. Data older than 3 months is to be automatically saved and archived on the BAS computer
14 without being overwritten. Data older than 5 years can be overwritten. It is the responsibility of the electrical
15 contractor to coordinate this work.
16

17 **3.3 NATURAL GAS**

- 18 A. Provide real-time monitoring of whole building natural gas consumption by using a signal from the building utility
19 meter to provide the data input to the BAS. The BAS must be capable of trending gas consumption. Data is to be
20 collected in 15 minute intervals. Storage of at least 3 months of 15 minute data is required on the BAS. Data
21 older than 3 months is to be automatically saved and archived on the BAS computer without being overwritten.
22 Data older than 5 years can be overwritten. It is the responsibility of the mechanical contractor to coordinate this
23 work.
24

25 **3.4 DOMESTIC HOT WATER**

- 26 A. Provide real-time monitoring of the domestic hot water (DHW) system by measuring water flow to DHW heater
27 and DHW supply and return temperatures and providing data input to the BAS. The BAS must be capable of
28 trending. Data is to be collected in 15 minute intervals. Storage of at least 3 months of 15 minute data is required
29 on the BAS. Data older than 3 months is to be automatically saved and archived on the BAS computer without
30 being overwritten. Data older than 5 years can be overwritten. It is the responsibility of the mechanical
31 contractor to coordinate this work.
32

33 **3.5 HEATING HOT WATER**

- 34 A. Provide real-time monitoring of the heating hot water (HW) system by measuring water flow to the boiler(s) and
35 HW supply and return temperatures and providing data input to the BAS. The BAS must be capable of trending.
36 Data is to be collected in 15 minute intervals. Storage of at least 3 months of 15 minute data is required on the
37 BAS. Data older than 3 months is to be automatically saved and archived on the BAS computer without being
38 overwritten. Data older than 5 years can be overwritten. It is the responsibility of the mechanical contractor to
39 coordinate this work.
40

41 **3.6 CHILLED WATER**

- 42 A. Provide real-time monitoring of the chilled water (CW) system by measuring water flow to the chillers(s) and CW
43 supply and return temperatures and providing data input to the BAS. The BAS must be capable of trending. Data
44 is to be collected in 15 minute intervals. Storage of at least 3 months of 15 minute data is required on the BAS.
45 Data older than 3 months is to be automatically saved and archived on the BAS computer without being
46 overwritten. Data older than 5 years can be overwritten. It is the responsibility of the mechanical contractor to
47 coordinate this work.
48

49 **3.7 TEMPORARY MONITORING**

- 50 A. Provide easy access to allow for the temporary installation of split-core current sensors and voltage sensors for
51 the electrical measurement and datalogging on the following systems:
52 1. Lighting
53 2. Plug loads
54 3. HVAC equipment including chillers, fans, circulation pumps, and air handling units
55 4. DHW equipment
56 B. Temporary monitoring equipment will be provided by the Cx Agent.
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3.8 DDC TRENDS

- A. The Controls Contractor is to provide provision for remote access to BAS to view status of building and the ability to download trendable points per the MbCx requirements in the Cx Plan.

END OF SECTION

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Sections:
 - 1. 09 91 10 Section "Paint and Coating".
- C.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED v4 Submittals. This project is attempting to achieve LEED v4 certification and as such the following submittals for concrete shall be provided.
 - 1. Building Life-cycle Impact Reduction. For each product (mix design) submit:
 - a. If available, provide an ISO 14044 compliant Life Cycle Assessment and/or Inventory for each product proposed for the project (Including Steel Reinforcement). The Life Cycle Assessment / Inventory must be at least cradle-to-gate in scope. Cradle-to-grave scope is preferred.
 - b. Alternatively, submit product-specific Environmental Product Declarations (EPDs) for each product (mix design) proposed on the project (Including Steel Reinforcement).
 - c. Alternatively, submit an Industry-Wide EPD including external verification in accordance with ISO 14025 in which the manufacturer is explicitly recognized as a participant by the program operator.
 - 2. Materials and Resources: Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations. For each product (mix design) submit:
 - a. If available, provide a product-specific Type III EPD —third-party certified EPD including external verification in accordance with ISO 14025.
 - b. Alternatively, submit an industry-wide (generic) EPD — products with third-party certified EPD including external verification in accordance with ISO 14025 in which the manufacturer is explicitly recognized as a participant by the program operator.
 - c. Alternatively, submit product specific declaration — publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
 - 3. Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 1. Raw Material Source and Extraction Reporting. If available, for each product (mix design) submit:
 - a. If available, provide a third-party verified corporate sustainability report (CSR) which includes long-term ecologically responsible land use and commitment to reducing environmental impacts of extraction operations and activities associated with the manufacturer’s product and the product’s supply chain, following one of the recognized frameworks:
 - 1) Global Reporting Initiative (GRI) Sustainability Report
 - 2) Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
 - 3) U.N. Global Compact: Communication of Progress
 - 4) ISO 26000: 2010 Guidance on Social Responsibility
 - b. Alternatively, provide a publicly available self-declared report that includes reports from raw material suppliers which includes raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria.
 - 4. Product Disclosure and Optimization – Material Ingredients. Option 1. Material Ingredients Reporting. If available, for each product (mix design) submit:
 - a. A chemical inventory of the product to at least 0.1% (1000 ppm) using one of the following criteria:
 - b. A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN). Materials defined as trade secret or intellectual property may withhold the name and/or CASRN but must disclose role, amount and GreenScreen benchmark, as defined in GreenScreen v1.2
 - c. Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.

- 1 d. Cradle to Cradle v2 Basic level certification documentation.
- 2 e. Cradle to Cradle v3 Bronze level certification documentation.
- 3 5. Construction and Demolition Waste Management. For all products (mix designs) submit:
- 4 6. A letter stating the total weight and volume of waste (returned or unused concrete) diverted from landfills.
- 5 Provide details of how the waste was recovered, reused or recycled.
- 6 C. Design Mixtures: For each concrete mixture.
- 7 D. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.
- 8
- 9 **1.3 INFORMATIONAL SUBMITTALS**
- 10 A. Material certificates (See Above).
- 11 B. Material test reports.
- 12 C. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing
- 13 fabrication, assembly, and support of formwork.
- 14 D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- 15
- 16 **1.4 QUALITY ASSURANCE**
- 17 A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies
- 18 with ASTM C 94/C 94M requirements for production facilities and equipment.
- 19 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- 20 B. Testing Agency Qualifications: An independent agency, **acceptable to authorities having jurisdiction**, qualified
- 21 according to ASTM C 1077 and ASTM E 329 for testing indicated.
- 22
- 23 **1.5 PRECONSTRUCTION TESTING**
- 24 A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete
- 25 mixtures.
- 26
- 27 **1.6 FIELD CONDITIONS**
- 28 A. Cold-Weather Placement: Comply with ACI 306.1.
- 29 1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators
- 30 unless otherwise specified and approved in mixture designs.
- 31 B. Hot-Weather Placement: Comply with **ACI 301 (ACI 301M) and ACI 305.1**.

32 PART 2 - PRODUCTS

- 33 **2.1 CONCRETE, GENERAL**
- 34 A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
- 35 1. **ACI 301 (ACI 301M)**.
- 36 2. **ACI 117 (ACI 117M)**.
- 37
- 38 **2.2 FORM-FACING MATERIALS**
- 39 A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces.
- 40 Furnish in largest practicable sizes to minimize number of joints.
- 41 B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed
- 42 on at least two edges and one side for tight fit.
- 43
- 44 **2.3 STEEL REINFORCEMENT**
- 45 A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content
- 46 not less than 75 percent.
- 47 B. Reinforcing Bars: ASTM A 615/A 615M, **Grade 60 (Grade 420)**, deformed.
- 48 C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- 49 D. Galvanized Reinforcing Bars: **ASTM A 615/A 615M, Grade 60 (Grade 420)** or **ASTM A 706/A 706M**, deformed bars,
- 50 ASTM A 767/A 767M, [Class I] [Class II] zinc coated after fabrication and bending.
- 51 E. Epoxy-Coated Reinforcing Bars: **ASTM A 615/A 615M, Grade 60 (Grade 420)** or **ASTM A 706/A 706M**, deformed
- 52 bars, **ASTM A 775/A 775M or ASTM A 934/A 934M**, epoxy coated, with less than 2 percent damaged coating in each
- 53 **12-inch (300-mm)** bar length.
- 54 F. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat
- 55 sheets.

- 1 G. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- 2 H. Galvanized-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from galvanized-steel wire
- 3 into flat sheets.
- 4 I. Epoxy-Coated Welded-Wire Reinforcement: ASTM A 884/A 884M, Class A coated, Type 1, deformed steel.
- 5 J. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and
- 6 welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according
- 7 to CRSI's "Manual of Standard Practice."
- 8

9 2.4 CONCRETE MATERIALS

- 10 A. Cementitious Materials:
 - 11 1. Portland Cement: ASTM C 150/C 150M, **Type I/II**
 - 12 2. Fly Ash: ASTM C 618, [**Class F**] [**Class F or C**].
 - 13 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
 - 14 4. Blended Hydraulic Cement: ASTM C 595/C 595M
- 15 B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
 - 16 1. Maximum Coarse-Aggregate Size: **1-1/2 inch (25 mm)** nominal.
 - 17 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- 18 C. Lightweight Aggregate: ASTM C 330/C 330M, **3/4-inch (19-mm)** nominal maximum aggregate size.
- 19 D. Air-Entraining Admixture: ASTM C 260/C 260M.
- 20 E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute
- 21 water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or
- 22 admixtures containing calcium chloride.
 - 23 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 24 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 25 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 26 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 27 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 28 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- 29 F. Water: ASTM C 94/C 94M.
- 30

31 2.5 LIQUID FLOOR TREATMENTS

- 32 A. Lithium silicate concrete floor densifier, hardener, and sealer.
- 33 B. Basis of Design: Lion Hard: Water based, deep penetrating, lithium silicate designed to harden, densify, and dustproof
- 34 concrete surfaces.
 - 35 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that
 - 36 may be incorporated into the Work include, but are not limited to the following:
 - 37 a. Laticrete L&M Construction Chemicals
- 38 C. Quality requirements:
 - 39 1. Manufacturer: ISO 9001 quality certified as primary manufacturer of specified products.
- 40 D. Informational Submittals
 - 41 1. Product List: List manufacturer name and product name for each product proposed for use as concrete
 - 42 admixture and surface treatment.
 - 43 2. Manufacturer Certificate: Indicating products listed on Contractor's Product List are compatible and suitable
 - 44 for the specified application.
- 45 E. Preparation
 - 46 When used on existing concrete, prepare concrete surfaces in accordance with manufacturer's written instructions.
 - 47 1. Ensure surfaces are clean, dry and free of standing water.
 - 48 2. Remove dirt, dust, oil, grease, sealers, and other materials that may prevent penetration liquid densifier
 - 49 sealer.
- 50 F. Application
 - 51 1. Apply one, saturating coat of LiON HARD™ in a uniform manner, at a rate of 600 ft²/gal (14.7 m²/L). Install
 - 52 with a low pressure sprayer or other device, maintaining a wet surface sheen for 15 to 20 minutes. Apply
 - 53 more LiON HARD to areas that are more porous and appear to readily absorb the material. Redistribute any
 - 54 excess LiON HARD with soft broom or microfiber pad, allowing material to dry uniformly. Avoid brooming
 - 55 once drying begins. After drying remove any excess, powder-like residue with a stiff broom or dry buffer.
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2.6 WATERSTOPS

- A. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Williams Products, Inc.](#)
- B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [JP Specialties, Inc.](#)
 - b. [Sika Corporation.](#)
- C. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [BoMetals, Inc.](#)
 - b. [Sika Corporation.](#)
 - c. [Vinylex Waterstop & Accessories.](#)
- D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, **3/4 by 1 inch (19 by 25 mm)**.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Carlisle Coatings & Waterproofing Inc.](#)
 - b. [CETCO, a Minerals Technologies company.](#)
 - c. [Henry Company.](#)
 - d. [JP Specialties, Inc.](#)
 - e. [Sika Corporation.](#)
- E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, **3/8 by 3/4 inch (10 by 19 mm)**.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Adeka Corporation.](#)
 - b. [CETCO, a Minerals Technologies company.](#)
 - c. [GCP Applied Technologies Inc.](#)
 - d. [Kryton International Inc.](#)
 - e. [Sika Corporation.](#)

2.7 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Barrier-Bac; Inteplast Group, Ltd.](#)
 - b. [Poly-America, L.P.](#)
 - c. [Stego Industries, LLC.](#)
 - d. [Tex-Trude, LP.](#)
 - e. [W.R. Meadows, Inc.](#)
- B. Sheet Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Fortifiber Building Systems Group.](#)
- C. Sheet Vapor Retarder: ASTM E 1745, Class C. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [ISI Building Products.](#)
 - b. [Stego Industries, LLC.](#)
 - c. [Tex-Trude, LP.](#)
- D. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than **10 mils (0.25 mm)** thick.

2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [BASF Corp. - Construction Chemicals.](#)
 - b. [ChemMasters, Inc.](#)
 - c. [Euclid Chemical Company \(The\); an RPM company.](#)
 - d. [Kaufman Products, Inc.](#)
 - e. [Lambert Corporation.](#)
 - f. [Laticrete International, Inc.](#)
 - g. [Metalcrete Industries.](#)
 - h. [Sika Corporation.](#)
 - i. [SpecChem, LLC.](#)
 - j. [TK Products.](#)
 - k. [Vexcon Chemicals Inc.](#)
 - l. [W.R. Meadows, Inc.](#)
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately **9 oz./sq. yd. (305 g/sq. m)** when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [Anti-Hydro International, Inc.](#)
 - b. [ChemMasters, Inc.](#)
 - c. [Dayton Superior.](#)
 - d. [Euclid Chemical Company \(The\); an RPM company.](#)
 - e. [Kaufman Products, Inc.](#)
 - f. [Lambert Corporation.](#)
 - g. [Laticrete International, Inc.](#)
 - h. [SpecChem, LLC.](#)
 - i. [TK Products.](#)
 - j. [Vexcon Chemicals Inc.](#)
 - k. [W.R. Meadows, Inc.](#)
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [Anti-Hydro International, Inc.](#)
 - b. [BASF Corp. - Construction Chemicals.](#)
 - c. [ChemMasters, Inc.](#)
 - d. [Dayton Superior.](#)
 - e. [Euclid Chemical Company \(The\); an RPM company.](#)
 - f. [Kaufman Products, Inc.](#)
 - g. [Lambert Corporation.](#)
 - h. [Laticrete International, Inc.](#)
 - i. [Metalcrete Industries.](#)
 - j. [Nox-Crete Products Group.](#)
 - k. [SpecChem, LLC.](#)
 - l. [TK Products.](#)
 - m. [Vexcon Chemicals Inc.](#)

- 1 n. [W.R. Meadows, Inc.](#)
- 2 G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids,
3 nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- 4 1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
5 may be incorporated into the Work include, but are not limited to the following:
- 6 a. [BASF Corp. - Construction Chemicals.](#)
- 7 b. [ChemMasters, Inc.](#)
- 8 c. [Dayton Superior.](#)
- 9 d. [Euclid Chemical Company \(The\); an RPM company.](#)
- 10 e. [Kaufman Products, Inc.](#)
- 11 f. [Lambert Corporation.](#)
- 12 g. [Laticrete International, Inc.](#)
- 13 h. [Metalcrete Industries.](#)
- 14 i. [Nox-Crete Products Group.](#)
- 15 j. [SpecChem, LLC.](#)
- 16 k. [Vexcon Chemicals Inc.](#)
- 17 l. [V-Seal Concrete Sealers & Specialty Coatings.](#)
- 18 m. [W.R. Meadows, Inc.](#)
- 19 H. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- 20 1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
21 may be incorporated into the Work include, but are not limited to the following:
- 22 a. [BASF Corp. - Construction Chemicals.](#)
- 23 b. [ChemMasters, Inc.](#)
- 24 c. [Concrete Sealers USA.](#)
- 25 d. [Dayton Superior.](#)
- 26 e. [Euclid Chemical Company \(The\); an RPM company.](#)
- 27 f. [Kaufman Products, Inc.](#)
- 28 g. [Lambert Corporation.](#)
- 29 h. [Laticrete International, Inc.](#)
- 30 i. [Metalcrete Industries.](#)
- 31 j. [Nox-Crete Products Group.](#)
- 32 k. [Right Pointe.](#)
- 33 l. [SpecChem, LLC.](#)
- 34 m. [TK Products.](#)
- 35 n. [Vexcon Chemicals Inc.](#)
- 36 o. [W.R. Meadows, Inc.](#)
- 37 2. [Products shall comply with the](#) requirements of the California Department of Public Health's "Standard
38 Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
39 Environmental Chambers."
- 40 I. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- 41 1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
42 may be incorporated into the Work include, but are not limited to the following:
- 43 a. [ChemMasters, Inc.](#)
- 44 b. [Concrete Sealers USA.](#)
- 45 c. [Dayton Superior.](#)
- 46 d. [Euclid Chemical Company \(The\); an RPM company.](#)
- 47 e. [Kaufman Products, Inc.](#)
- 48 f. [Lambert Corporation.](#)
- 49 g. [Laticrete International, Inc.](#)
- 50 h. [Metalcrete Industries.](#)
- 51 i. [Nox-Crete Products Group.](#)
- 52 j. [Right Pointe.](#)
- 53 k. [SpecChem, LLC.](#)
- 54 l. [TK Products.](#)
- 55 m. [Vexcon Chemicals Inc.](#)
- 56 n. [W.R. Meadows, Inc.](#)

- 1 2. Products shall comply with the requirements of the California Department of Public Health's "Standard
2 Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
3 Environmental Chambers."

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5 **2.9 RELATED MATERIALS**

- 6 A. Expansion- and Isolation-Joint-Filler Strips: [ASTM D 1751, asphalt-saturated cellulosic fiber] [or] [ASTM D 1752, cork
7 or self-expanding cork].
8

9 **2.10 CONCRETE MIXTURES, GENERAL**

- 10 A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture
11 or field test data, or both, according to **ACI 301 (ACI 301M)**.
12 B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of
13 portland cement, which would otherwise be used, by not less than 40 percent.
14 C. Admixtures: Use admixtures according to manufacturer's written instructions.
15 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for
16 placement and workability.
17 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other
18 adverse placement conditions.
19 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking
20 structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
21

22 **2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS**

- 23 A. Normal-Weight Concrete:
24 1. Minimum Compressive Strength at 28 days:
25 a. Footing below frost line: 3000 psi (20.7 MPa)
26 b. Exterior foundation walls and grade beams that are exposed to freezing: 4000 psi (27.6 MPa)
27 c. Interior and Exterior Slab on Ground: 4000 psi (27.6 MPa)
28 d. Concrete beams joists and columns: 4000 psi (27.6 MPa)
29 e. All other Concrete: 3000 psi (20.7 Mpa)
30 2. Maximum W/C Ratio: **0.50**
31 3. Slump Limit: **4 inches (100 mm)** before adding high-range water-reducing admixture or plasticizing admixture,
32 plus or minus 1 inch (25 mm).
33 4. Air Content: **6** percent, plus or minus 1.5 percent at point of delivery for **1-1/2-inch (38-mm)** nominal
34 maximum aggregate size.
35 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
36 6. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate.
37

38 **2.12 FABRICATING REINFORCEMENT**

- 39 A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
40

41 **2.13 CONCRETE MIXING**

- 42 A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and
43 ASTM C 1116/C 1116M, and furnish batch ticket information.
44 1. When air temperature is between **85 and 90 deg F (30 and 32 deg C)**, reduce mixing and delivery time from
45 1-1/2 hours to 75 minutes; when air temperature is above **90 deg F (32 deg C)**, reduce mixing and delivery
46 time to 60 minutes.

47 **PART 3 - EXECUTION**

48 **3.1 FORMWORK INSTALLATION**

- 49 A. Design, erect, shore, brace, and maintain formwork, according to **ACI 301 (ACI 301M)**, to support vertical, lateral,
50 static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
51 B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position
52 indicated, within tolerance limits of **ACI 117 (ACI 117M)**.
53 C. [**Chamfer**] [**Do not chamfer**] exterior corners and edges of permanently exposed concrete.

- 1
2 **3.2 EMBEDDED ITEM INSTALLATION**
3 A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or
4 supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions
5 furnished with items to be embedded.
6
7 **3.3 VAPOR-RETARDER INSTALLATION**
8 A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's
9 written instructions.
10 1. Lap joints **6 inches (150 mm)** minimum and seal with manufacturer's recommended tape.
11
12 **3.4 STEEL REINFORCEMENT INSTALLATION**
13 A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
14 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
15
16 **3.5 JOINTS**
17 A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
18 B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as
19 approved by Architect.
20 C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as
21 indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
22 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a
23 radius of **1/8 inch (3.2 mm)**. Repeat grooving of contraction joints after applying surface finishes. Eliminate
24 groover tool marks on concrete surfaces.
25 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-
26 rimmed blades. Cut **1/8-inch- (3.2-mm-)** wide joints into concrete when cutting action does not tear, abrade,
27 or otherwise damage surface and before concrete develops random contraction cracks.
28 D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical
29 surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
30
31 **3.6 WATERSTOP INSTALLATION**
32 A. Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written
33 instructions.
34
35 **3.7 CONCRETE PLACEMENT**
36 A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and
37 that required inspections are completed.
38 B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on
39 concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously,
40 provide construction joints as indicated. Deposit concrete to avoid segregation.
41 1. Consolidate placed concrete with mechanical vibrating equipment according to **ACI 301 (ACI 301M)**.
42
43 **3.8 FINISHING FORMED SURFACES**
44 A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired
45 and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
46 1. Apply to concrete surfaces [not exposed to public view] <Insert locations>.
47 B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and
48 symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other
49 projections that exceed specified limits on formed-surface irregularities.
50 1. Apply to concrete surfaces [exposed to public view,] [to receive a rubbed finish,] [or to be covered with a
51 coating or covering material applied directly to concrete] <Insert locations>.
52 C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
53 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with
54 carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement
55 grout other than that created by the rubbing process.
56 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces
57 and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding
58 admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry

- 1 grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub
2 surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- 3 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine
4 sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by
5 trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface.
6 In a swirling motion, finish surface with a cork float.
- 7 D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed
8 surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface
9 treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

10 3.9 FINISHING FLOORS AND SLABS

- 11 A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for
12 concrete surfaces. Do not wet concrete surfaces.
- 13 B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use
14 stiff brushes, brooms, or rakes to produce a profile amplitude of **1/4 inch (6 mm)** in one direction.
- 15 1. Apply scratch finish to surfaces [indicated] [and] [to receive concrete floor toppings] [to receive mortar setting
16 beds for bonded cementitious floor finishes] <Insert locations>.
- 17 C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-
18 driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until
19 surface is left with a uniform, smooth, granular texture.
- 20 1. Apply float finish to surfaces [indicated] [to receive trowel finish] [and] [to be covered with fluid-applied or
21 sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo] <Insert locations>.
- 22 D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven
23 trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and
24 appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
- 25 1. Apply a trowel finish to surfaces [indicated] [exposed to view] [or] [to be covered with resilient flooring,
26 carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system]
27 <Insert locations>.
- 28 2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding,
29 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not
30 exceed 1/8 inch (3.2 mm).
- 31 E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly
32 scarify surface with a fine broom.
- 33 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- 34 F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
- 35 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom
36 perpendicular to main traffic route. Coordinate required final finish with Architect before application.
37
38

39 3.10 CONCRETE PROTECTING AND CURING

- 40 A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with
41 ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.
- 42 B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions
43 cause moisture loss approaching **0.2 lb/sq. ft. x h (1 kg/sq. m x h)** before and during finishing operations. Apply
44 according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but
45 before float finishing.
- 46 C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar
47 surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of
48 curing period, continue curing for remainder of curing period.
- 49 D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
- 50 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
- 51 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete,
52 placed in widest practicable width, with sides and ends lapped at least **12 inches (300 mm)**, and sealed by
53 waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during
54 curing period, using cover material and waterproof tape.
- 55 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to
56 manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial
57 application. Maintain continuity of coating and repair damage during curing period.

FOR CONSTRUCTION
5/10/2023

- 1 a. Removal: After curing period has elapsed, remove curing compound without damaging concrete
2 surfaces by method recommended by curing compound manufacturer, unless manufacturer certifies
3 curing compound does not interfere with bonding of floor covering used on Project.
- 4 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by
5 power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy
6 rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat.
7 Maintain continuity of coating and repair damage during curing period.
- 8
- 9 **3.11 CONCRETE SURFACE REPAIRS**
- 10 A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that
11 cannot be repaired and patched to Architect's approval.
- 12 END OF SECTION 033000

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SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Concrete masonry units.
 - 2. Concrete building brick.
 - 3. Decorative veneer concrete masonry units.
 - 4. Building (common) brick.
 - 5. Hollow brick.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. **Product Certificates:** For materials manufactured within **100 miles (160 km)** of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
- C. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
- D. Samples for Verification: For each type and color of exposed masonry unit and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include data on material properties, material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
 - 2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Mockups: As part of the overall wall construction, build a min 48 inches by 48 inches by full thickness test area to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, insulation, ties, and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Confirm color of masonry, mortar color, flashing, drip edge, weeps.

1.6 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1 PART 2 - PRODUCTS

2 **2.1 UNIT MASONRY, GENERAL**

- 3 A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract
4 Documents.
- 5 B. Concrete Masonry Design Standard: Comply with National Concrete Masonry Associations contained in the
6 publication TEK Manual for Concrete Masonry Design and Construction.
- 7 C. Brick Masonry Design Standard: Comply with Brick Institute of America contained in the publication Technical Notes
8 on Brick Construction.
- 9 D. Exterior Limestone Design: comply with guidelines of the handbook published by the Indiana Limestone Institute of
10 America.
- 11 E. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks,
12 or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- 13 F. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
- 14 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing
15 agency acceptable to authorities having jurisdiction.

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17 **2.2 CONCRETE MASONRY UNITS**

- 18 A. Regional Materials: CMUs shall be manufactured within **100 miles (160 km)** of Project site from aggregates and
19 cement that have been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of
20 Project site.
- 21 B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units
22 unless otherwise indicated.
- 23 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other
24 special conditions.
- 25 C. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
- 26 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
27 may be incorporated into the Work include, but are not limited to, the following:
- 28 a. Echelon Masonry
- 29 b. ACM Chemistries.
- 30 c. BASF Corp. - Construction Chemicals.
- 31 d. Euclid Chemical Company (The); an RPM company.
- 32 e. GCP Applied Technologies Inc.
- 33 f. Moxie International.
- 34 D. CMUs: ASTM C90.
- 35 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **[2150 psi**
36 **(14.8 MPa)] [2800 psi (19.3 MPa)] [3050 psi (21.0 MPa)]**
- 37 2. Density Classification: Normal weight
- 38 3. Loadbearing concrete units: ASTM C90-00 American Society for Testing Materials
- 39 E. Acoustical Sound CMUs:
- 40 .
- 41 F. Ground Face (Burnished/Honed) CMUs: ASTM C90
- 42 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **[2150 psi**
43 **(14.8 MPa)] [2800 psi (19.3 MPa)] [3050 psi (21.0 MPa)]**
- 44 2. Density Classification: Normal weight
- 45 3. Size (actual dimensions): 7-5/8 inches (92 mm) high by 7-5/8 inches (194 mm) wide x 15-5/8 inches (397 mm)
46 long
- 47 4. Colors: As indicated on Materials Finish Schedule
- 48 5. Texture: as indicated on Materials Finish Schedule
- 49 6. Bond: running bond unless noted otherwise
- 50 7. Freeze-Thaw Resistance: Meet or exceed the requirements of ASTM C1262.
- 51 8. Abrasion Resistance: Meet or exceed the requirements of ASTM C744.
- 52 9. Adhesion: Meet or exceed the requirements of ASTM C744.
- 53 10. Color Change: Meet or exceed the requirements of ASTM C744.
- 54 11. Resistance to Cracking: Meet or exceed the requirements of ASTM C744.
- 55 12. Integral Water Repellent: Concrete Masonry Units must include an integral water repellent (IWR) admixture
56 at the time of production.
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2.3 CONCRETE LINTELS

- A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than that of CMUs.

2.4 BRICK

- A. Regional Materials: Brick shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- C. Clay Face Brick: Facing brick complying with ASTM C216.
 - 1. Grade: SW.
 - 2. Type: **FBX**
 - 3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of **3350 psi (23.10 MPa)**.
 - 4. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C67.
 - 5. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
 - 6. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing according to ASTM C67 with no observable difference in the applied finish when viewed from 10 feet (3 m).
 - 7. Size (Actual Dimensions):
 - Emperor size: (nom 4x2 1/4x 16) 3-5/8 inches wide by 2-1/4 inches high by 15-5/8 inches long
 - Atlas Emperor size: (nom 4x4x16) 3-5/8 inches wide by 3-9/16 inches high by 15-5/8 inches long
 - Super Emperor size: (nom 4x8x16) 3-5/8 inches wide by 7-5/8 inches high by 15-5/8 inches long
 - 8. Color: Brick 1: basis of design Interstate Brick, 50/50 blend of Arctic White and Almond
Brick 2: basis of design Interstate Brick, Midnight Black
 - 9. Texture: Matte
 - 10. Bond: Running bond unless shown otherwise

2.5 STONE – Type 1

- A. Type: Limestone
- B. Pattern: 2:1 Sawn Coursed Heights; Dry-stack Dimensional, Tight-fit
- C. Heights: 2-1/2", 5"
- D. Length: 4"-16"
- E. Depth: 4" Nom.
- F. Colors: Beige, Buff, Gray blend
- G. Texture: 100% Bedface
- H. Lay-up: Random 2:1 Ashlar; Mortar Joint: 3/16"
- I. Mock Up: provide a 36 inch x 36 inch minimum sample for Architects review and approval prior to building installation

2.6 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C91/C91M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Interstate Brick
 - b. Cemex S.A.B. de C.V.

- 1 c. [Essroc.](#)
- 2 d. [Holcim \(US\) Inc.](#)
- 3 e. [Lafarge North America Inc.](#)
- 4 f. [Lehigh Hanson; HeidelbergCement Group.](#)
- 5 F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and
6 complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
7 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
8 may be incorporated into the Work include, but are not limited to the following:
9 a. [Davis Colors.](#)
10 b. [Euclid Chemical Company \(The\); an RPM company.](#)
11 c. [Lanxess Corporation.](#)
12 d. [Solomon Colors, Inc.](#)
- 13 G. Colored Cement Products: Packaged blend made from [**portland cement and hydrated lime**] [or] [**masonry cement**]
14 and mortar pigments, all complying with specified requirements, and containing no other ingredients.
15 1. Colored Portland Cement-Lime Mix:
16 a. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products
17 that may be incorporated into the Work include, but are not limited to the following:
18 1) [Essroc.](#)
19 2) [Holcim \(US\) Inc.](#)
20 3) [Lafarge North America Inc.](#)
21 4) [Lehigh Hanson; HeidelbergCement Group.](#)
22 2. Colored Masonry Cement:
23 a. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products
24 that may be incorporated into the Work include, but are not limited to the following:
25 1) [Cemex S.A.B. de C.V.](#)
26 2) [Essroc.](#)
27 3) [Holcim \(US\) Inc.](#)
28 4) [Lafarge North America Inc.](#)
29 5) [Lehigh Hanson; HeidelbergCement Group.](#)
- 30 H. Aggregate for Mortar: ASTM C144.
31 1. For joints less than **1/4 inch (6 mm)** thick, use aggregate graded with 100 percent passing the **No. 16 (1.18-**
32 **mm)** sieve.
33 2. White-Mortar Aggregates: Natural white sand or crushed white stone.
34 3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar
35 color.
- 36 I. Aggregate for Grout: ASTM C404.
- 37 J. Epoxy Pointing Mortar: ASTM C395, epoxy-resin-based material formulated for use as pointing mortar for glazed or
38 pre-faced masonry units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise
39 indicated, as selected by Architect from manufacturer's colors.
- 40 K. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M,
41 Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
42 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
43 may be incorporated into the Work include, but are not limited to the following:
44 a. [BASF Corp. - Construction Chemicals.](#)
45 b. [Euclid Chemical Company \(The\); an RPM company.](#)
46 c. [GCP Applied Technologies Inc.](#)
- 47 L. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral
48 water repellent from same manufacturer.
49 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
50 may be incorporated into the Work include, but are not limited to the following:
51 a. [ACM Chemistries.](#)
52 b. [BASF Corp. - Construction Chemicals.](#)
53 c. [Euclid Chemical Company \(The\); an RPM company.](#)
54 d. [GCP Applied Technologies Inc.](#)
- 55 M. Water: Potable.
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2.7 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).
- B. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.187-inch (4.76-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.187-inch (4.76-mm) diameter.
 - 5. Wire Size for Veneer Ties: 0.187-inch (4.76-mm) diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 - 7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- C. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.
- D. Masonry-Joint Reinforcement for Multiwythe Masonry:
 - 1. Ladder type with one side rod at each face shell of hollow masonry units more than 4 inches (100 mm) wide, plus two side rods at each wythe of masonry 4 inches (100 mm) wide or less.
 - 2. Tab type, either ladder or truss design, with one side rod at each face shell of backing wythe and with rectangular tabs sized to extend at least halfway through facing wythe, but with at least 5/8-inch (16-mm) cover on outside face.
 - 3. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch (1.5 mm) and maximum vertical adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe but with at least 5/8-inch (16-mm) cover on outside face. Ties have hooks or clips to engage a continuous horizontal wire in the facing wythe.
- E. Masonry-Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized carbon steel continuous wire.

2.8 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.
 - 1. Wire: Fabricate from [3/16-inch- (4.76-mm-)] [1/4-inch- (6.35-mm-)] diameter, hot-dip galvanized-steel wire.
- D. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized-steel wire.
 - 2. Tie Section: Triangular-shaped wire tie made from [0.187-inch- (4.76-mm-)] [0.25-inch- (6.35-mm-)] diameter, hot-dip galvanized-steel wire.
- E. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from [0.060-inch- (1.52-mm-)] thick steel sheet, galvanized after fabrication [0.105-inch- (2.66-mm-)] thick steel sheet, galvanized after fabrication]
 - 2. Tie Section: Triangular-shaped wire tie made from [0.187-inch- (4.76-mm-)] [0.25-inch- (6.35-mm-)] diameter, hot-dip galvanized-steel wire.
 - 3. Corrugated-Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.075-inch- (1.90 mm-) thick steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete.
- F. Partition Top Anchors: 0.105-inch- (2.66-mm-) thick metal plate with a 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- G. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.

1. Corrosion Protection: [Hot-dip galvanized to comply with ASTM A153/A153M] [Epoxy coating **0.020 inch (0.51 mm)** thick].
- H. Adjustable Masonry-Veneer Anchors:
 1. General: Provide anchors that allow vertical adjustment but resist a **100-lbf (445-N)** load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of **1/16 inch (1.5 mm)**.
 2. Fabricate sheet metal anchor sections and other sheet metal parts from **0.105-inch- (2.66-mm-)** thick steel sheet, galvanized after fabrication.
 3. Fabricate wire ties from **0.25-inch- (6.35-mm-)** diameter, hot-dip galvanized-steel wire unless otherwise indicated.
 4. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section.
 - a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) [FERO Corporation.](#)
 - 2) [Hohmann & Barnard, Inc.](#)
 5. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a gasketed sheet metal anchor section, with pronged legs of length to match thickness of insulation or sheathing and raised rib-stiffened strap to provide a slot for inserting wire tie.
 - a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) [Hohmann & Barnard, Inc.](#)
 - 2) [Wire-Bond.](#)

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch (0.40 mm) thick.
 2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
 3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches (76 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
 4. Fabricate metal sealant stops from stainless steel. Extend at least 3 inches (76 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
 5. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
- B. Flexible Flashing: Use the following unless otherwise indicated:
 1. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than **0.030 inch (0.8 mm)**
 - a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) [DuPont Safety & Construction.](#)
 - 2) [GCP Applied Technologies Inc.](#)
 - 3) [Protecto Wrap Company.](#)
 - 4) [Raven Industries, Inc.](#)
 - 5) [Wire-Bond.](#)
- C. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from [**neoprene**] [**urethane**] [**or**] [**PVC**].
- B. Preformed Control-Joint Gaskets: Made from [styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805] [**or**] [**PVC**, complying with ASTM D2287, Type PVC-65406] and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- D. Weep/Cavity Vent Products: Use the following unless otherwise indicated:

- 1 1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint
2 and depth **1/8 inch (3 mm)** less than depth of outer wythe; in color selected from manufacturer's standard.
3 a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products
4 that may be incorporated into the Work include, but are not limited to the following:
5 1) Advanced Building Products Inc.
6 2) CavClear/Archovations, Inc.
7 3) Keene Building Products.
8 4) Mortar Net Solutions.
9 E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
10 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
11 may be incorporated into the Work include, but are not limited to the following:
12 a. Advanced Building Products Inc.
13 b. CavClear/Archovations, Inc.
14 c. Heckmann Building Products, Inc.
15 d. Hohmann & Barnard, Inc.
16 e. Mortar Net Solutions.
17 f. Wire-Bond.
18 2. Configuration: Provide one of the following:
19 a. Strips, full depth of cavity and **10 inches (250 mm)** high, with dovetail shaped notches **7 inches (175**
20 **mm)** deep that prevent clogging with mortar droppings.
21 b. Strips, not less than **1-1/2 inches (38 mm)** thick and **10 inches (250 mm)** high, with dimpled surface
22 designed to catch mortar droppings and prevent weep holes from clogging with mortar.
23 c. Sheets or strips full depth of cavity and installed to full height of cavity.
24 d. Sheets or strips not less than **3/4 inch (19 mm)** thick and installed to full height of cavity, with
25 additional strips **4 inches (100 mm)** high at weep holes and thick enough to fill entire depth of cavity
26 and prevent weep holes from clogging with mortar.
27

28 **2.11 MASONRY-CELL FILL**

- 29 A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited
30 moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
31 B. Lightweight-Aggregate Fill: ASTM C331/C331M.
32

33 **2.12 MASONRY CLEANERS**

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35 A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains,
36 efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry
37 surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry
38 units being cleaned.
39 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
40 may be incorporated into the Work include, but are not limited to the following:
41 a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
42 b. EaCo Chem, Inc.
43 c. PROSOCO, Inc.
44

45 Do not power wash masonry projects with integral water-repellant additives
46

47 **2.13 MORTAR AND GROUT MIXES**

- 48 A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent
49 agents, antifreeze compounds, or other admixtures unless otherwise indicated.
50 1. Do not use calcium chloride in mortar or grout.
51 2. Use portland cement-lime mortar unless otherwise indicated.
52 3. For exterior masonry, use portland cement-lime mortar.
53 4. For reinforced masonry, use portland cement-lime mortar.
54 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of
55 weather conditions, to ensure that mortar color is consistent.
56 B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by
57 weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- 1 C. Mortar for Unit Masonry: Comply with ASTM C270, [Proportion] [Property] Specification. Provide the following types
2 of mortar for applications stated unless another type is indicated[or needed to provide required compressive
3 strength of masonry].
4 1. For masonry below grade or in contact with earth, use Type M.
5 2. For reinforced masonry, use Type S.
6 3. For mortar parge coats, use Type S.
7 4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-
8 bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not
9 indicated, use Type N.
10 5. For interior nonload-bearing partitions, Type O may be used instead of Type N.
11 D. Pigmented Mortar: Use colored cement product[or select and proportion pigments with other ingredients to produce
12 color required. Do not add pigments to colored cement products].
13 1. Pigments shall not exceed 10 percent of portland cement by weight.
14 2. Pigments shall not exceed 5 percent of [masonry cement] [or] [mortar cement] by weight.
15 3. Mix to match Architect's sample.
16 4. Application: Use pigmented mortar for exposed mortar joints with the following units:
17 a. Decorative CMUs.
18 b. Clay face brick.
19 c. Hollow brick.
20 E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white
21 cement as necessary to produce required mortar color.
22 1. Mix to match Architect's sample.
23 2. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
24 a. Decorative CMUs.
25 b. Clay face brick.
26 F. Grout for Unit Masonry: Comply with ASTM C476.
27 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with
28 TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
29 2. Proportion grout in accordance with ASTM C476, [Table 1] [or] [paragraph 4.2.2 for specified 28-day
30 compressive strength indicated, but not less than 2000 psi (14 MPa)].
31 3. Provide grout with a slump of [8 to 11 inches (200 to 280 mm)] [10 to 11 inches (250 to 280 mm)] as measured
32 according to ASTM C143/C143M.
33 G. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.
34 1. Application: Use epoxy pointing mortar for exposed mortar joints with the following units:
35 a. Pre-faced CMUs.
36 b. Glazed structural clay facing tile.

37 PART 3 - EXECUTION

38 3.1 INSTALLATION, GENERAL

- 39 A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining
40 construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before
41 laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
42 B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from
43 several pallets or cubes as they are placed.
44 C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per
45 minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of
46 laying.
47

48 3.2 TOLERANCES

- 49 A. Dimensions and Locations of Elements:
50 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4
51 inch (6 mm).
52 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12
53 mm).
54 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6
55 mm) in a story height or 1/2 inch (12 mm) total.

- 1 B. Lines and Levels:
- 2 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than **1/4 inch in 10 feet (6**
- 3 **mm in 3 m)**, or **1/2-inch (12-mm)** maximum.
- 4 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more
- 5 than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
- 6 3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8**
- 7 **inch in 20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
- 8 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints,
- 9 do not vary from plumb by more than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or
- 10 **1/2-inch (12-mm)** maximum.
- 11 5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in**
- 12 **20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
- 13 C. Joints:
- 14 1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a
- 15 maximum thickness limited to **1/2 inch (12 mm)**.
- 16 2. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch (9 mm)** or minus
- 17 **1/4 inch (6 mm)**.
- 18 3. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**.
- 19

20 3.3 LAYING MASONRY WALLS

- 21 A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate
- 22 location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at
- 23 corners, jambs, and, where possible, at other locations.
- 24 B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use
- 25 units with less-than-nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.
- 26 C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with
- 27 masonry around built-in items.
- 28 D. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- 29 E. Fill cores in hollow CMUs with grout **24 inches (600 mm)** under bearing plates, beams, lintels, posts, and similar items
- 30 unless otherwise indicated.
- 31

32 3.4 MORTAR BEDDING AND JOINTING

- 33 A. Lay **brick and CMUs** as follows:
- 34 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
- 35 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
- 36 3. Bed webs in mortar in grouted masonry, including starting course on footings.
- 37 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- 38 B. Lay solid masonry units and hollow brick with completely filled bed and head joints; butter ends with sufficient mortar
- 39 to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- 40 C. Rake out mortar joints at **pre-faced CMUs** to a uniform depth of **1/4 inch (6 mm)** and point with epoxy mortar to
- 41 comply with epoxy-mortar manufacturer's written instructions.
- 42 D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless
- 43 otherwise indicated.
- 44 E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise
- 45 indicated.
- 46

47 3.5 COMPOSITE MASONRY

- 48 A. Bond wythes of composite masonry together **[using one of the following methods] [as follows]:**
- 49 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for
- 50 **[4.5 sq. ft. (0.42 sq. m)] [2.67 sq. ft. (0.25 sq. m)] [1.77 sq. ft. (0.16 sq. m)]** of wall area spaced not to exceed
- 51 **[36 inches (914 mm)] [24 inches (610 mm)] [16 inches (406 mm)]** o.c. horizontally and **16 inches (406 mm)**
- 52 o.c. vertically. Stagger ties in alternate courses. Provide additional ties within **12 inches (305 mm)** of openings
- 53 and space not more than **36 inches (914 mm)** apart around perimeter of openings. At intersecting and
- 54 abutting walls, provide ties at no more than **24 inches (610 mm)** o.c. vertically.
- 55 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
- 56 a. Where bed joints of both wythes align, use **[ladder-type reinforcement extending across both**
- 57 **wythes] [tab-type reinforcement]**.

- 1 b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement **with**
2 **continuous horizontal wire in facing wythe attached to ties.**
- 3 B. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into
4 place.
- 5 C. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
- 6 D. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together
7 as follows:
- 8 1. Provide individual metal ties not more than **[8 inches (203 mm)] [16 inches (406 mm)]** o.c.
9 2. Provide continuity with masonry-joint reinforcement by using prefabricated T-shaped units.
10 3. Provide rigid metal anchors not more than **[24 inches (610 mm)] [48 inches (1220 mm)]** o.c. If used with
11 hollow masonry units, embed ends in mortar-filled cores.

3.6 CAVITY WALLS

- 14 A. Bond wythes of cavity walls together [using one of the following methods] [as follows]:
- 15 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for
16 **[4.5 sq. ft. (0.42 sq. m)] [2.67 sq. ft. (0.25 sq. m)] [1.77 sq. ft. (0.16 sq. m)]** of wall area spaced not to exceed
17 **[36 inches (914 mm)] [24 inches (610 mm)] [16 inches (406 mm)]** o.c. horizontally and **16 inches (406 mm)**
18 o.c. vertically. Stagger ties in alternate courses. Provide additional ties within **12 inches (305 mm)** of openings
19 and space not more than **36 inches (915 mm)** apart around perimeter of openings. At intersecting and
20 abutting walls, provide ties at no more than **24 inches (610 mm)** o.c. vertically.
- 21 2. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
- 22 a. Where bed joints of both wythes align, use **[ladder-type reinforcement extending across both**
23 **wythes] [tab-type reinforcement]**.
- 24 b. Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with
25 continuous horizontal wire in facing wythe attached to ties.
- 26 c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable-type (two-
27 piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties to allow
28 for differential movement regardless of whether bed joints align.
- 29 B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to
30 minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- 31 C. Parge cavity face of backup wythe in a single coat approximately **3/8 inch (10 mm)** thick. Trowel face of parge coat
32 smooth.
- 33 D. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately **12 inches (300 mm)** o.c. both
34 ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of
35 insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press
36 units firmly against inside wythe of masonry or other construction as shown.

3.7 ANCHORED MASONRY VENEERS

- 39 A. Anchor masonry veneers to **[wall framing] [and] [concrete and masonry backup]** with **[seismic]** masonry-veneer
40 anchors to comply with the following requirements:
- 41 1. Fasten screw-attached anchors through sheathing to wall framing and to concrete and masonry backup with
42 metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
- 43 2. Embed [tie sections] [connector sections and continuous wire] in masonry joints.
- 44 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
- 45 4. Space anchors as indicated, but not more than **18 inches (458 mm)** o.c. vertically and **24 inches (610 mm)** o.c.
46 horizontally, with not less than one anchor for each **2 sq. ft. (0.2 sq. m)** of wall area. Install additional anchors
47 within **12 inches (305 mm)** of openings and at intervals, not exceeding **8 inches (203 mm)**, around perimeter.
- 48 5. Space anchors as indicated, but not more than **16 inches (406 mm)** o.c. vertically and **25 inches (635 mm)** o.c.
49 horizontally, with not less than one anchor for each **[2.67 sq. ft. (0.25 sq. m)] [3.5 sq. ft. (0.33 sq. m)]** of wall
50 area. Install additional anchors within **12 inches (305 mm)** of openings and at intervals, not exceeding **36**
51 **inches (914 mm)**, around perimeter.
- 52 6. Space anchors as indicated, but not more than **18 inches (458 mm)** o.c. vertically and horizontally. Install
53 additional anchors within **12 inches (305 mm)** of openings and at intervals, not exceeding **24 inches (610 mm)**,
54 around perimeter.

1 **3.8 MASONRY-CELL FILL**

- 2 A. Pour [**loose-fill insulation**] [**lightweight-aggregate fill**] into cavities to fill void spaces. Maintain inspection ports to
3 show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall
4 of fill to one story high, but not more than **20 feet (6 m)**
5

6 **3.9 MASONRY-JOINT REINFORCEMENT**

- 7 A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior
8 side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
9 1. Space reinforcement not more than **16 inches (406 mm)** o.c.
10 2. Space reinforcement not more than **8 inches (203 mm)** o.c. in foundation walls and parapet walls.
11 3. Provide reinforcement not more than **8 inches (203 mm)** above and below wall openings and extending **12**
12 **inches (305 mm)** beyond openings[**in addition to continuous reinforcement**].
13 B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
14 C. Provide continuity at wall intersections by using prefabricated T-shaped units.
15 D. Provide continuity at corners by using prefabricated L-shaped units
16

17 **3.10 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE**

- 18 A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply
19 with the following:
20 1. Provide an open space not less than [**1/2 inch (13 mm)**] [**1 inch (25 mm)**] [**2 inches (50 mm)**] wide between
21 masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and
22 other rigid materials.
23 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
24 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c.
25 horizontally.
26

27 **3.11 FLASHING, WEEP HOLES, AND CAVITY VENTS**

- 28 A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to
29 downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other
30 obstructions to upward flow of air in cavities, and where indicated.
31 B. Install flashing as follows unless otherwise indicated:
32 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where
33 flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar.
34 Before covering with mortar, seal penetrations in flashing with adhesive or sealant as recommended by
35 flashing manufacturer.
36 2. At lintels and shelf angles, extend flashing a minimum of **6 inches (150 mm)** into masonry at each end. At
37 heads and sills, extend flashing **6 inches (150 mm)** at ends and turn up not less than **2 inches (50 mm)** to form
38 end dams.
39 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13**
40 **mm)** back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
41 4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2**
42 **inch (13 mm)** back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
43 C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above
44 embedded flashing.
45 1. Use specified weep/cavity vent products to form weep holes.
46 2. Space weep holes **24 inches (600 mm)** o.c. unless otherwise indicated.
47 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
48 D. Place cavity drainage material in **airspace behind veneers** to comply with configuration requirements for cavity
49 drainage material in "Miscellaneous Masonry Accessories" Article.
50 E. Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products to
51 form cavity vents.
52 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing
53 and weep holes above horizontal blocking.
54

55 **3.12 REINFORCED UNIT MASONRY INSTALLATION**

- 56 A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry
57 elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than **60 inches (1520 mm)**.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level **[B]** **[C]** in TMS 402/ACI 530/ASCE 5.
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each **5000 sq. ft. (464 sq. m)** of wall area or portion thereof.
- E. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C67 for compressive strength.
- F. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- G. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- H. Mortar Test (Property Specification): For each mix provided, according to ASTM C780. Test mortar for **[mortar air content]** **[and]** **[compressive strength]**.
- I. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.14 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of **3/4 inch (19 mm)**. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of **1/8 inch per foot (3 mm per 300 mm)**. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured

3.15 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 3. Protect adjacent surfaces from contact with cleaner.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.16 MASONRY WASTE DISPOSAL

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
1. Do not dispose of masonry waste as fill within **18 inches (450 mm)** of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

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SECTION 04 72 00 - CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Cast-stone units

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. For cast-stone units, include dimensions and finishes.
- B. Sustainable Design Submittals:
1. **Product Certificates:** For materials manufactured within **100 miles (160 km)** of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
- C. Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
- D. Test results: Submit manufacturers test results of Cast Stone previously made by the manufacturer.
- E. Samples:
1. For each color and texture of cast stone required.
 2. For colored mortar.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.
- C. Warranty Period: 10 years.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute, the Architectural Precast Association or the Precast/Prestressed Concrete Institute for Group A, Category AT.

PART 2 - PRODUCTS

2.1 CAST-STONE UNITS

- A. **Regional Materials:** Cast stone units shall be manufactured within **100 miles (160 km)** of Project site from aggregates **and cement** that have been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of Project site.
- B. Basis of Design: Edwards Cast Stone, edcstone.com
- C. Cast-Stone Units: Comply with ASTM C 1364.
1. Units shall be manufactured using the **vibrant dry tamp or wet-cast** method.
 2. Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
- D. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 3. Provide drips on projecting elements unless otherwise indicated.
- E. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of **100 deg F (38 deg C)** for 12 hours or **70 deg F (21 deg C)** for 16 hours.

- 1 2. Keep units damp and continue curing to comply with one of the following:
- 2 a. No fewer than five days at mean daily temperature of 70 deg F (21 deg C) or above.
- 3 b. No fewer than six days at mean daily temperature of 60 deg F (16 deg C) or above.
- 4 c. No fewer than seven days at mean daily temperature of 50 deg F (10 deg C) or above.
- 5 d. No fewer than eight days at mean daily temperature of 45 deg F (7 deg C) or above.
- 6 F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- 7 Colors and Textures: As selected from manufacturers full range of colors.
- 8

9 2.2 ACCESSORIES

- 10 A. Anchors: Type and size indicated, fabricated from [Type 304 stainless steel complying with ASTM A 240/A 240M,
- 11 ASTM A 276, or ASTM A 666] [steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with
- 12 ASTM A 123/A 123M].
- 13 B. Dowels: 1/2-inch- (12-mm-) diameter round bars, fabricated from Type 304 stainless steel complying with
- 14 ASTM A 240/A 240M, ASTM A 276, or ASTM A 666
- 15 C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains,
- 16 efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry
- 17 surfaces. Use product expressly approved for intended use by cast-stone manufacturer and expressly approved by
- 18 cleaner manufacturer for use on cast stone and adjacent masonry materials.
- 19 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
- 20 may be incorporated into the Work include, but are not limited to the following:
- 21 a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
- 22 b. EaCo Chem, Inc.
- 23 c. PROSOCO, Inc.

24 2.3 MORTAR

- 25 A. Comply with requirements in Section 042000 "Unit Masonry" for mortar mixes.
- 26 1. For setting mortar, use Type S
- 27 2. For pointing mortar, use Type N
- 28 B. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce
- 29 color required. Do not add pigments to colored cement products.
- 30 C. Regional Materials: Aggregate for mortar and grout, **cement, and lime** shall be manufactured within 100 miles (160
- 31 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within
- 32 100 miles (160 km) of Project site.
- 33

34 2.4 SOURCE QUALITY CONTROL

- 35 A. Engage a qualified independent testing agency to sample and test cast-stone units according to ASTM C 1364.
- 36 1. Include one test for resistance to freezing and thawing.

37 PART 3 - EXECUTION

38 3.1 SETTING CAST STONE IN MORTAR

- 39 A. Install cast-stone units to comply with requirements in Section 042000 "Unit Masonry."
- 40 B. Set units in full bed of mortar with full head joints unless otherwise indicated.
- 41 1. Fill dowel holes and anchor slots with mortar.
- 42 2. Fill collar joints solid as units are set.
- 43 3. Build concealed flashing into mortar joints as units are set.
- 44 4. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
- 45 5. Keep joints at shelf angles open to receive sealant.
- 46 C. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths
- 47 with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- 48 D. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each
- 49 layer thoroughly and allow it to become thumbprint hard before applying next layer.
- 50 E. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- 51 F. Rake out joints for pointing with sealant to depths of not less than 3/4 inch (19 mm). Scrub faces of units to remove
- 52 excess mortar as joints are raked.
- 53 G. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-
- 54 relieving joints; and at locations indicated.
- 55 1. Keep joints free of mortar and other rigid materials.

- 1 2. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in
2 Section 079200 "Joint Sealants."
3

4 **3.2 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS**

- 5 A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned
6 according to established relationships and indicated tolerances.
7 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
8 2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
9 B. Fill anchor holes with sealant.
10 1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
11 C. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to
12 maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.
13 D. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in
14 Section 079200 "Joint Sealants."
15

16 **3.3 INSTALLATION TOLERANCES**

- 17 A. Variation from Plumb: Do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**
18 B. Variation from Level: Do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**
19 C. Variation in Joint Width: Do not vary joint thickness more than **1/8 inch in 36 inches (3 mm in 900 mm)** or one-fourth
20 of nominal joint width, whichever is less.
21 D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or
22 adjacent surfaces indicated to be flush with units by more than **1/16 inch (1.5 mm)**, except where variation is due to
23 warpage of units within tolerances specified.
24

25 **3.4 ADJUSTING AND CLEANING**

- 26 A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may
27 be repaired if methods and results are approved by Architect.
28 B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements,
29 and showing no evidence of replacement.
30 C. In-Progress Cleaning: Clean cast stone as work progresses.
31 1. Remove mortar fins and smears before tooling joints.
32 2. Remove excess sealant immediately, including spills, smears, and spatter.
33 D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
34 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
35 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's
36 approval of sample cleaning before proceeding with cleaning of cast stone.
37 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or
38 polyethylene film and waterproof masking tape.
39 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear
40 water.
41 5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
42 6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

43 END OF SECTION 047200

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1

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

2

PART 1 - GENERAL

3

1.1 SUMMARY

4

A. Section Includes:

5

1. Structural steel.

6

2. Field-installed shear connectors.

7

B. Related Requirements:

8

1. Section 09 91 00 "Paint and Coatings"

9

10

1.2 DEFINITIONS

11

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

12

13

B. Heavy Sections: Rolled and built-up sections as follows:

14

1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches38 mm.

15

2. Welded built-up members with plates thicker than 2 inches50 mm.

16

3. Column base plates thicker than 2 inches50 mm.

17

18

1.3 COORDINATION

19

A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

20

21

22

1.4 PREINSTALLATION MEETINGS

23

A. Preinstallation Conference: Conduct conference at Project site.

24

25

1.5 ACTION SUBMITTALS

26

A. Product Data: For each type of product.

27

B. Shop Drawings: Show fabrication of structural-steel components.

28

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

29

2. Include embedment Drawings.

30

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

31

32

33

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

34

35

5. Identify members and connections of the Seismic-Load-Resisting System.

36

6. Indicate locations and dimensions of protected zones.

37

7. Identify demand critical welds.

38

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

39

40

41

1. Power source (constant current or constant voltage).

42

2. Electrode manufacturer and trade name, for demand critical welds.

43

D. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

44

45

46

1.6 INFORMATIONAL SUBMITTALS

47

A. Qualification Data: For fabricator.

48

B. Welding certificates.

49

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

50

51

D. Mill test reports for structural steel, including chemical and physical properties.

52

E. Product Test Reports: For the following:

- 1 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
- 2 2. Direct-tension indicators.
- 3 3. Shear stud connectors.
- 4 4. Shop primers.
- 5 ?. Nonshrink grout.
- 6 F. Survey of existing conditions.
- 7

8 **1.7 QUALITY ASSURANCE**

- 9 A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is
10 designated an AISC-Certified Plant, Category STD.
- 11 B. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint or to SSPC-QP 3, "Standard
12 Procedure for Evaluating Qualifications of Shop Painting Applicators."
- 13 C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding
14 Code - Steel."
 - 15 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the
16 supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be
17 considered separate processes for welding personnel qualification.
- 18 D. Comply with applicable provisions of the following specifications and documents:
 - 19 1. AISC 303.
 - 20 2. AISC 341 and AISC 341s1.
 - 21 3. AISC 360.
 - 22 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- 23

24 **1.8 DELIVERY, STORAGE, AND HANDLING**

- 25 A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced
26 by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from
27 corrosion and deterioration.
 - 28 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to
29 members or supporting structures. Repair or replace damaged materials or structures as directed.
- 30 B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 31 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and
32 seals containers.
 - 33 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 34 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners
35 and for retesting fasteners after lubrication.

36 **PART 2 - PRODUCTS**

37 **2.1 STRUCTURAL-STEEL MATERIALS**

- 38 A. W-Shapes: ASTM A 992/.
- 39 B. Channels, Angles-Shapes: ASTM A 36.
- 40 C. Plate and Bar: ASTM A 36.
- 41 D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50345.
- 42 E. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- 43 F. Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.
- 44 G. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
- 45 H. Steel Forgings: ASTM A 668/A 668M.
- 46 I. Welding Electrodes: Comply with AWS requirements.
- 47

48 **2.2 BOLTS, CONNECTORS, AND ANCHORS**

- 49 A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade
50 C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
- 51 B. High-Strength Bolts, Nuts, and Washers: ASTM A 490 ASTM A 490M, Type 1, heavy-hex steel structural bolts or
52 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, ASTM A 563M, Class 10S
53 heavy-hex carbon-steel nuts; and ASTM F 436 ASTM F 436M, Type 1, hardened carbon-steel washers with plain
54 finish.

- 1 1. Direct-Tension Indicators: **ASTM F 959, Type 490** **ASTM F 959M, Type 10.9**, compressible-washer type with
2 plain finish.
- 3 C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS
4 D1.1/D1.1M, Type B.
- 5 D. Headed Anchor Rods: ASTM F 1554, Grade 36], straight.
- 6 1. Nuts: **ASTM A 563** heavy-hex carbon steel.
- 7 2. Plate Washers: ASTM A 36/A 36M carbon steel.
- 8 3. Washers: **ASTM F 436**, Type 1, hardened carbon steel.
- 9 4. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- 10 E. Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- 11

12

13 2.3 PRIMER

- 14 A. Primer: Comply with Section 09 91 10 "Paint and Coatings"
- 15 B. Primer: SSPC-Paint 25, , zinc oxide, alkyd, linseed oil primer.
- 16 C. Primer: SSPC-Paint 25 BCS, , zinc oxide, alkyd, linseed oil primer
- 17

18

19 2.4 FABRICATION

- 20 A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303,
21 "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
- 22 1. Camber structural-steel members where indicated.
- 23 2. Fabricate beams with rolling camber up.
- 24 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural
25 steel has been erected.
- 26 4. Mark and match-mark materials for field assembly.
- 27 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- 28 B. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- 29 C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- 30 D. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool
31 Cleaning." or SSPC-SP 3, "Power Tool Cleaning."
- 32 E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic
33 end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written
34 instructions.
- 35 F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel
36 members.
- 37 1. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
- 38 2. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- 39

40 2.5 SHOP CONNECTIONS

- 41 A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using
42 ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
- 43 1. Joint Type: Snug tightened.
- 44 B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications,
45 weld quality, and methods used in correcting welding work.
- 46 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding
47 tolerances in AISC 303 for mill material.
- 48

49 2.6 THERMAL INSULATION MATERIAL

- 50 A. Fiberglass-Reinforced Laminate Composite, Fabreka-TIM®, as manufactured by Fabreka International, Inc.
- 51 B. Material shall maintain structural integrity of connections. Refer to Structural Drawings for specific Load
52 requirements.
- 53 C. Ultimate Material Properties:
- | | | | |
|-------|-------------------|-----------|------------------------|
| 54 a. | Tensile Strength | ASTM D638 | 11,000 psi (75.8 MPa) |
| 55 b. | Flexural Strength | ASTM D790 | 25,000 psi (172.4 MPa) |

1	c.	Compressive Strength	ASTM D695	38,900 psi (268.2 MPa)
2	d.	Compressive Modulus	ASTM D695	
3		i. 1/2" thk (12.7mm)		291,194 psi (2,007.7 MPa)
4		ii. 1" thk (25.4mm)		519,531 psi (3,582.0 MPa)
5	e.	Shear Strength	ASTM D732	15,000 psi (103.4 MPa)
6	f.	Thickness		1" (25.4mm) or as indicated
7	g.	Oxygen Index	ASTM D2863	21.8%
8	h.	Coefficient of Thermal Expansion	ASTM D696	2.2
9	i.	Thermal Conductivity	ASTM C177	1.8 BTU/Hr/ft2/in/°F (0.259 W/m**K)
10	j.	Density		107.83 lb/ft3 (1727 Kg/M3)

11
12

13 2.7 SHOP PRIMING

- 14 A. Shop prime steel surfaces except the following:
- 15 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of
 - 16 2 inches50 mm.
 - 17 2. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 18 3. Surfaces enclosed in interior construction.

19 PART 3 - EXECUTION

20 3.1 EXAMINATION

- 21 A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of
- 22 anchor rods, bearing plates, and other embedments for compliance with requirements.
- 23 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and
 - 24 other embedments showing dimensions, locations, angles, and elevations.
- 25 B. Proceed with installation only after unsatisfactory conditions have been corrected.
- 26

27 3.2 PREPARATION

- 28 A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb,
- 29 and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove
- 30 temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise
- 31 indicated.
- 32 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has
 - 33 attained its design compressive strength.

34 3.3 ERECTION

- 35 A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- 36 B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing
- 37 materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
- 38 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 39 2. Weld plate washers to top of baseplate.
 - 40 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove
 - 41 wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 42 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed
 - 43 surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for
 - 44 shrinkage-resistant grouts.
- 45 C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and
- 46 Bridges."
- 47 D. Align and adjust various members that form part of complete frame or structure before permanently fastening.
- 48 Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform
- 49 necessary adjustments to compensate for discrepancies in elevations and alignment.
- 50 1. Level and plumb individual members of structure.
 - 51 2. Make allowances for difference between temperature at time of erection and mean temperature when
 - 52 structure is completed and in service.
- 53 E. Splice members only where indicated.

- 1 F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic
2 end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written
3 instructions.
4

5 **3.4 FIELD QUALITY CONTROL**

- 6 A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
7 1. Verify structural-steel materials and inspect steel frame joint details.
8 2. Verify weld materials and inspect welds.
9 3. Verify connection materials and inspect high-strength bolted connections.
10 B. Testing Agency: a qualified testing agency to perform tests and inspections.
11 C. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using
12 ASTM A 325 or A 490 Bolts."
13

14 **3.5 REPAIRS AND PROTECTION**

- 15 A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with
16 ASTM A 780/A 780M.
17 B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint
18 with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
19 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
20 C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section
21 099123 "Interior Painting."
22 D. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

23 END OF SECTION 051200

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1 SECTION 05 50 00 - METAL FABRICATIONS

2 PART 1 - GENERAL

3 1.1 SUMMARY

4 A. Section Includes:

- 5 1. Miscellaneous steel framing and supports.
- 6 2. Shelf angles.
- 7 3. Metal floor plate and supports.
- 8 4. Miscellaneous steel trim.
- 9 5. Loose bearing and leveling plates.

10 B. Products furnished, but not installed, under this Section include the following:

- 11 1. Loose steel lintels.
- 12 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- 13 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

16 1.2 ACTION SUBMITTALS

17 A. Product Data: For the following:

- 18 1. Loose steel lintels
- 19 2. Loose bearing and leveling plates

20 B. Sustainable Design Submittals:

- 21 1. [Product Data](#): For recycled content, indicating postconsumer and preconsumer recycled content and cost.

22 C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

25 PART 2 - PRODUCTS

26 2.1 PERFORMANCE REQUIREMENTS

- 27 A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
- 28 1. Temperature Change: **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces.

30 2.2 METALS

- 31 A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

- 32 B. [Recycled Content of Steel Products](#): Postconsumer recycled content plus one-half of preconsumer recycled content not less than **[25] <Insert value>** percent.

- 33 C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

- 34 D. Stainless-Steel Bars and Shapes: ASTM A 276, **[Type 304] [Type 316L]**.

- 35 E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

- 36 F. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

- 37 G. Abrasive-Surface Floor Plate: Steel plate [with abrasive granules rolled into surface] [or] [with abrasive material metallicly bonded to steel].

- 38 1. [<Double click here to find, evaluate, and insert list of manufacturers and products.>](#)

- 39 H. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

- 40 I. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

- 41 J. Zinc-Coated Steel Wire Rope: ASTM A 741.

- 42 1. Wire-Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

- 43 K. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

- 44 1. Size of Channels: As indicated

- 1 2. Material: Galvanized steel, ASTM A 653/A 653M, [commercial steel, Type B] [structural steel, **Grade 33**
- 2 **(Grade 230)**], with **G90 (Z275)** coating; [**0.108-inch (2.8-mm)**] [**0.079-inch (2-mm)**] [**0.064-inch (1.6-mm)**]
- 3 nominal thickness.
- 4 3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, [commercial steel, Type B] [structural steel, **Grade 33**
- 5 **(Grade 230)**]; [**0.0966-inch (2.5-mm)**] [**0.0677-inch (1.7-mm)**] [**0.0528-inch (1.35-mm)**] minimum thickness;
- 6 [unfinished] [coated with rust-inhibitive, baked-on, acrylic enamel] [hot-dip galvanized after fabrication].
- 7 L. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
- 8 M. Aluminum Extrusions: **ASTM B 221 (ASTM B 221M)**, Alloy 6063-T6.
- 9 N. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.
- 10 O. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- 11 P. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).
- 12 Q. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- 13 R. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).
- 14

2.3 FASTENERS

- 16 A. General: Unless otherwise indicated, provide [**Type 304**] [**Type 316**] stainless-steel fasteners for exterior use and zinc-
- 17 plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, at exterior
- 18 walls. Select fasteners for type, grade, and class required.
- 19 1. Provide stainless-steel fasteners for fastening aluminum.
- 20 2. Provide stainless-steel fasteners for fastening stainless steel.
- 21 3. Provide stainless-steel fasteners for fastening nickel silver.
- 22 4. Provide bronze fasteners for fastening bronze.
- 23 B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous
- 24 castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims
- 25 as needed, all hot-dip galvanized per ASTM F 2329.
- 26 C. Post-Installed Anchors: [Torque-controlled expansion anchors] [or] [chemical anchors].
- 27 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or
- 28 **ASTM F 1941 (ASTM F 1941M)**, Class Fe/Zn 5, unless otherwise indicated.
- 29 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy [**Group 1 (A1)**] [**Group 2 (A4)**]
- 30 stainless-steel bolts, **ASTM F 593 (ASTM F 738M)**, and nuts, **ASTM F 594 (ASTM F 836M)**.
- 31 D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, **1-5/8**
- 32 **by 7/8 inches (41 by 22 mm)** by length indicated with anchor straps or studs not less than **3 inches (75 mm)** long at
- 33 not more than **8 inches (200 mm)** o.c. Provide with temporary filler and tee-head bolts, complete with washers and
- 34 nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.
- 35

2.4 MISCELLANEOUS MATERIALS

- 37 A. Shop Primers: Provide primers that comply with [Section 099113 "Exterior Painting."] [Section 099123 Interior
- 38 Painting."] [Section 099600 "High-Performance Coatings."] [Section 099113 "Exterior Painting," Section 099123
- 39 Interior Painting," and Section 099600 "High-Performance Coatings."]
- 40 B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79
- 41 and compatible with topcoat.
- 42 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- 43 C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash
- 44 rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- 45 D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- 46 E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints
- 47 specified to be used over it.
- 48 F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- 49 G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with
- 50 ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior
- 51 applications.
- 52 H. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained,
- 53 concrete with a minimum 28-day compressive strength of **3000 psi (20 MPa)**.
- 54

2.5 FABRICATION, GENERAL

- 56 A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural
- 57 value of joined pieces.

- 1 B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on
2 exposed surfaces.
- 3 C. Weld corners and seams continuously to comply with the following:
- 4 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base
5 metals.
- 6 2. Obtain fusion without undercut or overlap.
- 7 3. Remove welding flux immediately.
- 8 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- 9 D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible.
10 Locate joints where least conspicuous.
- 11 E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep
12 holes where water may accumulate.
- 13 F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap
14 anchors not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** o.c.
15

16 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- 17 A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- 18 B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to
19 sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- 20 C. Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.
- 21 1. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at **24 inches (600**
22 **mm)** o.c.
- 23 D. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top
24 plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with
25 fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.
26

27 2.7 SHELF ANGLES

- 28 A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide
29 horizontally slotted holes to receive **3/4-inch (19-mm)** bolts, spaced not more than **6 inches (150 mm)** from ends and
30 **24 inches (600 mm)** o.c., unless otherwise indicated.
- 31 B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- 32 C. Galvanize shelf angles located in exterior walls.
- 33 D. Prime shelf angles located in exterior walls with [zinc-rich primer.] [primer specified in Section 099600 "High-
34 Performance Coatings."]
- 35 E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.
36

37 2.8 LOOSE BEARING AND LEVELING PLATES

- 38 A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to
39 receive anchor bolts and for grouting.
40

41 2.9 LOOSE STEEL LINTELS

- 42 A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls
43 and partitions at locations indicated.
- 44 B. Galvanize loose steel lintels located in exterior walls.
- 45 C. Prime loose steel lintels located in exterior walls with primer specified in Section 099600 "High-Performance
46 Coatings."
47

48 2.10 STEEL WELD PLATES AND ANGLES

- 48 A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction
49 as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for
50 embedding in concrete.
51

52 2.11 FINISHES, GENERAL

- 53 A. Finish metal fabrications after assembly.
54

55 2.12 STEEL AND IRON FINISHES

- 56 A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware
57 and with ASTM A 123/A 123M for other steel and iron products.

- 1 B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-
2 on fireproofing, or masonry, or unless otherwise indicated.
- 3 1. Shop prime with primers specified in Section 099113 "Exterior Painting" and primers specified in
4 Section 099123 "Interior Painting" unless zinc-rich primer specified in Section 099600 "High-Performance
5 Coatings" as indicated.
- 6 C. Preparation for Shop Priming: Prepare surfaces to comply with [SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."]
7 [SSPC-SP 3, "Power Tool Cleaning."] [requirements indicated below:]
- 8 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
9 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
10 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-
11 SP 6/NACE No. 3, "Commercial Blast Cleaning."
12 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- 13 D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and
14 Maintenance Painting of Steel," for shop painting.

15 PART 3 - EXECUTION

16 **3.1 INSTALLATION, GENERAL**

- 17 A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set
18 metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and
19 free of rack; and measured from established lines and levels.
- 20 B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as
21 exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces
22 of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- 23 C. Field Welding: Comply with the following requirements:
- 24 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base
25 metals.
- 26 2. Obtain fusion without undercut or overlap.
- 27 3. Remove welding flux immediately.
- 28 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after
29 finishing and contour of welded surface matches that of adjacent surface.
- 30 D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required
31 to be fastened to in-place construction.
- 32 E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar
33 construction.
34

35 **3.2 INSTALLING BEARING AND LEVELING PLATES**

- 36 A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces.
37 Clean bottom surface of plates.
- 38 B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and
39 plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing
40 plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no
41 voids remain.
42

43 **3.3 ADJUSTING AND CLEANING**

- 44 A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint
45 uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching
46 up shop-painted surfaces.
- 47 B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with
48 ASTM A 780/A 780M.

49 END OF SECTION 055000

1 **SECTION 06 15 16 - WOOD ROOF DECKING**

2 PART 1 - GENERAL

3 **1.1 SUMMARY**

4 A. Section includes solid-sawn wood roof decking

6 **1.2 ACTION SUBMITTALS**

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

8 B. Samples: For each exposed product and for each color, texture, and pattern specified.

9 C. Sustainable Design Submittals:

10 1. Product Certificates: For materials manufactured within **100 miles (160 km)** of Project, indicating location of
11 material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance
12 to Project and cost for each raw material.

13 2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.

14 3. Chain-of-Custody Qualification Data: For manufacturer and vendor.

15 4. Laboratory Test Reports: For laminating adhesives, indicating compliance with requirements for low-emitting
16 materials.

18 **1.3 INFORMATIONAL SUBMITTALS**

19 A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and
20 construction, from ICC-ES.

21 B. Warranty

23 **1.4 QUALITY ASSURANCE**

24 A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited
25 certification body.

26 B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

27 C. Conform to American Institute of Timber Construction AITC 112-93

28 PART 2 - PRODUCTS

29 **2.1 WOOD ROOF DECKING, GENERAL**

30 A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of
31 Review.

32 B. Regional Materials: Wood products shall be manufactured within **100 miles (160 km)** of Project site from materials
33 that have been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of Project
34 site.

35 C. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001
36 and FSC STD-40-004.

38 **2.2 SOLID-SAWN WOOD ROOF DECKING**

39 A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.

40 B. Roof Decking Species: Douglas fir or Douglas fir-larch (North).

41 C. Roof Decking Nominal Size: 3 by 6.

42 D. Profile: Tongue and groove

43 E. Roof Decking Grade: Select Superior Structural Commercial Decking

44 F. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are
45 not exposed to view.

46 G. Moisture Content: Provide wood roof decking with **19** percent maximum moisture content at time of dressing.

47 H. Face Surface: Smooth.

48 I. Finish: Clear

49 J. Edge Pattern: Vee grooved.

50 K. Lengths: Not less than 40% to be 14ft and longer with at least 20% equal to or greater in length than the maximum
51 span. No more than 10% to be less than 10 ft, and not more than 1% to be 4-5 ft.

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2.3 ACCESSORY MATERIALS

- A. Fastener Material: Hot-dip galvanized steel.
- B. Sealants: Latex, complying with applicable requirements, low VOC 0 gms/gal, and recommended by sealant manufacturer and manufacturer of substrates for intended application.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Bostik, Inc.
 - b. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - c. Pecora Corporation.
 - d. Schnee-Morehead, Inc., an ITW company.
 - e. Tremco Incorporated.

2.4 INTERIOR WOOD STAINS AND VARNISHES

- A. Clear Sanding Sealer: Factory-formulated low VOC 275 gms/gal, fast-drying alkyd-based clear wood sealer applied at spreading rate recommended by manufacturer.
Sherwin-Williams; DuraSeal Fast Dry Sanding Sealer

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install solid-sawn wood roof decking to comply with AITC 112.
 - 1. Locate end joints for controlled random lay-up
- B. Anchor wood roof decking, where supported on walls, with bolts as indicated.
- C. Apply joint sealant to seal roof decking at exterior walls at the following locations:
 - 1. Between roof decking and supports located at exterior walls.
 - 2. Between roof decking and exterior walls that butt against underside of roof decking.
 - 3. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

3.2 PROTECTION

- A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

END OF SECTION 061516

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Underlayment.
 - 4. Sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Sustainable Design Submittals:
 - 1. [Chain-of-Custody Certificates](#): For certified wood products. Include statement of costs.
 - 2. [Chain-of-Custody Qualification Data](#): For manufacturer and vendor.
 - 3. [Laboratory Test Reports](#): For composite wood products, indicating compliance with requirements for low-emitting materials.
 - 4. [Product Data](#): For installation adhesives, indicating VOC content.
 - 5. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preserved-treated plywood.
 - 2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

- A. [Manufacturer Qualifications](#): A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. [Vendor Qualifications](#): A vendor that is certified for chain of custody by an FSC-accredited certification body.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. [Certified Wood](#): The following wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
 - 1. Plywood.
 - 2. Oriented strand board.
 - 3. Particleboard underlayment.
 - 4. Hardboard underlayment.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

- 1 B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having
2 jurisdiction.
3 C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing,
4 flashing, vapor barriers, and waterproofing.
5

6 2.4 FIRE-RETARDANT-TREATED PLYWOOD

- 7 A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this
8 article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as
9 determined by testing identical products per test method indicated by a qualified testing agency.
10 B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested
11 according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an
12 additional 20 minutes, and with the flame front not extending more than **10.5 feet (3.2 m)** beyond the centerline of
13 the burners at any time during the test.
14 1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated
15 plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use
16 for exterior locations and where indicated.
17 2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according
18 to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
19 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and
20 design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment
21 shall be not less than span ratings specified
22 C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
23 D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
24 E. Application: Treat plywood indicated on Drawings.
25

26 2.5 WALL SHEATHING

- 27 A. Plywood Sheathing: Exterior, Structural I sheathing.
28 B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.
29 C. Paper-Surfaced Gypsum Sheathing: ASTM C1396/C1396M, gypsum sheathing; with water-resistant-treated core and
30 with water-repellent paper bonded to core's face, back, and long edges.
31 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
32 may be incorporated into the Work include, but are not limited to the following:
33 a. [American Gypsum.](#)
34 b. [Georgia-Pacific Gypsum LLC.](#)
35 c. [National Gypsum Company.](#)
36 d. [Temple-Inland Building Products by Georgia-Pacific.](#)
37 e. [USG Corporation.](#)
38 2. Type and Thickness: Type X, **5/8 inch (15.9 mm)** thick.
39 D. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.
40 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
41 may be incorporated into the Work include, but are not limited to the following:
42 a. [CertainTeed Corporation.](#)
43 b. [Continental Building Products, LLC.](#)
44 c. [Georgia-Pacific Gypsum LLC.](#)
45 d. [National Gypsum Company.](#)
46 e. [Temple-Inland Building Products by Georgia-Pacific.](#)
47 f. [USG Corporation.](#)
48 2. Type and Thickness: [Regular, **1/2 inch (13 mm)**] [Type X, **5/8 inch (15.9 mm)**] thick.
49 E. Cellulose Fiber-Reinforced Gypsum Sheathing: ASTM C1278/C1278M, gypsum sheathing.
50 1. Product: Subject to compliance with requirements, provide "Fiberock Sheathing with Aqua-Tough" by United
51 States Gypsum Co.
52 2. Type and Thickness: [Regular, **1/2 inch (13 mm)**] [Type X, **5/8 inch (15.9 mm)**] thick.
53 F. Cementitious Backer Units: ASTM C1325, Type A.
54 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
55 may be incorporated into the Work include, but are not limited to the following:

- 1 a. [C-Cure.](#)
- 2 b. [Custom Building Products.](#)
- 3 c. [FinPan, Inc.](#)
- 4 d. [USG Corporation.](#)
- 5 2. Thickness: **5/8 inch (15.9 mm)**
- 6 G. Extruded-Polystyrene-Foam Sheathing: ASTM C578, Type IV, in manufacturer's standard lengths and widths with
- 7 tongue-and-groove or shiplap long edges as standard with manufacturer.
- 8 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
- 9 may be incorporated into the Work include, but are not limited to the following:
- 10 a. [DiversiFoam Products.](#)
- 11 b. [Dow Chemical Company \(The\).](#)
- 12 c. [Kingspan Insulation Limited.](#)
- 13 d. [Owens Corning.](#)
- 14 2. Thickness: **1 inch (25 mm)** [As indicated].
- 15 3. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

2.6 ROOF SHEATHING

- 18 A. Plywood Sheathing: Exterior, Structural I sheathing.
- 19 B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.

2.7 SUBFLOORING AND UNDERLAYMENT

- 22 A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Underlayment single-floor panels.
- 23 B. Oriented-Strand-Board Combination Subfloor-Underlayment: DOC PS 2, Exposure 1 single-floor panels.
- 24 C. Plywood Subflooring: Exposure 1, Structural I single-floor panels or sheathing.
- 25 D. Oriented-Strand-Board Subflooring: DOC PS 2, Exposure 1, Structural I sheathing
- 26 E. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than **1/4 inch (6.4**
- 27 **mm)** over smooth subfloors and not less than **3/8 inch (9.5 mm)** over board or uneven subfloors.
- 28 1. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.
- 29 2. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than **5/8-inch (15.9-mm)**
- 30 nominal thickness.
- 31 3. Plywood Underlayment for Carpet: DOC PS 1, [Exterior, C-C Plugged] [Exposure 1, Underlayment] [Interior,
- 32 Underlayment].
- 33 4. Particleboard Underlayment: ANSI A208.1, [**Grade PBU**] [**Grade M-2**].
- 34 a. [Particleboard shall be made without](#) urea formaldehyde.
- 35 5. Hardboard Underlayment: ANSI A135.4, Class 4 (Service), Surface S1S; with back side sanded.

2.8 FASTENERS

- 38 A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for
- 39 material and manufacture.
- 40 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- 41 2. For roof and wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating
- 42 having a salt-spray resistance of more than 800 hours according to ASTM B117.

2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- 45 A. Sealant for **Paper-Surfaced** Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant
- 46 compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing
- 47 manufacturer for application indicated and complying with requirements for elastomeric sealants specified in
- 48 Section 079200 "Joint Sealants."
- 49 B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with
- 50 sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber
- 51 sheathing tape and for covering exposed fasteners.
- 52 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum **2 inches (50 mm)** wide, **10 by 10 or 10 by 20**
- 53 **threads/inch (390 by 390 or 390 by 780 threads/m)**, of type recommended by sheathing and tape
- 54 manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with
- 55 a history of successful in-service use.
- 56 C. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer
- 57 for sealing joints and penetrations in sheathing.

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2.10 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with [APA AFG-01] [ASTM D3498] that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
 - 1. Adhesive shall have a VOC content of [50] [70] <Insert value> g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Refer to fastener schedule and patten as indicated on drawings.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 CEMENTITIOUS BACKER UNIT INSTALLATION

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.3 FOAM-PLASTIC SHEATHING INSTALLATION

- A. Comply with manufacturer's written instructions.
- B. Foam-Plastic Wall Sheathing: Install vapor-relief strips or equivalent for permitting escape of moisture vapor that otherwise would be trapped in stud cavity behind sheathing.
- C. Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

3.4 PARTICLEBOARD UNDERLAYMENT INSTALLATION

- A. Comply with CPA's recommendations for type of subfloor indicated. Fill and sand gouges, gaps, and chipped edges. Sand uneven joints flush.
 - 1. Fastening Method: [Glue and nail] [Nail] [Nail or staple] underlayment to subflooring.

END OF SECTION 061600

1 **SECTION 071416 - COLD FLUID-APPLIED WATERPROOFING**

2 **PART 1 - GENERAL**

3 **1.1 SUMMARY**

- 4 A. Section Includes:
5 1. Fluid-applied membrane waterproofing and accessory products
6

7 **1.2 PREINSTALLATION MEETINGS**

- 8 A. Preinstallation Conference: Conduct conference at Project site
9

10 **1.3 ACTION SUBMITTALS**

- 11 A. Product Data: For each type of product.
12 B. Sustainable Design Submittals:
13 1. Health Product Declaration and Environmental Product Declaration in compliance with LEED V4: For each
14 product.
15 2. Third party testing in compliance with LEED V4 or V4.1 for low emitting materials and materials and resources
16 credit.
17 C. Shop Drawings:
18 1. Show locations and extent of waterproofing.
19 2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-
20 ins with adjoining waterproofing, and other termination conditions.
21

22 **1.4 INFORMATIONAL SUBMITTALS**

- 23 A. Manufacturer's installation instructions.
24 B. Sample warranty.
25

26 **1.5 QUALITY ASSURANCE**

- 27 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
28 waterproofing manufacturer.
29 B. Single-Source Responsibility: Obtain Product and Accessories from single manufacturer
30

31 **1.6 WARRANTY**

- 32 A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or
33 workmanship within specified warranty period.
34 1. Warranty Period: **(10) Ten** years from date of Substantial Completion.
35

36 **1.7 DELIVERY, STORAGE AND HANDLING**

- 37 A. Deliver Product and Accessories to Project site in original packages with seals unbroken, labeled with Manufacturer's
38 name, product name, lot number and directions for storage.
39 B. Protect Product from freezing.
40 C. Store Product and Accessories in their original, undamaged packages in clean, dry, protected location and within
41 temperature range required by Manufacturer.
42 D. Avoid spillage. Immediately notify Owner, [Architect] [Consultant] if spillage occurs and start clean up procedures.
43 Clean spills and leave area as it was prior to spill

44 **PART 2 - PRODUCTS**

45 **2.1 RUBBERIZED WATERPROOFING**

- 46 A. Single-Component, water based, Polymer-modified asphalt emulsion Waterproofing:
47 B. Basis of Design: Carlisle Coatings, CCW Barricoat, Barriseal
48 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
49 may be incorporated into the Work include, but are not limited to the following:
50

- 1 a. Anti-Hydro International, Inc.
- 2 b. BASF Corp. - Construction Chemicals.
- 3 c. Carlisle Coatings & Waterproofing Inc.
- 4 d. CETCO, a Minerals Technologies company.
- 5 e. ITW Polymers Sealants North America (formerly Pacific Polymers, Inc.).
- 6 f. Mar-flex Waterproofing & Building Products.
- 7 g. Neogard; a division of Jones-Blair, Inc.
- 8 h. Polyguard Products, Inc.
- 9 i. Tremco Incorporated.
- 10 j. NaturaSeal NS F300 Waterproofing
- 11 C. Performance
- 12 D. Spray-Grade: Basis of Design: Barricoat™-S pourable consistency, water-based, polymermodified asphalt
- 13 E. Roller-Grade: Basis of Design: Barricoat™-R paste consistency, water-based, polymermodified asphalt
- 14 F. Product provided by this Section shall be a water-based, rubberized asphalt emulsion which rapidly cures in place to
- 15 provide a seamless waterproofing membrane.
- 16 G. Product shall be solvent free, have VOC content of not more than 30 grams per liter and shall be free of noxious
- 17 odors. Third party testing in compliance with LEED V4 or V4.1 for low emitting materials and materials and resources
- 18 credit.
- 19 H. Product, when applied at minimum 0.060 inch (60 mils) cured thickness, shall meet the following requirements:
- 20 1. Water Vapor Permeance: Not more than 0.1 Perm ASTM E-96, Method B
- 21 2. Tensile Elongation: Not less than 500 percent ASTM D-412
- 22 3. Low Temperature Flexibility: No cracking, 180 degree bend over 1-inch mandrel at minus 20 degrees F ASTM D
- 23 1970 Low-Temperature Crack Bridging: Withstand 10 cycles at minus 15 degrees F ASTM C 836
- 24 4. Peel adhesion on HDPE film, concrete and concrete block: Not less than 10 lb per inch of width OR substrate
- 25 failure ASTM D 903
- 26 5. Pull adhesion on concrete and concrete block: Not less than 16 lb per square inch ASTM D 4541

2.2 AUXILIARY MATERIALS

- 29 A. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated.
- 30 B. Sheet Flashing: **50-mil- (1.3-mm-)** minimum, nonstaining, uncured sheet neoprene.
 - 31 1. Adhesive: Manufacturer's recommended contact adhesive.
- 32 C. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric.
- 33 D. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.
- 34 E. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; and as recommended by
- 35 manufacturer for substrate and joint conditions.
 - 36 1. Backer Rod: Closed-cell polyethylene foam.

2.3 INSULATION DRAINAGE PANELS

- 38 A. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type IV,
- 39 **25-psi (173-kPa)** minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side
- 40 having grooved drainage channels.
 - 41 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that
 - 42 may be incorporated into the Work include, but are not limited to the following:
 - 43 a. DiversiFoam Products.
 - 44 b. Dow Chemical Company (The).
 - 45 c. Insulfoam - a division of Carlisle Construction Materials Inc.
 - 46 d. Owens Corning.
 - 47 e. NaturaSeal NS A250 LP Weather Barrier

PART 3 - EXECUTION

3.1 PREPARATION

- 50 A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and
- 51 dry substrates for waterproofing application.
- 52 B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other
- 53 construction.
- 54 C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

- 1 D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating
- 2 contaminants or film-forming coatings from concrete.
- 3 E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.
- 4 F. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves,
- 5 and corners according to waterproofing manufacturer's written instructions and to recommendations in
- 6 **[ASTM C 898/C 898M] [and] [ASTM C 1471/C 1471M]**.
- 7 G. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat
- 8 when recommended by waterproofing manufacturer.
- 9 H. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written
- 10 instructions and to recommendations in **[ASTM C 898/C 898M] [and] [ASTM C 1471/C 1471M]**. Before coating
- 11 surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
- 12 I. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's
- 13 written instructions.
- 14

3.2 WATERPROOFING APPLICATION

- 16 A. Apply waterproofing according to manufacturer's written instructions and to recommendations in
- 17 **[ASTM C 898/C 898M] [and] [ASTM C 1471/C 1471M]**.
- 18 B. Unreinforced Waterproofing Applications.
- 19 1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and
- 20 pinholes, with a dry film thickness of **60 mils (1.5 mm)**.
- 21 C. Reinforced Waterproofing Applications.
- 22 1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of
- 23 waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free
- 24 of entrapped gases and pinholes, with an average dry film total thickness of **70 mils (1.8 mm)**.
- 25 D. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
- 26 1. For horizontal applications, install protection course loose laid over fully cured membrane.
- 27 2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive.
- 28 If membrane cures before application of protection course, use adhesive.
- 29 3. **[Molded-sheet drainage panels] [Insulation drainage panels] [Thermal insulation specified in**
- 30 **Section 072100 "Thermal Insulation"]** may be used in place of a separate protection course for vertical
- 31 applications when approved in writing by waterproofing manufacturer.
- 32

3.3 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- 34 A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according
- 35 to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap
- 36 edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during
- 37 subsequent construction.
- 38 1. For vertical applications, install [thermal insulation specified in Section 072100 "Thermal Insulation"]
- 39 [protection course] before installing drainage panels.
- 40

3.4 INSULATION DRAINAGE PANEL INSTALLATION

- 42 A. Install drainage panels over waterproofed surfaces. Cut and fit to within **3/4 inch (19 mm)** of projections and
- 43 penetrations.
- 44 B. Ensure that drainage channels are aligned and free of obstructions.
- 45 C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written
- 46 instructions.
- 47 D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions.
- 48 Stagger end joints and tightly abut insulation units.
- 49

3.5 PROTECTION

- 51 A. Do not permit foot or vehicular traffic on unprotected membrane.
- 52 B. Protect waterproofing from damage and wear during remainder of construction period.
- 53 C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply
- 54 waterproofing, and repair sheet flashings.

55 END OF SECTION 071416

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SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene foam-plastic board.
 - 2. Molded polystyrene foam-plastic board.
 - 3. Polyisocyanurate foam-plastic board.
 - 4. Glass-fiber blanket.
 - 5. Glass-fiber board.
 - 6. Mineral-wool blanket.
 - 7. Mineral-wool board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. [Laboratory Test Reports](#): For floor covering products, indicating compliance with requirements for low-emitting materials.
 - 2. [Product Data](#): For adhesives, indicating VOC content.
 - 3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 4. In compliance with LEED V4 requirements for materials and resource credit and low emitting materials.
 - 5. [Product Data](#): For chemical-bonding compounds, indicating VOC content.
 - 6. Laboratory Test Reports: For chemical-bonding compounds, indicating compliance with requirements for low-emitting materials.
 - 7. [Product Data](#): For sealants, indicating VOC content.
 - 8. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 9. [Environmental Product Declaration](#): For each product.
 - 10. Health Product Declaration: For each product.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: As part of the overall wall construction, build a min 48 inches by 48 inches by full thickness test area to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, insulation, ties, and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE BOARD INSULATION

- A. Extruded polystyrene boards in this article are also called "XPS boards."
- B. CAVITY WALL INSULATION
- C. Basis-of Design: Foamular CW15, Owens Corning Corporation
- D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - Dow Chemical Company
 - Owens Corning
 - Pactiv Building Products Division

- 1 E. Materials: Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, closed-cell product extruded with an
2 integral skin and with maximum flame-spread and smoke developed indexes of 75 and 450, respectively, per ASTM E
3 84. Thickness as shown on drawings and maximum water absorption of .1% by volume, "K" factor .18 at 40°F (5.4 R),
4 "K" factor .20 at 75°F (5.0 R).
5 Type X, 1.30 lb/cu. Ft., unless otherwise indicated.
6 Thickness: As indicated on drawings
7 R-value: 1" = R5
8 Compressive strength: 15 psi, unless indicated otherwise
9 F. Adhesive: Type recommended by insulation board manufacturer for application indicated and in compliance with
10 low emitting material requirements.
11

12 2.2 EXTRUDED POLYSTYRENE BOARD INSULATION

- 13 A. BELOW GRADE PERIMETER AND UNDER SLAB INSULATION
14 B. Basis-of Design: Foamular 250, Owens Corning Corporation
15 C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be
16 incorporated into the Work include, but are not limited to, the following:
17 Dow Chemical Company
18 Owens Corning
19 Pactiv Building Products Division
20 D. Materials: Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with
21 maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
22 Type IV, 1.60 lb/cu. Ft. (26 kg/cu.m), unless otherwise indicated.
23 Site: 2" thickness, 48 inch x 96 inch board
24 R-value: 1" = R5
25 Compressive strength: 25 psi, unless indicated otherwise
26 Drainage channels
27

28 2.3 POLYISOCYANURATE ROOF BOARD INSULATION

- 29 A. Polyisocyanurate Board: ASTM C 1289, foil faced, Type I, Class 2.
30 B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be
31 incorporated into the Work include, but are not limited to, the following:
32 Dow Chemical Company
33 Carlisle
34 Firestone Building Products
35 1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
36 R-value: 1" = 6.5R
37 Size: 6" thickness total
38 Compressive strength:
39

40 2.4 GLASS-FIBER BLANKET

- 41 A. INTERIOR FRAMED WALL INSULATION
42 B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be
43 incorporated into the Work include, but are not limited to, the following:
44 CertainTeed Corporation.
45 Johns Manville.
46 Owens Corning.
47 C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers;
48 with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for
49 combustion characteristics.
50

51 2.5 ACCESSORIES

- 52 A. Insulation for Miscellaneous Voids:
53 1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed
54 indexes of 5, per ASTM E 84.
55 2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and
56 smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
57 B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

- 1 C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with
- 2 demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
- 3 D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing
- 4 members and to provide ventilation between insulated attic spaces and vented eaves.

5 PART 3 - EXECUTION

6 **3.1 INSTALLATION, GENERAL**

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

15

16 **3.2 INSTALLATION OF SLAB INSULATION**

- 17 A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive
- 18 according to manufacturer's written instructions.
- 19 1. If not otherwise indicated, extend insulation a minimum of 48 inches below exterior grade line.
- 20

21 **3.3 INSTALLATION OF FOUNDATION WALL INSULATION**

- 22 A. Butt panels together for tight fit.
- 23 B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation
- 24 anchors.
- 25 C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to
- 26 manufacturer's written instructions.
- 27

28 **3.4 INSTALLATION OF CAVITY-WALL INSULATION**

- 29 A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on
- 30 inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions,
- 31 with edges butted tightly in both directions. Press units firmly against inside substrates.
- 32 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this
- 33 purpose and specified in Section 042000 "Unit Masonry."
- 34

35 END OF SECTION 072100

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1 **SECTION 07 27 26 - FLUID-APPLIED MEMBRANE AIR BARRIERS**

2 **PART 1 - GENERAL**

3 **1.1 SUMMARY**

4 A. Section Includes:

- 5 1. Vapor-retarding, fluid-applied air barriers.
- 6 2. Vapor-permeable, fluid-applied air barriers.

7
8 **1.2 PREINSTALLATION MEETINGS**

- 9 A. Preinstallation Conference: Conduct conference at Project site

10
11 **1.3 ACTION SUBMITTALS**

- 12 A. Product Data: For each type of product.

13 B. Sustainable Design Submittals:

- 14 1. Product Data: For coatings, indicating VOC content in compliance with LEED V4 low emitting materials requirements.
- 15
- 16 2. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.
- 17 3. Health Product Declaration and Environmental Product Declaration in compliance with LEED V4: For each
- 18 product.

19 C. Shop Drawings: For air-barrier assemblies.

- 20 1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners,
- 21 terminations, and tie-ins with adjoining construction.

22
23 **1.4 INFORMATIONAL SUBMITTALS**

- 24 A. Product certificates.

25 B. Product test reports.

- 26 C. Field quality-control reports.

27
28 **1.5 QUALITY ASSURANCE**

- 29 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

- 30 B. Mockups: As part of the overall wall construction, build a min 48 inches by 48 inches by full thickness test area to set quality standards for materials and execution.

- 31 1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, insulation, ties, and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

- 32 a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.

- 33 b. Include junction with roofing, and foundation wall intersection.

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40 **PART 2 - PRODUCTS**

41 **2.1 MATERIALS**

- 42 A. VOC Content: 100g/L or less.

- 43 B. Low-Emitting Materials: Products shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

44
45
46
47 **2.2 PERFORMANCE REQUIREMENTS**

- 48 A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement

1 and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at
2 perimeter conditions without deterioration and air leakage exceeding specified limits.

- 3 B. Air-Barrier Assembly Air Leakage: Maximum **0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of**
4 **surface area at 75 Pa)** when tested according to ASTM E 2357.

6 2.3 VAPOR RETARDING MEMBRANE AIR BARRIERS

7 A. Fluid applied, Vapor-Retarding Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane with an
8 installed dry film thickness, according to manufacturer's written instructions, of **35 mils (0.9 mm)** or thicker over
9 smooth, void-free substrates.

10 1. Modified Bituminous Type:

11 a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products
12 that may be incorporated into the Work include, but are not limited to the following:

- 13 1) [Carlisle Coatings & Waterproofing Inc.](#)
- 14 2) [Henry Company.](#)
- 15 3) [Tremco Incorporated.](#)
- 16 4) [W.R. Meadows, Inc.](#)

17
18 2. Synthetic Polymer Type:

19 a. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products
20 that may be incorporated into the Work include, but are not limited to the following:

- 21 1) [Carlisle Coatings & Waterproofing Inc.](#)
- 22 2) [GCP Applied Technologies Inc.](#)
- 23 3) [Henry Company.](#)
- 24 4) [Hohmann & Barnard, Inc.](#)
- 25 5) [Rubber Polymer Corporation, Inc.](#)
- 26 6) [Sto Corp.](#)
- 27 7) [W.R. Meadows, Inc.](#)

28
29 3. Physical and Performance Properties:

- 30 a. Air Permeance: Maximum **0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft.** pressure difference;
31 ASTM E 2178.
- 32 b. Vapor Permeance: Maximum **0.1 perm (5.8 ng/Pa x s x sq. m)**; ASTM E 96/E 96M, Desiccant Method.
- 33 c. Ultimate Elongation: Minimum 500 percent; ASTM D 412, Die C.
- 34 d. Adhesion to Substrate: Minimum **16 lbf/sq. in. (110 kPa)** when tested according to ASTM D 4541.
- 35 e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- 36 f. UV Resistance: Can be exposed to sunlight for 30 days according to manufacturer's written
37 instructions.

38 39 2.4 ACCESSORY MATERIALS

40 A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly
41 and compatible with primary air-barrier material.

42 B. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to
43 2.0-lb/cu. ft density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive
44 substrate cleaner recommended by foam sealant manufacturer.

45 C. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

46 D. Primer: Liquid waterborne primer recommended for substrate by air-barrier material manufacturer.

47 E. Counterflashing Strip: Modified bituminous, 40-mil thick, self-adhering sheet consisting of 32 mils of rubberized
48 asphalt laminated to an 8-mil thick, cross-laminated polyethylene film with release liner backing.

49 F. Modified Bituminous Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of
50 rubberized asphalt laminated to a 4-mil thick polyethylene film with release liner backing.

51 G. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.

52 H. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

53 I. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

54 J. Modified Bituminous Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36
55 mils of rubberized asphalt laminated to a 4-mil thick polyethylene film with release liner backing.

56 K. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone
57 extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone
58 sealant for bonding extrusions to substrates.

- 1 Products: Subject to compliance with requirements, available products that may be incorporated into the Work
2 include, but are not limited to, the following:
3 Dow Corning Corporation; 123 Silicone Seal.
4 Momentive Performance Materials Inc.; US11000 UltraSpan.
5 Pecora Corporation; Sil-Span.
6 Tremco Incorporated, an RPM company; Spectrem Simple Seal.
7
8 L. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT
9 related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Section 07 90 00 "Sealants."
10 M.
11 Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

12 PART 3 - EXECUTION

13 **3.1 SURFACE PREPARATION**

- 14 A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written
15 instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.
16 B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
17 C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in
18 concrete with substrate-patching material.
19 D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
20 E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth
21 transition from one plane to another.
22 F. Bridge isolation joints, expansion joints, and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with
23 air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions
24 and details.
25

26 **3.2 INSTALLATION**

- 27 A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent
28 construction and ensure continuity of air and water barrier.
29 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure
30 continuity of air barrier with roofing membrane.
31 2. Install transition strip on roofing membrane or base flashing so that a minimum of **3 inches (75 mm)** of
32 coverage is achieved over each substrate.
33 3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and
34 allow it to dry.
35 4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by
36 air-barrier material on same day. Reprime areas exposed for more than 24 hours.
37 B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-
38 grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems,
39 storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings,
40 using accessory materials.
41 C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply
42 transition strip so that a minimum of **3 inches (75 mm)** of coverage is achieved over each substrate. Maintain **3 inches**
43 **(75 mm)** of full contact over firm bearing to perimeter frames, with not less than **1 inch (25 mm)** of full contact.
44 D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and
45 blisters. Patch with transition strips extending **6 inches (150 mm)** beyond repaired areas in strip direction.
46 E. Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply
47 air-barrier material in full contact around protrusions such as masonry ties.
48 1. Vapor-Retarding, High-Build Air Barrier: Total dry film thickness [as recommended in writing by manufacturer
49 to comply with performance requirements, but not less than **35 mils (0.9 mm)**] [not less than **40 mils (1.0**
50 **mm)**] [not less than **45 mils (1.1 mm)**] <Insert dimension>, applied in [one coat] [two equal coats] [one or
51 more equal coats].
52 2. Vapor-Permeable, High-Build Air Barrier: Total dry film thickness [as recommended in writing by
53 manufacturer to comply with performance requirements, but not less than **35 mils (0.9 mm)**] <Insert
54 dimension>, applied in [one coat] [two equal coats] [one or more equal coats].
55 F. Do not cover air barrier until it has been tested and inspected by testing agency.

- 1 G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply
2 air-barrier components.
3

4 **3.3 FIELD QUALITY CONTROL**

- 5 A. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with
6 requirements.
7 1. Air-barrier dry film thickness.
8 2. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to
9 [ASTM E 1186, chamber pressurization or depressurization with smoke tracers] [ASTM E 1186, chamber
10 depressurization using detection liquids] <Insert requirement>.
11 3. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to
12 ASTM E 783 or ASTM E 2357.
13 4. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to
14 ASTM D 4541 for each **600 sq. ft. (56 sq. m)** of installed air barrier or part thereof.
15 B. Air barriers will be considered defective if they do not pass tests and inspections.
16 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection
17 results indicate insufficient thickness.
18 2. Remove and replace deficient air-barrier components for retesting as specified above.
19 C. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
20 D. Prepare test and inspection reports.
21

22 **3.4 CLEANING AND PROTECTION**

- 23 A. Protect air-barrier system from damage during application and remainder of construction period, according to
24 manufacturer's written instructions.
25 B. Remove masking materials after installation.

26 END OF SECTION 072726

1 **SECTION 07 41 13.16 - STANDING-SEAM METAL ROOF PANELS**

2 **PART 1 - GENERAL**

3 **1.1 SUMMARY**

- 4 A. Section includes prefinished standing-seam metal roof panels and accessories.
5

6 **1.2 PREINSTALLATION MEETINGS**

- 7 A. Preinstallation Conference: Conduct conference at Project site
8

9 **1.3 ACTION SUBMITTALS**

- 10 A. Product Data: For each type of product.
11 B. Sustainable Design Submittals:
12 1. **Product Test Reports:** For roof materials, documentation indicating that roof materials comply with Solar
13 Reflectance Index requirements.
14 2. **Product Data:** For recycled content, indicating postconsumer and preconsumer recycled content and cost.
15 C. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel
16 profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
17 D. Furnish detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location,
18 gauges, shape and method of attachment of all trim locations and types of sealants, and any other details as may be
19 required for a weather-tight installation.
20 E. Samples: For each type of metal panel and color indicated.
21 F. LEED Submittals
22 1. Product Test reports for Credit SS 7.2. For roof panels, indicating that the panels comply with Solar Reflective
23 Index requirement
24 2. Product data for Credit MR 4.1 and credit MR 4.2: Indicating the percentages by weight of postconsumer and
25 preconsumer recycled content for products having recycled content.
26

27 **1.4 INFORMATIONAL SUBMITTALS**

- 28 A. Product test reports.
29 B. Warranties: Sample of warranties
30

31 **1.5 CLOSEOUT SUBMITTALS**

- 32 A. Maintenance data.
33

34 **1.6 QUALITY ASSURANCE**

- 35 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
36 manufacturer.
37 B. Weather Limitations: proceed with installation only when existing and forecasted weather conditions permit metal
38 roof panel work to be performed.
39 C. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field
40 measurements before fabrication.
41

42 **1.7 WARRANTY**

- 43 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of
44 metal panel systems that fail in materials or workmanship within specified warranty period.
45 1. Warranty Period: Two years from date of Substantial Completion.
46 B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or
47 replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
48 1. Finish Warranty Period: 20 years from date of Substantial Completion.
49 C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace
50 standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty
51 period.
52 1. Warranty Period: 20 years from date of Substantial Completion.

1 PART 2 - PRODUCTS

2 **2.1 PERFORMANCE REQUIREMENTS**

- 3 A. [Recycled Content](#): Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20
4 percent.
- 5 B. [Solar Reflectance Index \(SRI\)](#): Three-year-aged SRI not less than [64] [32] or initial SRI not less than [82] [39] when
6 calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- 7 C. Energy Performance: Provide roof panels that are listed on the EPA/DOE's ENERGY STAR "Roof Product List" for low
8 /steep-slope roof products.
- 9 D. Energy Performance: Provide roof panels according to one of the following when tested according to CRRC-1:
10 1. Three-year, aged solar reflectance of not less than 0.55 and emissivity of not less than 0.75
11 2. Three-year, aged Solar Reflectance Index of not less than 64 when calculated according to ASTM E 1980.
- 12 E. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based
13 on testing according to ASTM E 1592:
14 1. Wind Loads: As indicated on Drawings.
15 2. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- 16 F. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to
17 ASTM E 1680 or ASTM E 283 at the following test-pressure difference:
18 1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa)
- 19 G. Water Penetration: When tested per ASTM E-283/1680 and ASTM E-331/1646 there shall be no uncontrolled water
20 penetration or air infiltration through the panel joints.
- 21 H. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- 22 I. Wind-Uplift Resistance: Roof System shall be designed to meet a UL Class 90 wind uplift in accordance with UL
23 standard 580 and panel system shall be ASTM 1592 Tested and approved.
- 24 J. UL 2218 - Impact Resistance rated
- 25 K. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in
26 FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or
27 noncombustible construction, as applicable. Identify materials with FM Global markings.
28 1. Fire/Windstorm Classification: Class 1A-90 (45lbs per sq ft roof wind uplift)
29 2. Hail Resistance: SH (severe hail)
- 30 L. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing
31 buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other
32 detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-
33 sky heat loss.
34 1. Temperature Change (Range): **120 deg F (67 deg C)**, ambient; **180 deg F (100 deg C)**, material surfaces
35

36 **2.2 STANDING-SEAM METAL ROOF PANELS**

- 37 A. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan
38 between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips
39 located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels
40 together.
- 41 B. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised
42 side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed
43 clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
44 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
45 2. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1637.
- 46 C. Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat smooth pan between ribs;
47 designed for sequential installation by mechanically attaching panels to supports using
48
- 49 Basis of Design: PAC-CLAD Tite-Loc Panel, smooth panel Tite-Loc in 12" widths with 2" high seams that are
50 mechanically seamed together @ 90 degrees.
- 51 1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
52 may be incorporated into the Work include, but are not limited to the following:
- 53 a. [Advanced Architectural Products](#).
- 54 b. [AEP Span; A BlueScope Steel Company](#).
- 55 c. [Architectural Building Components](#).
- 56 d. [Architectural Metal Systems](#).

- 1 e. [Berridge Manufacturing Company.](#)
- 2 f. [CENTRIA Architectural Systems.](#)
- 3 g. [Dimensional Metals, Inc.](#)
- 4 h. [Drexel Metals.](#)
- 5 i. [Englert, Inc.](#)
- 6 j. [Everlast Metals.](#)
- 7 k. [Fabral.](#)
- 8 l. [Garland Company, Inc. \(The\).](#)
- 9 m. [IMETCO.](#)
- 10 n. [MBCI.](#)
- 11 o. [McElroy Metal, Inc.](#)
- 12 p. [Merchant and Evans.](#)
- 13 q. [Metal Sales Manufacturing Corporation.](#)
- 14 r. [Morin - A Kingspan Group Company.](#)
- 15 s. [PAC-CLAD; Petersen Aluminum Corporation.](#)
- 16 t. [Ultra Seam Incorporated.](#)
- 17 u. [Union Corrugating Company.](#)
- 18 v. [VICWEST.](#)
- 19 2. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting
20 raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports
21 using concealed clips inside laps. Include clips, cleats, pressure plates and accessories required for a
22 weathertight installation.
- 23 3. Panels to be designed for attachment with concealed fastener clips, spaced as required by the manufacturer
24 to provide for both positive and negative design loads, while allowing for the expansion and contraction of
25 the entire roof system resulting from variations in temperature.
- 26 4. Forming: Use continuous end rolling method. No end laps on panels. No portable rollforming machines will
27 be permitted on this project, no installer-owned or installer-rented machines will be permitted. It is the intent
28 of the Architect to provide Factory-Manufactured panel systems only for this project.
 - 29 a. Panels to be fabricated of 22 gage Steel
 - 30 b. Finish: Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil
31 over a 0.25 to 0.3 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil, to meet AAMA
32 621. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall
33 conform to all tests for adhesions, flexibility and longevity as specified by Kynar 500 or Hylar 5000
34 finish supplier.
 - 35 c. Color: Silver (Basis of Design PAC-CLAD)
 - 36 d. Texture: Smooth
- 37 5. Panel width: 12 inches O.C.
- 38 6. Panel Height: 2.0 inch high
- 39 7. Not acceptable: snap on standing seam panels

2.3 UNDERLAYMENT MATERIALS

- 42 A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a
43 minimum of 40 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or
44 SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment
45 manufacturer.
- 46 B. Underlayment shall be laid in horizontal layers with joints lapped toward the eaves a minimum of 6, and well secured
47 along laps and at ends as necessary to properly hold the felt in place. All underlayment shall be preserved unbroken
48 and whole.
- 49 C. Peel and Stick Underlayment shall lap all hips and ridges at least 12 to form double thickness and shall be lapped 6
50 over the metal of any valley or built-in gutters and shall be installed as required by the Standing Seam Panel
51 Manufacturer to attain the desired 20 Year Weathertightness Warranty.
 - 52 1. Basis of Design: Carlisle WIP 300 HT High Temperature Protection Self Adhering Roofing Underlayment (Peel
53 and Stick membrane)
 - 54 2. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
 - 55 3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
 - 56 4. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
57 may be incorporated into the Work include, but are not limited to the following:

- 1 a. [Carlisle Residential; a division of Carlisle Construction Materials.](#)
- 2 b. [Drexel Metals.](#)
- 3 c. [GCP Applied Technologies Inc.](#)
- 4 d. [Henry Company.](#)
- 5 e. [Kirsch Building Products, LLC.](#)
- 6 f. [Owens Corning.](#)
- 7 D. Felt Underlayment: ASTM D 226/D 22M, Type II (No. 30), asphalt-saturated organic felts.
- 8 E. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.
- 9 F. Sealants
- 10 1. Provide two-part polysulfide class B non-sag type for vertical and horizontal joints or
- 11 2. one part polysulfide not containing pitch or phenolic extenders or
- 12 3. Exterior grade silicone sealant recommended by roofing manufacturer or
- 13 4. One part non-sag, gun grade exterior type polyurethane recommended by the roofing manufacturer.
- 14

2.4 MISCELLANEOUS MATERIALS

- 16 A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet,
17 ASTM A 653/A 653M, **G90 (Z275 hot-dip galvanized)** coating designation or ASTM A 792/A 792M, **Class AZ50**
18 **(Class AZM150)** coating designation unless otherwise indicated. Provide manufacturer's standard sections as required
19 for support and alignment of metal panel system.
- 20 B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings,
21 fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match
22 material and finish of metal panels unless otherwise indicated.
- 23 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
- 24 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by
25 manufacturer.
- 26 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated
27 polyethylene; minimum **1-inch- (25-mm-)** thick, flexible closure strips; cut or premolded to match metal panel
28 profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- 29 C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against
30 weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases,
31 framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- 32 D. Gutters and Downspouts: Formed from same material as roof panels according to SMACNA's "Architectural Sheet
33 Metal Manual." Finish to match: Refer to Materials finish Schedule.
- 34 E. Roof Curbs: Fabricated from same material as roof panels, [**0.048-inch (1.2-mm)**] **<Insert dimension>** nominal
35 thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length
36 cricket. Fabricate curb subframing of **0.060-inch- (1.52-mm-)** nominal thickness, angle-, C-, or Z-shaped steel sheet.
37 Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match
38 metal roof panels.
- 39 F. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- 40 G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are
41 nonstaining, and do not damage panel finish.
- 42 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with
43 release-paper backing; **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
- 44 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
- 45 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.
- 46

2.5 FABRICATION

- 48 A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and
49 processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply
50 with indicated profiles and with dimensional and structural requirements.
- 51 B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- 52 C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal
53 and prevent metal-to-metal contact, and that minimize noise from movements.
- 54 D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and
55 recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and
56 other characteristics of item indicated.

1 PART 3 - EXECUTION

2 **3.1 PREPARATION**

- 3 A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages
4 according to ASTM C 754 and metal panel manufacturer's written recommendations.

6 **3.2 DELIVERY, STORAGE, AND HANDLING**

- 7 A. Deliver components, sheets, metal roof panels and other manufactured items so as not to be damaged or deformed.
8 Package metal roof panels for protection during transportation and handling.
9 B. Unload, store and erect metal roof panels in a manner to prevent bending, warping, twisting and surface damage.
10 C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store
11 metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause
12 staining, denting or other surface damage.
13 D. Protect strippable protective coating on any metal coated product from exposure to sunlight and high humidity,
14 except to the extent necessary for material installation.

16 **3.3 UNDERLAYMENT INSTALLATION**

- 17 A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions
18 of underlayment manufacturer for installation. Apply at locations indicated below wrinkle free, in shingle fashion to
19 shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses.
20 Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
21 1. Apply over the entire roof surface.
22 B. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.
23 C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet
24 Metal Flashing and Trim."
25

26 **3.4 METAL PANEL INSTALLATION**

- 27 A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each
28 standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
29 1. Install clips to supports with self-tapping fasteners.
30 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
31 3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof
32 panel, and factory-applied sealant are completely engaged.
33 4. Watertight Installation:
34 a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as
35 recommend in writing by manufacturer as needed to make panels watertight.
36 b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
37 c. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened
38 together by interlocking clamping plates.
39 B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide
40 for thermal expansion. Coordinate installation with flashings and other components.
41 C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and
42 SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line
43 and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather
44 resistant.
45 D. Panels shall be installed plumb and true in a proper alignment and in relation to the structural framing. The erector
46 must have at least five years successful experience with similar applications.
47 E. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be
48 required for a weather-tight installation.
49 F. Remove all strippable coating and provide a dry-wipe down cleaning of the panels as they are erected.
50

51 **3.5 CLEANING AND PROTECTION**

- 52 A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise
53 indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished
54 surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

55 END OF SECTION 074113.16

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1 SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

2 PART 1 - GENERAL

3 1.1 SUMMARY

4 A. Section Includes:

- 5 1. Standard and custom hollow metal doors and frames.
- 6 2. Steel sidelight, borrowed lite and transom frames.
- 7 3. Louvers installed in hollow metal doors.
- 8 4. Light frames and glazing installed in hollow metal doors.
- 9

10 B. Related Sections:

- 11 1. Division 01 Section "General Conditions".
- 12 2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
- 13 3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
- 14 4. Division 08 Section "Door Hardware".
- 15 5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

16 C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

- 17 1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- 18 2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
- 19 3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
- 20 4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- 21 5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
- 22 6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- 23 7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- 24 8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- 25 9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
- 26 10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
- 27 11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
- 28 12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
- 29 13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
- 30 14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
- 31 15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
- 32 16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

33 1.2 SUBMITTALS

- 34 A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- 35 B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- 36 C. Shop Drawings: Include the following:
 - 37 1. Elevations of each door design.
 - 38 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 - 39 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 40 4. Locations of reinforcement and preparations for hardware.
 - 41 5. Details of anchorages, joints, field splices, and connections.
 - 42 6. Details of accessories.
 - 43 7. Details of moldings, removable stops, and glazing.

- 1 8. Details of conduit and preparations for power, signal, and control systems.
2 D. Samples for Verification:
3 1. Samples are only required by request of the architect and for manufacturers that are not current members
4 of the Steel Door Institute.

5 **1.3 QUALITY ASSURANCE**

- 6 A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever
7 possible.
8 B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with
9 ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
10 C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing
11 agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral
12 pressure at 40" above sill) or UL 10C.
13 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach
14 construction label certifying doors are built to standard construction requirements for tested and labeled fire
15 rated door assemblies except for size.
16 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit
17 passageways, provide doors that have a maximum transmitted temperature end point of not more than 450
18 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
19 3. Smoke Control Door Assemblies: Comply with NFPA 105.
20 a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to
21 frame and on meeting stiles of pair doors.
22 D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a
23 testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based
24 on testing according to NFPA 257. Provide labeled glazing material.
25 E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project
26 Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and
27 procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and
28 conduit at frames with electrified or access control hardware.
29 F. Mockups: As part of the overall wall construction installation of one door frame by full thickness test area to set
30 quality standards for materials and execution.
31 1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding,
32 insulation, ties, and other penetrations, and flashing to demonstrate surface preparation, crack and joint
33 treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier
34 assembly.

35 **1.4 DELIVERY, STORAGE, AND HANDLING**

- 36 A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage.
37 Do not use non-vented plastic.
38 B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and
39 mullions.
40 C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with
41 heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess
42 humidity.
43 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be
44 stacked in a vertical upright position.

45 **1.5 PROJECT CONDITIONS**

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

47 **1.6 COORDINATION**

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

- 1 B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to
2 successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data
3 integration and data reliability of their Work into the coordinated BIM applications.

4 **1.7 WARRANTY**

- 5 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in
6 materials or workmanship within specified warranty period.
7 B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

8 **PART 2 - PRODUCTS**

9 **2.1 MANUFACTURERS**

- 10 **A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from an SDI Certified**
11 **manufacturer:**
12 1. CECO Door Products (C).
13 2. Curries Company (CU).
14 3. Pioneer Industries (PI).
15 4. Steelcraft (S).

16 **2.2 MATERIALS**

- 17 A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
18 B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60
19 (ZF180) metallic coating.
20 C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60
21 (Z180) or A60 (ZF180) metallic coating.

22 **2.3 HOLLOW METAL DOORS**

- 23 A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth
24 surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8
25 and ANSI/NAAMM HMMA 867.
26 B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that
27 complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing
28 ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door
29 construction.
30 1. Design: Flush panel.
31 2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face
32 welds, in compliance with HMMA 867 "Laminated Core".
33 a. Provide 22-gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral
34 core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No
35 stiffener face welding is permitted.
36 b. Thermal properties to rate at a fully operable minimum U-Factor 0.37 and R-Value 2.7, including
37 insulated door, thermal-break frame and threshold.
38 c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value
39 2.6, including insulated door, kerf type frame, and threshold.
40 3. Level/Model at Exterior Doors: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16
41 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
42 4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch
43 in 2 inches (3 mm in 50 mm).
44 5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16
45 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel
46 to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of
47 the door. Plastic or composite channel fillers are not acceptable.
48 6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
49 7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same
50 material as door face sheets.

- 1 C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with
2 ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8
3 for level and model and ANSI/SDI A250.4 for physical performance level:
- 4 1. Design: Flush panel.
 - 5 a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
 - 6 2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-
7 mm) thick steel, Model 2.
 - 8 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16
9 gauge, extending the full width of the door and welded to the face sheet.
 - 10 4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel
11 with pierced holes, drilled and tapped.
 - 12 5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same
13 material as door face sheets.
- 14 D. Manufacturers Basis of Design:
- 15 1. Interior: Curries Company (CU) - Polystyrene Core - 707 Series.
 - 16 2. Exterior: Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

17 2.4 HOLLOW METAL FRAMES

- 18 A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- 19 B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal
20 frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance
21 with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and
22 drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- 23 C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with SDI Grade III with G-90 galvanized zinc
24 coating.
- 25 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 26 2. Manufacturers Basis of Design:
 - 27 a. Interior: Curries Company (CU) – M Series.
 - 28 b. Exterior: Curries Company (CU) – Thermal Break TQ Series.
- 29
- 30
- 31 D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
- 32 1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
 - 33 2. Manufacturers Basis of Design:
 - 34 a. Curries Company (CU) - M Series.
- 35 E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for
36 fire-protection ratings indicated.
- 37 F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same
38 material as frames.

39 2.5 FRAME ANCHORS

- 40 A. Jamb Anchors:
- 41 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic
42 coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches
43 wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 44 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
 - 45 3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
- 46 B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than
47 0.042 inches thick.
- 48 C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

49 2.6 LOUVERS

- 50 A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
- 51 1. Blade Type: Vision proof inverted V or inverted Y.
 - 52 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or
53 powder coated finish. Match pre-finished door paint color where applicable.
- 54 B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors
55 with fire protection rating of 1-1/2 hours and less.
- 56 1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.

- 1 2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or
2 powder coated finish. Match pre-finished door paint color where applicable.

3 **2.7 LIGHT OPENINGS AND GLAZING**

- 4 A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and
5 moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple
6 glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops
7 with the type of glazing and installation indicated.
8 B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated
9 from same material as door face sheet in which they are installed.
10 C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless
11 otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior
12 doors and frames.
13 D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled
14 steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating
15 indicated. Match pre-finished door paint color where applicable.

16 **2.8 ACCESSORIES**

- 17 A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
18 B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

19 **2.9 FABRICATION**

- 20 A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes
21 and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's
22 plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or
23 splining in the field by others.
24 B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
25 C. Hollow Metal Doors:
26 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to
27 escape where specified.
28 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where
29 indicated.
30 3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door
31 Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where
32 indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
33 4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified
34 in hardware sets in Division 08 Section "Door Hardware".
35 D. Hollow Metal Frames:
36 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide
37 alignment plates or angles at each joint, fabricated of same thickness metal as frames.
38 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
39 a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of
40 both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and
41 are not to be used to size the frame opening.
42 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints,
43 fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
44 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-
45 inches and wider with mortise butt type hinges at top hinge locations.
46 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified
47 in hardware sets in Division 08 Section "Door Hardware".
48 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise
49 indicated for removable stops, provide security screws at exterior locations.
50 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps
51 regardless of grouting requirements.
52 8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
53 9. Jamb Anchors: Provide number and spacing of anchors as follows:
54 a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors
55 not more than 32 inches o.c. and as follows:
56 1) Two anchors per jamb up to 60 inches high.

- 1) Three anchors per jamb from 60 to 90 inches high.
- 2) Four anchors per jamb from 90 to 120 inches high.
- 3) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
- 4) Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

- 1 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-
2 installed expansion anchors.
- 3 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and
4 masonry with mortar.
- 5 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do
6 not grout vertical or horizontal closed mullion members.
- 7 C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as
8 necessary.
- 9 1. Non-Fire-Rated Standard Steel Doors:
10 a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
11 b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
12 c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
13 d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- 14 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- 15 D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal
16 manufacturer's written instructions.

18 **3.4 ADJUSTING AND CLEANING**

- 19 A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in
20 complete and proper operating condition. Remove and replace defective work, including hollow metal work that is
21 warped, bowed, or otherwise unacceptable.
- 22 B. Remove grout and other bonding material from hollow metal work immediately after installation.
- 23 C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime
24 coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior
25 and galvanized openings) or finish paint.

26 END OF SECTION 081113

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1 **SECTION 08 33 23 - OVERHEAD COILING DOORS**

2 PART 1 - GENERAL

3 **1.1 SUMMARY**

- 4 A. Section Includes:
- 5 1. Service doors.
 - 6 2. Insulated service doors.
 - 7 3. Fire-rated service doors.
- 8 B. Related Requirements:
- 9 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing.
 - 10 2. Section 087100 "Door Hardware" for cores and keying

11 **1.2 ACTION SUBMITTALS**

- 12 A. Product Data: For each type and size of overhead coiling door and accessory.
- 13 B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's
- 14 product data.
- 15 1. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage
 - 16 and support of each door.
 - 17 2. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 18 3. Show locations of controls, locking devices detectors or replaceable fusible links, and other accessories.
 - 19 4. Include diagrams for power, signal, and control wiring.
- 20 C. Samples: For each exposed product and for each color and texture specified.

21

22 **1.3 INFORMATIONAL SUBMITTALS**

- 23 A. Sample warranty.
- 24

25 **1.4 CLOSEOUT SUBMITTALS**

- 26 A. Maintenance data.
- 27

28 **1.5 QUALITY ASSURANCE**

- 29 A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by
- 30 manufacturer for both installation and maintenance of units required for this Project.
- 31 B. Accessibility Standard: Comply with applicable provisions in The International Building Code and ICC A117.1.
- 32

33 **1.6 WARRANTY**

- 34 A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or
- 35 workmanship within specified warranty period.
- 36 1. Warranty Period: Two years from date of Substantial Completion.

37 PART 2 - PRODUCTS

38 **2.1 PERFORMANCE REQUIREMENTS**

- 39 A. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:
- 40 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward and
 - 41 outward.
 - 42 2. Testing: According to ASTM E 330/E 330M or DASMA 108 for garage doors and complying with acceptance
 - 43 criteria of DASMA 108.
- 44 B. Accessibility Standard: Comply with applicable provisions in The International Building Code and ICC A117.1.
- 45
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- 50

2.2 DOOR ASSEMBLY – “CC-3” Exterior

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [ACME Rolling Doors.](#)
 - b. [Advanced Door Technologies.](#)
 - c. [Alpine Overhead Doors, Inc.](#)
 - d. [Alumatec Pacific Products.](#)
 - e. [ASTA Door Corporation.](#)
 - f. [C.H.I. Overhead Doors, Inc.](#)
 - g. [City-Gates.](#)
 - h. [Clipay Building Products.](#)
 - i. [Cookson Company.](#)
 - j. [Cornell.](#)
 - k. [Dynamic Closures Corporation.](#)
 - l. [ENTREMATI.C.](#)
 - m. [Lawrence Roll-Up Doors, Inc.](#)
 - n. [McKeon Rolling Steel Door Company, Inc.](#)
 - o. [Metro Door.](#)
 - p. [Overhead Door Corporation.](#)
 - q. [Raynor.](#)
 - r. [Southwestern Rolling Steel Door Co.](#)
 - s. [Wayne-Dalton Corp.](#)
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000.
- C. Curtain R-Value: Minimum 7.5 deg F x h x sq. ft./Btu
- D. Door Curtain Material: Galvanized steel or Aluminum.
- E. Door Curtain Slats: Flat profile slats.
1. Insulated-Slat Interior Facing: Metal.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from stainless steel.
- G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- H. Hood: Match curtain material and finish.
1. Mounting: Face of wall.
2. Mounting: Jamb Mounted at door 103D
- I. Locking Devices: Equip door with locking device assembly and chain lock keeper.
1. Locking Device Assembly: padlock
- J. Manual Door Operator: Chain-hoist operator.
- K. Curtain Accessories: Equip door with weatherseals
- L. Size: As indicated on drawings
- M. Door Finish:
1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range to match dark bronze
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.3 DOOR ASSEMBLY – “CO-1” (Garage door 108C)

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- a. [ACME Rolling Doors.](#)
 - b. [Advanced Door Technologies.](#)
 - c. [Alpine Overhead Doors, Inc.](#)
 - d. [Alumatec Pacific Products.](#)
 - e. [ASTA Door Corporation.](#)
 - f. [C.H.I. Overhead Doors, Inc.](#)
 - g. [City-Gates.](#)
 - h. [Clipay Building Products.](#)
 - i. [Cookson Company.](#)

- 1 j. [Cornell.](#)
- 2 k. [Dynamic Closures Corporation.](#)
- 3 l. [ENTREMATI.C.](#)
- 4 m. [Lawrence Roll-Up Doors, Inc.](#)
- 5 n. [McKeon Rolling Steel Door Company, Inc.](#)
- 6 o. [Metro Door.](#)
- 7 p. [Overhead Door Corporation.](#)
- 8 q. [Raynor.](#)
- 9 r. [Southwestern Rolling Steel Door Co.](#)
- 10 s. [Wayne-Dalton Corp.](#)
- 11 B. Operation Cycles: Door components and operators capable of operating for not less than 50,000.
- 12 C. Curtain R-Value: Minimum **7.5 deg F x h x sq. ft./Btu**
- 13 D. Door Curtain Material: Galvanized steel or Aluminum.
- 14 E. Door Curtain Slats: Flat profile slats.
 - 15 1. Insulated-Slat Interior Facing: Metal.
- 16 F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from
- 17 stainless steel.
- 18 G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- 19 H. Hood: Match curtain material and finish.
 - 20 1. Mounting: Face of wall.
- 21 I. Locking Devices: Equip door with locking device assembly and chain lock keeper.
 - 22 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with cylinder on outside.
 - 23 Coordinate core and keying with master key system.
- 24 J. Electric Door Operator:
 - 25 1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
 - 26 2. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
 - 27 3. Motor Exposure: Interior.
 - 28 4. Motor Electrical Characteristics:
 - 29 5. Horsepower: 1.5 hp.
 - 30 6. Voltage: See Electrical Drawings.
 - 31 7. Emergency Manual Operation: Chain type.
 - 32 8. Obstruction-Detection Device: Automatic photoelectric sensor.
 - 33 9. Control Station(s): Interior mounted where indicated on Drawings.
- 34 K. Curtain Accessories: Equip door with weatherseals
- 35 L. Size: As indicated on drawings
- 36 M. Door Finish:
 - 37 1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range to
 - 38 match dark bronze
 - 39 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

40 2.4 DOOR ASSEMBLY – “CC- 1 and CC-2 (Jamb Mounted)” Interior

- 41 A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
 - 42 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
 - 43 may be incorporated into the Work include, but are not limited to the following:
 - 44 a. [ACME Rolling Doors.](#)
 - 45 b. [Advanced Door Technologies.](#)
 - 46 c. [Alpine Overhead Doors, Inc.](#)
 - 47 d. [Alumatec Pacific Products.](#)
 - 48 e. [ASTA Door Corporation.](#)
 - 49 f. [C.H.I. Overhead Doors, Inc.](#)
 - 50 g. [City-Gates.](#)
 - 51 h. [Clipay Building Products.](#)
 - 52 i. [Cookson Company.](#)
 - 53 j. [Cornell.](#)
 - 54 k. [Dynamic Closures Corporation.](#)
 - 55 l. [ENTREMATI.C.](#)
 - 56 m. [Lawrence Roll-Up Doors, Inc.](#)
 - 57 n. [McKeon Rolling Steel Door Company, Inc.](#)

- 1 o. [Metro Door.](#)
- 2 p. [Overhead Door Corporation.](#)
- 3 q. [Raynor.](#)
- 4 r. [Southwestern Rolling Steel Door Co.](#)
- 5 s. [Wayne-Dalton Corp.](#)
- 6 B. Operation Cycles: Door components and operators capable of operating for not less than 50,000.
- 7 C. Curtain R-Value: NA
- 8 D. Door Curtain Material: Galvanized steel or Aluminum.
- 9 E. Door Curtain Slats: Flat profile slats.
- 10 F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from
- 11 stainless steel.
- 12 G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- 13 H. Hood: Match curtain material and finish.
- 14 1. Mounting: Face of wall. (CC-1)
- 15 2. Mounting: Between Jamb (CC-2)
- 16 I. Locking Devices: Equip door with locking device assembly and chain lock keeper.
- 17 1. Locking Device: Padlock
- 18 J. Manual Door Operator: Chain-hoist operator.
- 19 K. Size: As indicated on drawings
- 20 L. Door Finish:
- 21 1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range to
- 22 match dark bronze.
- 23 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

24 2.5 FIRE-RATED DOOR ASSEMBLY – “CC-4” Interior

- 25 A. Use at Building Separation Fire Barrier
- 26 B. Fire-Rated Service Door: Overhead fire-rated coiling door formed with curtain of interlocking metal slats.
- 27 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that
- 28 may be incorporated into the Work include, but are not limited to the following:
- 29 a. [ACME Rolling Doors.](#)
- 30 b. [Advanced Door Technologies.](#)
- 31 c. [Alpine Overhead Doors, Inc.](#)
- 32 d. [ASTA Door Corporation.](#)
- 33 e. [C.H.I. Overhead Doors, Inc.](#)
- 34 f. [City-Gates.](#)
- 35 g. [Clipay Building Products.](#)
- 36 h. [Cookson Company.](#)
- 37 i. [Cornell.](#)
- 38 j. [ENTREMATIIC.](#)
- 39 k. [Lawrence Roll-Up Doors, Inc.](#)
- 40 l. [McKeon Rolling Steel Door Company, Inc.](#)
- 41 m. [Overhead Door Corporation.](#)
- 42 n. [Raynor.](#)
- 43 o. [Southwestern Rolling Steel Door Co.](#)
- 44 p. [Wayne-Dalton Corp.](#)
- 45 C. Operation Cycles: Door components and operators capable of operating for not less than 20,000.
- 46 D. Fire Rating: 1 hour with temperature-rise limit and with smoke control.
- 47 E. Curtain R-Value: Not Applicable
- 48 F. Door Curtain Material: Galvanized steel.
- 49 G. Door Curtain Slats: Flat profile slats.
- 50 1. Insulated-Slat Interior Facing: Metal.
- 51 H. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- 52 I. Hood: Match curtain material and finish.
- 53 1. Mounting: Face of wall.
- 54 J. Locking Devices: Equip door with locking device assembly and chain lock keeper.
- 55 1. Locking Device Assembly: NONE
- 56 K. Manual Door Operator: Chain-hoist operator on Both side.
- 57 L. Curtain Accessories: Equip door with smoke seals, and automatic-closing device.

FOR CONSTRUCTION
5/10/2023

- 1 M. Size: As indicated on drawings
- 2 N. Door Finish:
- 3 Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range to match dark
- 4 bronze.
- 5 O. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

6 PART 3 - EXECUTION

7 **3.1 INSTALLATION**

- 8 A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts,
- 9 hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- 10 B. Fire-Rated Doors: Install according to NFPA 80.
- 11 C. Smoke-Control Doors: Install according to NFPA 80 and NFPA 105.
- 12 D. Power-Operated Doors: Install according to UL 325.

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14 **3.2 DEMONSTRATION**

- 15 A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and
- 16 maintain overhead coiling doors.

17 END OF SECTION 083323

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SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Storefront framing.
 - 2. Manual-swing entrance doors.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. [Product Data](#): For sealants, indicating VOC content.
 - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 3. [Product Data](#): For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 4. [Product Certificates](#): For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - 5. [Environmental Product Declaration](#): For each product.
 - 6. Health Product Declaration: For each product.
 - 7. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
- C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 2. Include point-to-point wiring diagrams.
- D. Samples: For each type of exposed finish required.
- E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.
- F. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.
- B. Product test reports.
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: As part of the overall wall construction, build a min 48 inches by 48 inches by full thickness test area to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly incorporating backup wall construction, external cladding, insulation, penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Confirm color of sealant.

- 1
2 C. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated and accredited by the
3 International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition
4 Arrangement as complying with ISO/IEC 17025.
5 D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and
6 performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment,
7 and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
8 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If
9 changes are proposed, submit comprehensive explanatory data to Architect for review.

10 **1.7 WARRANTY**

- 11 A. Special Warranty: **Installer** agrees to repair or replace components of aluminum-framed entrances and storefronts
12 that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
13 1. Warranty Period: Two years from date of Substantial Completion.

14 **PART 2 - PRODUCTS**

15 **2.1 PERFORMANCE REQUIREMENTS**

- 16 A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to
17 design aluminum-framed entrances and storefronts.
18 B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-
19 framed entrances and storefronts representing those indicated for this Project without failure due to defective
20 manufacture, fabrication, installation, or other defects in construction.
21 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including,
22 but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and
23 concentrated live loads.
24 2. Failure also includes the following:
25 a. Thermal stresses transferring to building structure.
26 b. Glass breakage.
27 c. Noise or vibration created by wind and thermal and structural movements.
28 d. Loosening or weakening of fasteners, attachments, and other components.
29 e. Failure of operating units.
30 C. Structural Loads:
31 1. Wind Loads: As indicated on Drawings.
32 2. Other Design Loads: As indicated on Drawings
33 D. Deflection of Framing Members: At design wind pressure, as follows:
34 1. Deflection Normal to Wall Plane: Limited to [edge of glass in a direction perpendicular to glass plane not
35 exceeding 1/175 of the glass edge length for each individual glazing lite] [1/175 of clear span for spans of up
36 to **13 feet 6 inches (4.1 m)** and to 1/240 of clear span plus **1/4 inch (6.35 mm)** for spans greater than **13 feet**
37 **6 inches (4.1 m)**] <Insert deflection limit> or an amount that restricts edge deflection of individual glazing
38 lites to **3/4 inch (19.1 mm)**, whichever is less.
39 2. Deflection Parallel to Glazing Plane: Limited to [1/360 of clear span or **1/8 inch (3.2 mm)**, whichever is smaller]
40 [amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that
41 which reduces edge clearance between framing members and glazing or other fixed components to less than
42 **1/8 inch (3.2 mm)**].
43 a. Operable Units: Provide a minimum **1/16-inch (1.6-mm)** clearance between framing members and
44 operable units.
45 3. Cantilever Deflection: Where framing members overhang an anchor point, as follows:
46 a. Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus **1/4 inch (6.35 mm)** for spans
47 greater than **11 feet 8-1/4 inches (3.6 m)** or 1/175 times span, for spans of less than **11 feet 8-1/4**
48 **inches (3.6 m)**.
49 E. Structural: Test according to ASTM E330/E330M as follows:
50 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance
51 doors, do not evidence deflection exceeding specified limits.
52 2. When tested at **150**percent of positive and negative wind-load design pressures, storefront assemblies,
53 including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent
54 deformation of main framing members exceeding **0.2**percent of span.
55 3. Test Durations: As required by design wind velocity, but not less than **10** seconds.

- 1 F. Air Infiltration: Test according to ASTM E283 for infiltration as follows:
2 1. Fixed Framing and Glass Area:
3 a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m)] at a static-air-pressure differential of
4 6.24 lbf/sq. ft. (300 Pa).
5 2. Entrance Doors:
6 a. Single Doors: Maximum air leakage of [0.5 cfm/sq. ft. (2.54 L/s per sq. m)] <Insert value> at a static-
7 air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
8 G. Water Penetration under Static Pressure: Test according to ASTM E331 as follows:
9 1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when
10 tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design
11 pressure. No leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
12 H. Energy Performance: Certify and label energy performance according to NFRC as follows:
13 1. Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more
14 than [0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K)] [0.45 Btu/sq. ft. x h x deg F (2.55 W/sq. m x K)] [0.57
15 Btu/sq. ft. x h x deg F (3.23 W/sq. m x K)] [0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K)] <Insert value> as
16 determined according to NFRC 100.
17 2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater
18 than [0.26] [0.35] [0.40] [0.45] <Insert value> as determined according to NFRC 200.
19 3. Condensation Resistance: Fixed glazing and framing areas as a system shall have an NFRC-certified
20 condensation resistance rating of no less than [15] [25] [35] [45] [55] [65] [75] <Insert value> as determined
21 according to NFRC 500.
22 I. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with
23 ASTM E1996 for Wind Zone [1] [2] [3] [4] for [basic] [enhanced] protection.
24 1. Large-Missile Test: For glazing located within [30 feet (9.1 m)] <Insert dimension> of grade.
25 2. Small-Missile Test: For glazing located between 30 feet (9.1 m) and [60 feet (18.3 m)] <Insert dimension>
26 above grade.
27 J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
28 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
29

30 2.2 STOREFRONT SYSTEMS

- 31 A. Basis of Design: Kawneer Trifab VersaGlaz 451T Framing system Structural Silicone Glazed (SSG)
32 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be
33 incorporated into the Work include, but are not limited to the following:
34 1. [Arcadia, Inc.](#)
35 2. [Avanti Systems, Inc.](#)
36 3. [CMI Architectural.](#)
37 4. [Commercial Architectural Products, Inc.](#)
38 5. [Coral Industries, Inc.](#)
39 6. [EFCO Corporation.](#)
40 7. [Kawneer North America, an Arconic company.](#)
41 8. [Leed Himmel Industries, Inc.](#)
42 9. [Manko Window Systems, Inc.](#)
43 10. [Oldcastle BuildingEnvelope™.](#)
44 11. [Pittco Architectural Metals, Inc.](#)
45 12. [SAFTI FIRST Fire Rated Glazing Solutions.](#)
46 13. [Trulite Glass & Aluminum Solutions, LLC.](#)
47 14. [Tubelite Inc.](#)
48 15. [U.S. Aluminum; a brand of C.R. Laurence.](#)
49 16. [YKK AP America Inc.](#)
50 C. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and
51 reinforced as required to support imposed loads.
52 1. Exterior Framing Construction: Thermally broken
53 2. Interior Vestibule Framing Construction: Thermally broken.
54 3. Glazing System: Structural Silicone
55 4. Fabrication Method: Field-fabricated stick system.
56 5. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
57 6. Steel Reinforcement: As required by manufacturer.
58 D. 2" x 4-1/2" (50.8 mm x 114.3 mm) nominal dimension

- 1 E. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing
2 abuts adjacent construction.
3 F. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims
4 for aligning system components.
5

6 2.3 ENTRANCE DOOR SYSTEMS

- 7 A. Basis of Design: Kawneer 250/425 Thermal Entrances (High Thermal performance)
8 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be
9 incorporated into the Work include, but are not limited to the following:
10 1. [Arcadia, Inc.](#)
11 2. [CMI Architectural.](#)
12 3. [Commercial Architectural Products, Inc.](#)
13 4. [Coral Industries, Inc.](#)
14 5. [EFCO Corporation.](#)
15 6. [Kawneer North America, an Arconic company.](#)
16 7. [Leed Himmel Industries, Inc.](#)
17 8. [Manko Window Systems, Inc.](#)
18 9. [Nana Wall Systems, Inc.](#)
19 10. [Oldcastle BuildingEnvelope™.](#)
20 11. [Pittco Architectural Metals, Inc.](#)
21 12. [SAFTI FIRST Fire Rated Glazing Solutions.](#)
22 13. [Trulite Glass & Aluminum Solutions, LLC.](#)
23 14. [Tubelite Inc.](#)
24 15. [U.S. Aluminum; a brand of C.R. Laurence.](#)
25 16. [YKK AP America Inc.](#)
26 C. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
27 1. Door Construction: **2-1/4-inch** overall thickness, with minimum **0.125-inch- (3.2-mm-)** thick, extruded-
28 aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are
29 deeply penetrated and fillet welded or that incorporate concealed tie rods.
30 a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed
31 to the exterior from members exposed to the interior
32 2. Door Design: Medium stile: Vertical face dimension: 4-1/4" (108.0 mm). Bottom stile: 10",
33 3. Door Depth: 2-1/4" (57.2 mm)
34 4. Glass: 1" insulated glass infill
35 5. Glazing Stops and Gaskets: square snap-on, extruded-aluminum stops and preformed gaskets.
36 a. Provide nonremovable glazing stops on outside of door.
37

38 2.4 ENTRANCE DOOR HARDWARE

- 39 A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 Door Hardware
40 B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for
41 each entrance door, to comply with requirements in this Section.
42 1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and [named
43 manufacturers' products] [products equivalent in function and comparable in quality to named products]
44 [products complying with BHMA standard referenced].
45 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface
46 with other building control systems indicated.
47 3. Opening-Force Requirements:
48 a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set
49 the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
50 b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
51 C. Designations: Requirements for design, grade, function, finish, quantity, size, and other distinctive qualities of each
52 type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by
53 using entrance door hardware designations as follows:
54 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware
55 type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated
56 in "Entrance Door Hardware Sets" Article.
57 2. References to BHMA Standards: Provide products complying with these standards and requirements for
58 description, quality, and function.

- 1 D. Cylinders: As specified in Section 087100 "Door Hardware."
- 2 E. Pivot Hinges: BHMA A156.4, Grade 1.
- 3 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- 4 F. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
- 5 1. Nonremovable Pins: Provide setscrew in hinge barrel that, when tightened into a groove in hinge pin, prevents
- 6 removal of pin while entrance door is closed.
- 7 2. Exterior Hinges: [Stainless steel, with stainless-steel pin] [Nonferrous] <Insert material>.
- 8 3. Quantities:
- 9 a. For doors up to 87 inches (2210 mm) high, provide three hinges per leaf.
- 10 b. For doors more than 87 and up to 120 inches (2210 and up to 3048 mm) high, provide four hinges per
- 11 leaf.
- 12 G. Continuous-Gear Hinges: BHMA A156.26.
- 13 H. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- 14 I. Manual Flush Bolts: BHMA A156.16, Grade 1.
- 15 J. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.
- 16 K. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to
- 17 authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- 18 L. Cylinders: BHMA A156.5, Grade 1.
- 19 1. Keying: Master key system. Permanently inscribe each key with a visual key control number and include
- 20 notation "DO NOT DUPLICATE".
- 21 M. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- 22 N. Operating Trim: BHMA A156.6.
- 23 1. When used with panic exit devices, provide keyed removable mullions listed and labeled by a testing and
- 24 inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing
- 25 according to UL 305. Use only mullions that have been tested with exit devices to be used.
- 26 O. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size,
- 27 exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements
- 28 for opening force.
- 29 P. Concealed Overhead Holders and Stops: BHMA A156.8, Grade 1.
- 30 Q. Weather Stripping: Manufacturer's standard replaceable components.
- 31 1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.
- 32 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or
- 33 aluminum-strip backing.
- 34 R. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- 35 S. Thresholds: BHMA A156.21 raised thresholds beveled with a slope of not more than 1:2, with maximum height of **1/2**
- 36 **inch (12.7 mm)**.
- 37 T. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-
- 38 pivoted doors.

2.5 GLAZING

- 41 A. Insulating Glass, Type 1 (GL-1T Tempered)
- 42 B. Low-E-Coated Insulating Glass: Provide 2 sheets of glass and a desiccant dehydrated Argon gas filled space ($\frac{1}{2}$ " unless
- 43 otherwise noted) with -20 degree F (29 degrees C) dew point, with Class A sealant type edge construction to maintain
- 44 a hermetic seal; fabricated to provide the following overall performance characteristics:
- 45 1. Basis of Design: insulating glass, max 62% VLT, SHGC of .31, U value of .24.
- 46 2. Overall Unit Thickness: 11/16 inch.
- 47 3. Outer Light: 3.0-mm-thick, fully tempered glass.
- 48 4. Interspace: 12-mm, argon-filled.
- 49 5. Inner Light: 3.0-mm-thick, fully tempered glass.
- 50 6. Low-E Coating: Sputter coated on the second surface.
- 51 7. Glass Units: Select quality complying with ASTM C 1036.
- 52 8. Edge Construction: Twin primary seals of polyisobutylene; dark bronze anodized tubular aluminum spacer
- 53 bar frame with soldered sealed corners and filled with desiccant; and secondary seal outside of bar, bonded
- 54 to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricator's
- 55 option).
- 56 C. Submittals:
- 57 1. Product Data: For each glass product and glazing material indicated.
- 58 2. Samples: 12-inch- square, for each type of glass product indicated, other than monolithic clear float glass.

- 1 3. Glazing Schedule: Use same designations indicated on Drawings.
- 2 D. Quality: Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component
- 3 lite of units with appropriate certification label of IGCC.
- 4 E. Warranty: Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-
- 5 glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period.
- 6 Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass
- 7 breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of
- 8 failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
- 9 1. Warranty Period: 10 years from date of Substantial Completion.
- 10 F. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric
- 11 glazing gaskets, setting blocks, and shims or spacers.
- 12 G. Glazing Sealants: As recommended by manufacturer.
- 13 Sealant shall have a VOC content of 250 g/L or less.
- 14 Sealant shall comply with the testing and product requirements of the California Department of Public Health's
- 15 "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
- 16 Environmental Chambers."
- 17 H. Glazing Sealants for structural-sealant-glazed systems as recommended by manufacturer for joint type, and as
- 18 follows:
 - 19 1. Structural Sealant:
 - 20 a. ASTM C 1184
 - 21 b. Single-component neutral-curing silicone formulation that is compatible with the system components with
 - 22 which it comes in contact
 - 23 c. Specifically formulated and tested for use as structural sealant and approved by a structural-sealant
 - 24 manufacturer for use in the aluminum-framed systems indicated
 - 25 d. Color: Black
 - 26 2. Weatherseal sealant:
 - 27 a. ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O
 - 28 b. Single-component neutral-curing formulation that is compatible with the structural sealant and other
 - 29 system components with which it comes in contact
 - 30 c. Recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers
 - 31 for this use
 - 32 d. Color: Matching structural sealant
- 33 I. Cleaning and protection: Protect exterior glass from damage immediately after installation by attaching crossed
- 34 streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels,
- 35 and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations,
- 36 including weld splatter. If, despite such protection, contaminating substances do come into contact with glass,
- 37 remove substances immediately as recommended by glass manufacturer.
 - 38 1. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural
 - 39 causes, accidents, and vandalism, during construction period.

2.6 MATERIALS

- 42 A. Sheet and Plate: [ASTM B209](#) ([ASTM B209M](#)).
- 43 B. Extruded Bars, Rods, Profiles, and Tubes: [ASTM B221](#) ([ASTM B221M](#)).
- 44 C. Extruded Structural Pipe and Tubes: ASTM B429/B429M.
- 45 D. Structural Profiles: ASTM B308/B308M.
- 46 E. Steel Reinforcement:
 - 47 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
 - 48 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
 - 49 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
 - 50 4. Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-
 - 51 PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface
 - 52 preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to
 - 53 applicable SSPC standard.
- 54 F. [Recycled Content of Steel Products](#): Postconsumer recycled content plus one-half of preconsumer recycled content
- 55 not less than [25] <Insert value> percent.
- 56 G. [Recycled Content of Aluminum Components](#): Postconsumer recycled content plus one-half of preconsumer recycled
- 57 content not less than [25] [50] <Insert value> percent.

- 1 H. **Regional Materials:** Products shall be manufactured within **100 miles (160 km)** of Project site from materials that have
2 been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of Project site.
3

4 **2.7 FABRICATION**

- 5 A. Form or extrude aluminum shapes before finishing.
6 B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld
7 spatter and welding oxides from exposed surfaces by descaling or grinding.
8 C. Fabricate components that, when assembled, have the following characteristics:
9 1. Profiles that are sharp, straight, and free of defects or deformations.
10 2. Accurately fitted joints with ends coped or mitered.
11 3. Physical and thermal isolation of glazing from framing members.
12 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing
13 edge clearances.
14 5. Provisions for field replacement of glazing from [exterior] [interior] [interior for vision glass and exterior for
15 spandrel glazing or metal panels].
16 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
17 D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
18 E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance
19 door hardware.
20 F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
21 G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut,
22 drill, and tap for factory-installed entrance door hardware before applying finishes.
23 H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
24

25 **2.8 ALUMINUM FINISHES**

- 26 A. Color Anodic Finish, AA-M10C21 A44, Class I, 0.7 mm or thicker.
27 B. Basis of Design: Kawneer Anodized Finishes #40 Dark Bronze
28 1. Color: **Dark Bronze anodized**

29 **PART 3 - EXECUTION**

30 **3.1 INSTALLATION**

- 31 A. General:
32 1. Comply with manufacturer's written instructions.
33 2. Do not install damaged components.
34 3. Fit joints to produce hairline joints free of burrs and distortion.
35 4. Rigidly secure nonmovement joints.
36 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to
37 prevent impeding movement of moving joints.
38 6. Seal perimeter and other joints watertight unless otherwise indicated.
39 B. Metal Protection:
40 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact
41 surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive
42 spacers.
43 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact
44 surfaces with bituminous paint.
45 C. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to
46 produce weathertight installation.
47 D. Install components plumb and true in alignment with established lines and grades.
48 E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact
49 and hardware movement to produce proper operation.
50 F. Install glazing as specified in Section 088000 "Glazing."
51 G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
52 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
53 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to
54 entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent
55 possible.

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3.2 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.
 - 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
 - a. Perform a minimum of two tests in areas as directed by Architect.
 - 2. Air Infiltration: ASTM E783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than **0.09 cfm/sq. ft. (0.45 L/s per sq. m)** at a static-air-pressure differential of **1.57 lbf/sq. ft. (75 Pa)**.
 - a. Perform a minimum of **[two] [three] <Insert number>** tests in areas as directed by Architect.
 - 3. Water Penetration: ASTM E1105 at a minimum **[uniform] [and] [cyclic]** static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than **6.24 lbf/sq. ft. (300 Pa)**, and shall not evidence water penetration.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Cleaning and Protection
 - 1. Protect installed product's finish surfaces from damage during construction.
Cleaning: Clean glass immediately after installation.
 - a. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
 - b. Remove non-permanent labels and clean surfaces.
 - 2. Clean aluminum surfaces.
 - a. Avoid damaging protective coatings and finishes.
 - b. Remove excess sealants, glazing materials, dirt, and other substances.
 - c. Repair or replace damaged installed products.
 - d. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
 - e. Remove construction debris from project site and legally dispose of debris

30 END OF SECTION 084113

1

SECTION 087100 – DOOR HARDWARE

2 PART 1 - GENERAL

3 **1.1 SUMMARY**

- 4 A. This Section includes commercial door hardware for the following:
- 5 1. Swinging doors.
- 6 2. Other doors to the extent indicated.
- 7 B. Door hardware includes, but is not necessarily limited to, the following:
- 8 1. Mechanical door hardware.
- 9 2. Electromechanical door hardware.
- 10 3. Cylinders specified for doors in other sections.
- 11 C. Related Sections:
- 12 1. Division 08 Section "Hollow Metal Doors and Frames".
- 13 2. Division 08 Section "Flush Wood Doors".
- 14 3. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- 15 D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
- 16 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- 17 2. ICC/IBC - International Building Code.
- 18 3. NFPA 70 - National Electrical Code.
- 19 4. NFPA 80 - Fire Doors and Windows.
- 20 5. NFPA 101 - Life Safety Code.
- 21 6. NFPA 105 - Installation of Smoke Door Assemblies.
- 22 7. State Building Codes, Local Amendments.
- 23 E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any
- 24 undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
- 25 1. ANSI/BHMA Certified Product Standards - A156 Series.
- 26 2. UL10C – Positive Pressure Fire Tests of Door Assemblies.
- 27 3. ANSI/UL 294 – Access Control System Units.
- 28 4. ULC-S319 - Electronic Access Control Systems.
- 29 5. ULC-60839-11-1, Alarm and Electronic Security Systems - Part 11-1: Electronic Access Control Systems -
- 30 System and Components Requirements.
- 31 6. UL 305 – Panic Hardware.
- 32 7. ULC-S132, Emergency Exit and Emergency Fire Exit Hardware.
- 33 8. ULC-S533 – Egress Door Securing and Releasing Devices.
- 34 9. ANSI/UL 437- Key Locks.
- 35 10. ULC-S328, - Burglary Resistant Key Locks.
- 36

37 **1.2 SUBMITTALS**

- 38 A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions
- 39 of individual components and profiles, operational descriptions and finishes.
- 40 B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of
- 41 door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors,
- 42 frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
- 43 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the
- 44 Hardware Schedule."
- 45 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete
- 46 designations of every item required for each door or opening. Organize door hardware sets in same order as
- 47 in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as
- 48 the Door Hardware Sets will be rejected and subject to resubmission.
- 49 3. Content: Include the following information:
- 50 a. Type, style, function, size, label, hand, and finish of each door hardware item.
- 51 b. Manufacturer of each item.
- 52 c. Fastenings and other pertinent information.
- 53 d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and
- 54 frame schedule.

- 1 e. Explanation of abbreviations, symbols, and codes contained in schedule.
- 2 f. Mounting locations for door hardware.
- 3 g. Door and frame sizes and materials.
- 4 h. Warranty information for each product.
- 5 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where
- 6 approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the
- 7 Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by
- 8 door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- 9
- 10 C. Shop Drawings: Details of electrified access control hardware indicating the following:
- 11 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power,
- 12 signaling, monitoring, communication, and control of the access control system electrified hardware.
- 13 Differentiate between manufacturer-installed and field-installed wiring. Include the following:
- 14 a. Elevation diagram of each unique access controlled opening showing location and interconnection
- 15 of major system components with respect to their placement in the respective door openings.
- 16 b. Complete (risers, point-to-point) access control system block wiring diagrams.
- 17 c. Wiring instructions for each electronic component scheduled herein.
- 18 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at
- 19 electrically controlled and operated hardware openings.
- 20
- 21 D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule
- 22 detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation,
- 23 door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted
- 24 keying schedule prior to the ordering of permanent cylinders/cores.
- 25 E. Informational Submittals:
- 26 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of
- 27 comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- 28 F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item
- 29 comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- 30

1.3 QUALITY ASSURANCE

- 32 A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience
- 33 in producing hardware and equipment similar to that indicated for this Project and that have a proven record of
- 34 successful in-service performance.
- 35 B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware
- 36 Manufacturers Association (BHMA) Certified Products Directory (CPD).
- 37 C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door
- 38 hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in
- 39 construction with a record of successful in-service performance.
- 40 D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5
- 41 years documented experience supplying both mechanical and electromechanical hardware installations comparable
- 42 in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor
- 43 by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on
- 44 staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with
- 45 Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- 46 E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source
- 47 unless otherwise indicated.
- 48 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or
- 49 third party source will not be accepted.
- 50 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware,
- 51 unless otherwise indicated.
- 52 F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- 53 G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings."
- 54 Keying conference to incorporate the following criteria into the final keying schedule document:
- 55 1. Function of building, purpose of each area and degree of security required.
- 56 2. Plans for existing and future key system expansion.
- 57 3. Requirements for key control storage and software.
- 58 4. Installation of permanent keys, cylinder cores and software.
- 59 5. Address and requirements for delivery of keys.

- 1 H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section
- 2 "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review
- 3 proper methods and the procedures for receiving, handling, and installing door hardware.
- 4 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing
- 5 contractors' personnel on the proper installation and adjustment of their respective products. Product
- 6 training to be attended by installers of door hardware (including electromechanical hardware) for
- 7 aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware
- 8 schedules, templates and physical product samples as required.
- 9 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work
- 10 performed by other trades.
- 11 3. Review sequence of operation narratives for each unique access controlled opening.
- 12 4. Review and finalize construction schedule and verify availability of materials.
- 13 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- 14 I. At completion of installation, provide written documentation that components were applied to manufacturer's
- 15 instructions and recommendations and according to approved schedule.
- 16

17 **1.4 DELIVERY, STORAGE, AND HANDLING**

- 18 A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project
- 19 site. Do not store electronic access control hardware, software or accessories at Project site without prior
- 20 authorization.
- 21 B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include
- 22 basic installation instructions with each item or package.
- 23 C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories
- 24 directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be
- 25 established at the "Keying Conference".
- 26

27 **1.5 COORDINATION**

- 28 A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to
- 29 be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm
- 30 that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- 31 B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if
- 32 applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system
- 33 hardware without additional in-field modifications.
- 34

35 **1.6 WARRANTY**

- 36 A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall
- 37 not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be
- 38 in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract
- 39 Documents.
- 40 B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of
- 41 standard and electrified door hardware that fails in materials or workmanship within specified warranty period
- 42 after final acceptance by the Owner. Failures include, but are not limited to, the following:
- 43 1. Structural failures including excessive deflection, cracking, or breakage.
- 44 2. Faulty operation of the hardware.
- 45 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- 46 4. Electrical component defects and failures within the systems operation.
- 47 C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- 48 D. Special Warranty Periods:
- 49 1. Five years for standard duty cylindrical (bored) locks and latches.
- 50 2. Five years for exit hardware.
- 51 3. Twenty five years for manual overhead door closer bodies.
- 52 4. Two years for electromechanical door hardware.
- 53

54 **1.7 MAINTENANCE SERVICE**

- 55 A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as
- 56 needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

2 **2.1 SCHEDULED DOOR HARDWARE**

- 3 A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each
4 referenced section that products are to be supplied under.
- 5 B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of
6 each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by
7 using door hardware designations, as follows:
- 8 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware
9 type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the
10 Door Hardware Schedule.
- 11 C. Manufactures are subject to compliance with requirements, manufacturers offering products that may be
12 incorporated into the Work include, but are not limited to, those listed.
- 13 D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door
14 hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures
15 and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the
16 architect, owner, and their designated consultants.

17
18 **2.2 HANGING DEVICES**

- 19 A. Ball Bearing Hinges: ANSI A8111, complies with NFPA80, Heavy Weigh ball bearing hinges
- 20 1. Quantity: Provide the following hinge quantity:
- 21 a. Two Hinges: For doors with heights up to 60 inches.
- 22 b. Three Hinges: For doors with heights 61 to 90 inches.
- 23 c. Four Hinges: For doors with heights 91 to 120 inches.
- 24 d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of
25 door height greater than 120 inches.
- 26 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and
27 clearances required:
- 28 a. Widths up to 3'0": 4-1/2" heavy weight as specified.
- 29 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
- 30 a. Exterior Doors: Heavy weight, ball bearing. Full stainless-steel hinge with non removable stainless
31 steel pins
- 32 b. Interior Doors: Heavy weight, ball bearing. Full stainless-steel hinge with non removable stainless
33 steel pins
- 34 4. Hinge Options: Comply with the following:
- 35 Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge
36 pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
- 37 5. Manufacturers:
- 38 Basis of Design: Hager Co. BB1168 Heavy Weight Ball Bearing Full Stainless steel
- 39 a. Hager Co.(HAG)
- 40 b. Bommer Industries (BO).
- 41 c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
- 42 d. Stanley Hardware (ST).
- 43 B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum
44 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are
45 non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and
46 prepare for electrical cut-outs.
- 47 1. Manufacturers:
- 48 a. Bommer Industries (BO).
- 49 b. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
- 50 c. Stanley Hardware (ST).

51
52 **2.3 DOOR OPERATING TRIM**

- 53 A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
- 54 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location
55 approximately six feet from the floor.
- 56 2. Furnish dust proof strikes for bottom bolts.
- 57 3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm
58 components where applicable.

- 1 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate
2 installation and operation.
- 3 5. Manufacturers:
 - 4 a. Door Controls International (DC).
 - 5 b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - 6 c. Trimco (TC).
- 7 B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the
8 Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - 9 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured
10 with exposed screws unless otherwise indicated.
 - 11 2. Size: 8x16 push plate, 4x16 with 8102 Pull 10" centers. Minimum clearance of 2 1/2-inches from face of
12 door and offset of 90 degrees unless otherwise indicated.
 - 13 3. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
 - 14 4. Finish: 630 Stainless Steel
 - 15 5. Manufacturers:
16 Basis of Design: Ives 8200 Push plate 8x16,
 - 17 a. Ives by Allegion (Ive)
 - 18 b. Hiawatha, Inc. (HI).
 - 19 c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - 20 d. Trimco (TC).
- 21 C. Door Protection: ANSI A16.06 Grade 1
 - 22 1. Kick Plate: minimum thickness: .125 (1/8") grade 430 stainless steel.
 - 23 2. Locate on push side of door
 - 24 3. Size: 10" x 2" less door width
25 Basis of Design: Ives 8400 Series
 - 26 a. Ives by Allegion (Ive)
 - 27 b. Hiawatha, Inc. (HI).
 - 28 c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - 29 d. Trimco (TC).

31 2.4 CYLINDERS AND KEYING

- 32 A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and
33 have on record a published security keying system policy.
- 34 B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and
35 exit devices, unless otherwise indicated.
- 36 C. Cylinders: Original manufacturer cylinders complying with the following:
 - 37 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 38 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 39 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 40 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free
41 spinning with matching finishes.
 - 42 5. **Pin: Six-pin tumblers**
 - 43 6. Keyway: Match City of Madison facility master keying system
- 44 D. Keying System: Each type of lock and cylinders to be factory keyed.
 - 45 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and
46 requirements.
 - 47 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as
48 directed by Owner.
 - 49 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- 50 E. Key Quantity: Provide the following minimum number of keys:
 - 51 1. Change Keys per Cylinder: Two (2)
 - 52 2. Master Keys (per Master Key Level/Group): Five (5).
- 53 F. Key Registration List (Bitting List):
 - 54 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control
55 software.
 - 56 2. Provide transcript list in writing or electronic file as directed by the Owner.

58 2.5 LOCK AND LATCH STRIKES

- 59 A. Mechanical locks and latches:
 - 60 1. Basis of Design: Schlage L Series Mortise

- 1 2. Lock grade 1
- 2 3. Lever Style Schlage 03 with Neuschteon
- 3 4. Finish: 630 Satin Stainless Steel
- 4 B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended
- 5 to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
- 6 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
- 7 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
- 8 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- 9 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware
- 10 applications.
- 11 C. Standards: Comply with the following:
- 12 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
- 13 2. Strikes for Bored Locks and Latches: BHMA A156.2.
- 14 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
- 15 4. Dustproof Strikes: BHMA A156.16.
- 16

17 2.6 ELECTRO-MECHANICAL AUTOMATIC OPERATORS

- 18 A. Requirements: Provide low energy automatic operator units that are electro-mechanical design complying with
- 19 ANSI/BHMA A156.19.
- 20 1. Opening: Powered by DC motor working through reduction gears.
- 21 2. Closing: Spring force.
- 22 Manual, hydraulic, or chain drive closers: Not permitted.
- 23 3. Operation: Motor is off when door is in closing mode. Door can be manually operated with power on or off
- 24 without damage to operator. Provide variable adjustments, including opening and closing speed
- 25 adjustment.
- 26 4. Cover: Aluminum.
- 27 B. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule
- 28 interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface
- 29 with accessories, mats, and sensors.
- 30
- 31 C. Provide drop plates, brackets, or adapters for arms as required to suit details.
- 32
- 33 D. Provide hard-wired motion sensors and/or actuator switches for operation as specified. Provide weather-resistant
- 34 actuators at exterior applications.
- 35
- 36 E. Provide key switches, with LED's, recommended and approved by manufacturer of automatic operator as required
- 37 for function as described in operation description of hardware sets. Cylinders: Refer to "KEYING" article, herein.
- 38
- 39 F. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and
- 40 approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors
- 41 simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow
- 42 ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other
- 43 controls as directed by Architect.
- 44

45 2.7 ELECTRIC STRIKES

- 46 A. Standard Electric Strikes: Electric strikes tested to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated
- 47 openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and
- 48 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with
- 49 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike
- 50 monitoring indicating both the position of the latchbolt and locked condition of the strike. Mortise.
- 51 1. Finish: 630 Stainless Steel
- 52 2. Manufacturers:
- 53 Basis of Design: Von Duprin 6211 heavy duty electric rim strike.
- 54 a. Von Duprin
- 55 B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike
- 56 with the combined products having a five year warranty.
- 57

58 2.8 MANUAL FLUSH BOLTS

- 59 A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

- 1 B. Manufacturers: Subject to compliance with requirements, provide products indicated on schedule or comparable
2 product by one of the following:
3 a. IVES Hardware; an Allegion PLC Company.
4 b. Hiawatha, Inc.
5 c. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.
6

7 2.9 CONVENTIONAL EXIT DEVICES

- 8 A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
9 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for
10 "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex
11 nuts and bolts at openings specified in the Hardware Sets.
12 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL
13 labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested
14 and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
15 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in
16 a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
17 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar.
18 The addition of filler strips is required in any case where the door light extends behind the device as in a full
19 glass configuration.
20 5. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can
21 operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
22 6. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which
23 have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
24 7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon
25 trim with threaded studs for thru-bolts.
26 a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the
27 specified locksets.
28 b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in
29 Hardware Sets.
30 8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings,
31 provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins
32 are required to project into the floor.
33 9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide
34 devices designed for maximum 2" wide stiles.
35 10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
36 11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
37 12. Finish: 630 Stainless
38 13. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
39 B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD)
40 listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device
41 latch to be stainless steel, pullman type, with deadlock feature.
42 1. Manufacturers:
43 Basis of Design: Von Duprin 98/99 series high-performance heavy-duty push pads
44 a. Von Duprin
45

46 2.10 DOOR CLOSERS

- 47 A. All door closers specified herein shall meet or exceed the following criteria:
48 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door
49 preparations and templates regardless of application or spring size. Closers to be non-handed with full sized
50 covers.
51 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire
52 rated doors.
53 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on
54 size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors
55 required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI
56 ICC/A117.1.
57 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
58 5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for
59 optimum aesthetics.

- 1 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets,
2 spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners
3 as specified in the hardware sets.
- 4 7. Adjustable delayed opening feature
- 5 8. Installation on interior side (room side) of door opening.
- 6 9. Cover: Metal cover (MC)
- 7 10. Finish: Power Coat 622 Matte Black (hollow metal)
- 8 11. Finish: 689 Aluminum (aluminum entrance)
- 9 B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed
10 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully
11 operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion
12 type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical
13 valves for closing sweep and latch speed control. Provide non-handed units standard.
- 14 1. Manufacturers:
15 Basis of Design LCN 4000 Series, Model 4040XP with Cush-n-stop
- 16 a. LCN by Allegion (LCN) – 4000 Series
- 17 b. Corbin Russwin Hardware (RU) – DC6000 Series.
- 18 c. Norton Door Controls (NO) – 7500 Series.
- 19 d. Sargent Manufacturing (SA) – 351 Series.

2.11 ARCHITECTURAL TRIM

- 22 A. Door Protective Trim
- 23 1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
- 24 2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop
25 side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on
26 pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates.
27 Height to be as specified in the Hardware Sets.
- 28 3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of
29 the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for
30 specific requirements for size and applications.
- 31 4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the
32 following:
33 a. Stainless Steel: 300 grade, 050-inch thick.
- 34 5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
35 Provide countersunk screw holes.
- 36 6. Manufacturers:
37 a. Hiawatha, Inc. (HI).
- 38 b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- 39 c. Trimco (TC).

2.12 DOOR STOPS AND HOLDERS

- 42 A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- 43 B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall
44 bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are
45 specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers
46 are not appropriate, provide overhead type stops and holders.
- 47 1. Manufacturers:
48 a. Hiawatha, Inc. (HI).
- 49 b. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
- 50 c. Trimco (TC).
- 51 C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead
52 stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb
53 bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-
54 handed design with mounting brackets as required for proper operation and function.
- 55 1. Manufacturers:
56 a. Rixson Door Controls (RF).
- 57 b. Sargent Manufacturing (SA).

58

1 **2.13 ARCHITECTURAL SEALS**

- 2 A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the
3 Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound
4 gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere
5 where indicated.
- 6 B. Weather Strip: Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame. Meeting Stile
7 Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
8 Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
9 Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for
10 smoke control, as tested according to ASTM E 283.
11 Basis of Design (hollow metal): Reese 775 C clear anodized aluminum with polyurethane insert.
12 Aluminum frame condition supplied by aluminum frame supplier.
- 13 C. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and
14 inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing
15 according to UL 1784.
16 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- 17 D. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting
18 agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
19 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door
20 Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- 21 E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and
22 readily available from stocks maintained by manufacturer.
- 23 F. Manufacturers:
24 1. Reese Enterprises, Inc. (RE).
25 2. National Guard Products (NG).
26 3. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
27

28 **2.14 THRESHOLDS**

- 29 A. Comply with BHMA A156.21; fabricated to full width of opening indicated.
30 B. Profile: ½" x 5
31 C. Finish: **Dark Bronze Anodized Aluminum (DB)**
32 D. Manufacturers:
33 Basis of Design: **Reese S471**
34 1. National Guard Products (NG).
35 2. Pemko **252 Thermal Barrier Threshold**; ASSA ABLOY Architectural Door Accessories (PE).
36 3. Reese Enterprises Thresholds (RE).
37

38 **2.15 FABRICATION**

- 39 A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for
40 machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation
41 standards for application intended.
42

43 **2.16 FINISHES**

- 44 A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with
45 ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for
46 their products.
47 B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities
48 complying with manufacturer's standards, but in no case less than specified by referenced standards for the
49 applicable units of hardware
50 C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective
51 covering before shipping.

52 **PART 3 - EXECUTION**

53 **3.1 EXAMINATION**

- 54 A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances,
55 labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

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- 1 B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled
2 hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.
3

4 3.2 PREPARATION

- 5 A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
6 B. Wood Doors: Comply with ANSI/DHI A115-W series.
7

8 3.3 INSTALLATION

- 9 A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with
10 manufacturer's written instructions and according to specifications.
11 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of
12 fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
13 B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless
14 specifically indicated or required to comply with governing regulations:
15 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard
16 Steel Doors and Frames."
17 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware, "for Wood Flush Doors."
18 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility
19 Guidelines for Buildings and Facilities."
20 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
21 C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions.
22 Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or
23 finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with
24 finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been
25 completed on substrates involved.
26 D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements
27 specified in Division 7 Section "Joint Sealants."
28 E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling
29 and installation of hardware items so that the completion of the work will not be delayed by hardware losses before
30 and after installation.
31

32 3.4 FIELD QUALITY CONTROL

- 33 A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures" and "Cash Allowances".
34 Produce project punch report for each installed door opening indicating compliance with approved submittals and
35 verification hardware is properly installed, operating and adjusted. Include list of items to be completed and
36 corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
37 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized
38 by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
39 2. Submit documentation of incomplete items in the following formats:
40 a. PDF electronic file.
41 b. Electronic formatted file integrated with the Openings Studio™ door opening management software
42 platform.
43

44 3.5 ADJUSTING

- 45 A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper
46 operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door
47 control devices to compensate for final operation of heating and ventilating equipment and to comply with
48 referenced accessibility requirements.
49

50 3.6 CLEANING AND PROTECTION

- 51 A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on
52 doors during the construction phase. Install any and all hardware at the latest possible time frame.
53 B. Clean adjacent surfaces soiled by door hardware installation.
54 C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that
55 ensure door hardware is without damage or deterioration at time of owner occupancy.
56

57 3.7 DEMONSTRATION

- 58 A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door
59 hardware.
60

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3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handing and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
- B. Manufacturer's Abbreviations:
1. MK - McKinney
 2. MR - Markar
 3. PE - Pemko
 4. RO - Rockwood
 5. SA – SARGENT
 6. SCH – SCHLAGE
 7. HS - HES
 8. RF - Rixson
 9. NO – Norton
 10. VD – Von Duprin

Hardware Sets

Hardware Set No. 01A

For use on mark/door #(s): 100A (aluminum entrance exterior)

Provide each SGL door(s) with the following:

Qty		Description	Catalog Number	Finish	Mfr
2	EA	CONTINUOUS HINGE	FM-HD	C	PE
2	EA	EGRESS DEVICE	98/99 series (Key dog down)	630	VD
2	EA	SINGLE CYLINDER DEADBOLT (THUMB TURN INTERIOR)		630	SCH
2	EA	PULL		630	SCH
1	EA	POWER TRANSFER			
1	EA	AUTO OPERATOR			
1	EA	ACTUATOR			
1	EA	CONSTRUCTION CORE			
2	EA	OH STOP AND SURFACE CLOSER	4040XP CUSH-N-STOP	689	LCN
2	EA	DOOR SWEEP	39D	D	ZER
2	EA	THRESHOLD	S471	DB	RE
1	EA	ELECTRIC STRIKE	6211 Heavy duty electric rim strike		VD
2	EA	DOOR CONTACT			
1	EA	KEYPAD			
1	EA	CENTER MULLION			

WEATHER SEAL BY ALUMINUM DOOR MFR.

KEYING: Master and EPCL

ELECTRIC STRIKE: Controlled by City's central system

Coordinate Keypad and Auto Operator

Hardware Set No. 01B

For use on mark/door #(s): 100B (aluminum entrance vestibule)

2	EA	CONTINUOUS HINGE	FM-HD	C	PE
2	EA	EGRESS DEVICE	98/99 series	630	VD
2	EA	PULL			
2	EA	OH STOP AND SURFACE CLOSER	4040XP CUSH-N-STOP ARM	689	LCN
1	EA	CENTER MULLION			

NO LOCKING. LATCHING

FREE EGRESS AT ALL TIMES.

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Hardware Set No. 01C

For use on mark/door #(s): 101 (aluminum entrance)
Provide each SGL door(s) with the following:

Qty	Description	Catalog Number	Finish	Mfr
2	EA CONTINOUS HINGE	FM-HD	613	IVE
2	EA EGRESS DEVICE	98/99 series (Key dog down)	62B	
2	EA PULL			
2	EA SINGLE CYLINDER DEADBOLT (THUMB TURN INTERIOR)		630	SCH
2	EA OH STOP AND SURFACE CLOSER	4040XP CUSH-N-STOP	689	LCN
2	EA DOOR SWEEP	701	6063-T5	RE
2	EA THRESHOLD	S471	DB	RE
1	EA CENTER MULLION			

WEATHER SEAL BY ALUMINUM DOOR MFR.
KEYING: Master and EPCL

Hardware Set No. 02A

For use on mark/door #(s): 105A AND 107A (RESTROOM INTERIOR)
Provide each SGL door(s) with the following:

Qty	Description	Catalog Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
1	EA PUSH PLATE WITH CYLINDER	8200 8X16	630 SS	IVE
1	EA PULL PLATE	8302 4X16 WITH 8102 PULL 10: CENTERS	630 SS	IVE
1	EA SINGLE CYLINDER DEADBOLT (THUMB TURN HALLWAY SIDE)		630	SCH
1	EA SURFACE CLOSER	4040XP SHCUSH	622	LCN
1	EA KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA WALL STOP	WS401/402CCV	626	IVE

KEYING: Master and, EPCL. Thumbturn from hall, Key open on restroom side
PREP PUSH AND PULL PLATE FOR CYLINDER LOCK HOUSING

Hardware Set No. 02B

For use on mark/door #(s): 105B AND 107B (RESTROOM EXTERIOR)
Provide each SGL door(s) with the following:

Qty	Description	Catalog Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
1	EA LEVER SET	ND50BDCD ATH	630	SCH
1	EA SURFACE CLOSER	4040XP CUSH-N-STOP	622	LCN
1	EA KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA WALL STOP	WS401/402CCV	626	IVE
2	EA DOOR SWEEP	701	6063-T5	RE
2	EA THRESHOLD	S471	DB	RE
1	EA GASKETING			
1	EA ELECTRIC STRIKE			

CONNECT TO AUTOLOCK SYSTEM

ELECTRIC STRIKE: Controlled by City's central system
KEYING: Master, EPCL. Key open on exterior side. No locking on inside of restroom
FREE EGRESS AT ALL TIMES

Hardware Set No. 03

For use on mark/door #(s): 102 (FAMILY RESTROOM)
Provide each SGL door(s) with the following:

Qty	Description	Catalog Number	Finish	Mfr
3	EA HINGE	5BB1 4.5 X 5 NRP	652	HAG
1	EA LEVER SET		630	SCH
1	EA PRIVACY THUMB TURN AS PART OF LEVER SET			
1	EA SURFACE CLOSER	4040XP CUSH-N-STOP	622	LCN

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1	1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	1	EA	DOOR SWEEP	701	6063-T5	RE
3	1	EA	THRESHOLD	S471		RE
4	1	EA	GASKETING			
5	1	EA	ELECTRIC STRIKE			

6 **CONNECT TO AUTOLOCK SYSTEM**

7 ELECTRIC STRIKE: Controlled by City's central system

8 KEYING: Master and EPCL. Key open on exterior side.

9 Lever released the lock to always exit

10

11

12 **Hardware Set No. 04A**

13 For use on mark/door #(s): 103A (KITCHEN INTERIOR)

14 Provide each SGL door(s) with the following:

15	Qty		Description	Catalog Number	Finish	Mfr
16	3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
17	1	EA	LEVER SET	ND50BDCD ATH	626	SCH
18	1	EA	OH STOP AND HOLD OPEN			
19	1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

20 KEYING: No lock

21

22

23 **Hardware Set No. 04B**

24 For use on mark/door #(s): 103B (KITCHEN EXTERIOR)

25 Provide each SGL door(s) with the following:

26	Qty		Description	Catalog Number	Finish	Mfr
27	3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
28	1	EA	LEVER SET	ND50BDCD ATH	626	SCH
29	1	EA	SINGLE CYLINDER DEADBOLT (THUMB TURN INTERIOR)		630	SCH
30	1	EA	OH STOP AND SURFACE CLOSER	4040XP CUSH-N-HOLD	622	LCN
31	1	EA	GASKETING	770		RE
32	1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
33	1	EA	DOOR SWEEP	701	6063-T5	RE
34	1	EA	THRESHOLD	S471	DB	RE

35 KEYING: Master and EPCL.

36

37

38 **Hardware Set No. 05**

39 For use on mark/door #(s): 108B (GARAGE EXTERIOR)

40 Provide each SGL door(s) with the following:

41	Qty		Description	Catalog Number	Finish	Mfr
42	3	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
43	1	EA	LEVER SET	STOREROOM FUNCTION	630	SCH
44	1	EA	SURFACE CLOSER	4040XP CUSH	622	LCN
45	1	EA	GASKETING	188S-BK	S-Bk	ZER
46	1	EA	WALL STOP	WS401/402CCV	626	IVE
47	1	EA	ARMOR PLATE	8400 10" X 2" LDW B-CS	630	IVE
48	1	EA	DOOR SWEEP	701	6063-T5	RE
49	1	EA	THRESHOLD	S471	DB	RE

50 KEYING: Master, EPCL, unique key with door 108A

51

52

53 **Hardware Set No. 06 (1 HOUR FIRE RATED)**

54 For use on mark/door #(s): 108A (GARAGE INTERIOR)

55 Provide each SGL door(s) with the following:

56	Qty		Description	Catalog Number	Finish	Mfr
57	6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
58	2	EA	LEVER SET	STOREROOM FUNCTION	630	SCH
59	2	EA	SURFACE CLOSER	4040XP SHCUSH	622	LCN
60	1	EA	ASTRAGAL	109NA		

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1	1	EA	SMOKE GASKETING	188S-BK	S-Bk	ZER
2	1	EA	FLUSH BOLT	FB45826D	626	IVE
3	2	EA	DOOR BOTTOM			

4 KEYING: Master, unique key with door 108B

5
6

7 **Hardware Set No. 07**

8 For use on mark/door #(s): 109 (FURNITURE STORAGE)

9 Provide each SGL door(s) with the following:

10	Qty		Description	Catalog Number	Finish	Mfr
11	6	EA	HINGE	5BB1 4.5 X 4.5 NRP	652	HAG
12	1	EA	LEVER SET	CLASSROOM FUNCTION	630	SCH
13	2	EA	OH STOP	100S	613	GLY
14	1	EA	FLUSH BOLT	FB45826D	626	IVE

15 KEYING: Master, EPCL, EPE

16
17

18 **Hardware Set No. 08**

19 For use on mark/door #(s): 104A (EQUIPMENT STORAGE)

20 Provide each SGL door(s) with the following:

21	Qty		Description	Catalog Number	Finish	Mfr
22	3	EA	HINGE	5BB1 4.5 X 4.5 NRP	613	HAG
23	1	EA	LEVER SET	CLASSROOM FUNCTION	630	SCH
24	1	EA	WALL STOP	WS401/402CCV	626	IVE
25	1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

26 KEYING: Master, EPCL, EPE

27
28

29 **Hardware Set No. 09**

30 For use on mark/door #(s): 106 (JANITOR/MECH)

31 Provide each SGL door(s) with the following:

32	Qty		Description	Catalog Number	Finish	Mfr
33	3	EA	HINGE	5BB1 4.5 X 4.5 NRP	613	HAG
34	1	EA	LEVER SET	CLASSROOM FUNCTION	630	SCH
35	1	EA	WALL STOP	WS401/402CCV	626	IVE
36	1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

37 KEYING: Master and unique key

38
39

40 **Hardware Set No. 10**

41 For use on mark/door #(s): (OVRHEAD COILING COUNTER)

42 Provide each SGL door(s) with the following:

43	1	EA	PADLOCK BY CITY			
----	---	----	-----------------	--	--	--

44
45

46 **Hardware Set No. 11**

47 For use on mark/door #(s): 108C (GARAGE COILING OVERHEAD DOOR)

48 Provide each SGL door(s) with the following:

49	1	EA	CORE			
----	---	----	------	--	--	--

50 MOTORIZED OPERATOR

51 KEYING: Master, unique key with door 108B

52
53

53 IN THE EVENT OF POWER OUTAGE, THE AUTOLOCK SYSTEM TO FAIL CLOSED BUT ALWAYS ALLOW EGRESS OUT OF BUIDLING

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55

55 END OF SECTION 087100

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SECTION 09 29 00 - GYPSUM BOARD

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PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Texture finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2. Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - 3. Product Data: For adhesives and sealants, indicating VOC content.
 - 4. Laboratory Test Reports: For adhesives and sealants, indicating compliance with requirements for low-emitting materials.
 - 5. Laboratory Test Reports: For ceiling and wall materials, indicating compliance with requirements for low-emitting materials.
- C. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

1.3 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

1.4 GYPSUM BOARD, GENERAL

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Regional Materials: Products shall be manufactured within **100 miles (160 km)** of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within **100 miles (160 km)** of Project site.
- C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

1.5 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 - f. PABCO Gypsum.
 - g. USG Corporation.
 - 2. Thickness: **5/8 inch (15.9 mm)**.
 - 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

1 **1.6 TRIM ACCESSORIES**

- 2 A. Interior Trim: ASTM C 1047.
- 3 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized-steel sheet.
- 4 2. Shapes:
- 5 a. Cornerbead.
- 6 b. Bullnose bead.
- 7 c. LC-Bead: J-shaped; exposed long flange receives joint compound.
- 8 d. L-Bead: L-shaped; exposed long flange receives joint compound.
- 9 e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
- 10 f. Expansion (control) joint.
- 11 g. Curved-Edge Cornerbead: With notched or flexible flanges.

12

13 **1.7 JOINT TREATMENT MATERIALS**

- 14 A. General: Comply with ASTM C 475/C 475M.
- 15 B. Joint Tape:
- 16 1. Interior Gypsum Board: Paper.
- 17 C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other
- 18 compounds applied on previous or for successive coats.
- 19 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type
- 20 taping compound.
- 21 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use
- 22 setting-type taping compound.
- 23 a. Use setting-type compound for installing paper-faced metal trim accessories.
- 24 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
- 25 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- 26 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound high-build interior coating
- 27 product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5
- 28 finish.

29

30 **1.8 AUXILIARY MATERIALS**

- 31 A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written
- 32 instructions.
- 33 B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to
- 34 continuous substrate.
- 35 1. [Adhesives shall have a VOC](#) content of 50 < g/L or less.
- 36 2. [Adhesive shall comply with the](#) testing and product requirements of the California Department of Public
- 37 Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from
- 38 Indoor Sources Using Environmental Chambers."
- 39 C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- 40 1. Use screws complying with ASTM C 954 for fastening panels to steel members from **0.033 to 0.112 inch**
- 41 **(0.84 to 2.84 mm)** thick.
- 42 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- 43 D. Sound-Attenuation Blankets: ASTM C 665, Type I blankets without membrane facing produced by combining
- 44 thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- 45 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- 46 2. [Recycled Content](#): Postconsumer recycled content plus one-half of preconsumer recycled content not less
- 47 than 25 percent.
- 48 E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with
- 49 ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in
- 50 building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- 51 1. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that
- 52 may be incorporated into the Work include, but are not limited to the following:
- 53 a. [Accumetric LLC](#).
- 54 b. [Everkem Diversified Products, Inc.](#)
- 55 c. [Franklin International](#).
- 56 d. [Grabber Construction Products](#).
- 57 e. [Hilti, Inc.](#)
- 58 f. [Pecora Corporation](#).

- 1 g. [Specified Technologies, Inc.](#)
- 2 h. [USG Corporation.](#)
- 3 2. [Sealant shall have a VOC](#) content of 250 g/L or less.
- 4 3. [Sealant shall comply with the](#) testing and product requirements of the California Department of Public
- 5 Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from
- 6 Indoor Sources Using Environmental Chambers."
- 7 F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."
- 8 G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."
- 9

10
11 PART 2 - EXECUTION

12 **2.1 APPLYING AND FINISHING PANELS**

- 13 A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- 14 B. Comply with ASTM C 840.
- 15 C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide **1/4- to**
- 16 **1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations and trim edges with edge trim where edges of panels
- 17 are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- 18 D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise,
- 19 attach trim according to manufacturer's written instructions.
- 20 E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- 21 F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive
- 22 tape.
- 23 G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 24 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 25 2. Level 2: Panels that are substrate for tile.
 - 26 3. Level 3: Where indicated on Drawings
 - 27 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - 28 a. Primer and its application to surfaces are specified in Section 099123 "Paint"
 - 29 5. Level 5: Where indicated on Drawings
 - 30 a. Primer and its application to surfaces are specified in Section 099123 "Paint"
- 31 H. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- 32

33 **2.2 PROTECTION**

- 34 A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other
- 35 causes during remainder of the construction period.
- 36 B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

37 END OF SECTION 092900

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1 **SECTION 09 65 16 – RUBBER FLOOR TILE**

2 PART 1 - GENERAL

3 **1.1 SUMMARY**

- 4 A. Section Includes:
5 1. Rubber floor tiles with backing.

6
7 **1.2 ACTION SUBMITTALS**

- 8 A. Product Data: For each type of product.
9 B. Sustainable Design Submittals:
10 1. [Laboratory Test Reports](#): For floor covering products, indicating compliance with requirements for low-
11 emitting materials.
12 2. [Product Data](#): For adhesives, indicating VOC content.
13 3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting
14 materials.
15 4. [Product Data](#): For chemical-bonding compounds, indicating VOC content.
16 5. Laboratory Test Reports: For chemical-bonding compounds, indicating compliance with requirements for
17 low-emitting materials.
18 6. [Product Data](#): For sealants, indicating VOC content.
19 7. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
20 8. [Environmental Product Declaration](#): For each product.
21 9. Health Product Declaration: For each product.
22 10. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
23 C. Samples: For each exposed product and for each color, texture, and pattern specified.

24
25 **1.3 CLOSEOUT SUBMITTALS**

- 26 A. Maintenance data
27 B. Extra Materials: not less than 10% material of total installation
28 C. Warranty
29 1. Warranty period: (15) Fifteen years

30
31 **1.4 QUALITY ASSURANCE**

- 32 A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required
33 by manufacturer for resilient sheet flooring installation and seaming method indicated.
34 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet
35 flooring manufacturer for installation techniques required.

36 **1.5 PERFORMANCE REQUIREMENTS**

- 37 A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products
38 according to ASTM E 648 or NFPA 253 by a qualified testing agency.
39 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
40 B. [Flooring products shall comply with](#) the requirements of the California Department of Public Health's "Standard
41 Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
42 Environmental Chambers."

43
44 **1.6 RUBBER FLOORING WITH BACKING**

- 45 A. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be
46 incorporated into the Work include, but are not limited to the following:
47 1. [Nora Systems, Inc.](#)
48 B. Product Standard: ASTM F 1860.
49 Basis of Design Norament 992 Grano
50 1. Type: Homogeneous rubber sheet floor covering with backing
51 2. Wear-Layer Thickness: 3.0 mm
52 3. Overall Thickness: 9.0 mm.
53 4. Backing: 6.0 mm Foam Rubber
54 5. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.
55 C. Wearing Surface: Hammered
56 D. Material Size: 39.45 inches by 39.45 inches (1002 mm by 1002mm)

- 1 E. Colors and Patterns: Refer to Finish schedule
- 2 F. Static Load Limit: ASTM F970, Residual compression of 0.005" with 800 lbs greater than 0.005 with 250 lbs
- 3 G. Bacteria Resistance: ASTM E2180 and ASTM G21, resistant to bacteria, fungi, and micro-organism activity
- 4 H. Sound Absorption: ASTM E2179; ISO 140
- 5 I. Hardness: ASTM D2240, Shore Type 'A', 77 achieved, (70 required)
- 6 J. CAN/ULC-S102.2: Surface Burning, FSC1 of 25 and SD of 332
- 7 K. VOC Emissions: GREENGUARD Gold Certified for Low VOC Emission CA 01350 Compliance
- 8 L. Recycled content: 37%

10 1.7 INSTALLATION MATERIALS

- 11 A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- 12 B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet
- 13 flooring and substrate conditions indicated.
- 14
- 15 1. Adhesives shall have a VOC content of 60 gms/gal
- 16 2. Adhesive shall comply with the testing and product requirements of the California Department of Public
- 17 Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from
- 18 Indoor Sources Using Environmental Chambers."
- 19

20 PART 2 - EXECUTION

21 2.1 PREPARATION

- 22 A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of
- 23 flooring.
- 24 B. Concrete Substrates: Prepare according to ASTM F 710.
- 25 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
- 26 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain
- 27 soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring
- 28 manufacturer. Do not use solvents.
- 29 3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer.
- 30 Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by
- 31 manufacturer in writing, but not less than 5 or more than 10 pH.
- 32 4. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft. (18.6 sq. m)** and perform
- 33 no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
- 34 a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have
- 35 maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)**
- 36 in 24 hours.
- 37 b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after
- 38 substrates have a maximum **75** percent relative humidity level measurement.
- 39 C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps
- 40 and ridges to produce a uniform and smooth substrate.
- 41 D. Do not install flooring until materials are the same temperature as space where they are to be installed.
- 42 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they
- 43 will be installed.
- 44 2. The installation area must be fully enclosed, weather tight, and climate controlled between 63°F and 75°F
- 45 and 40% to 60% ambient relative humidity (RH) for at least 48 hours prior, during and 72 hours after
- 46 installation.
- 47 E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.
- 48

49 2.2 FLOORING INSTALLATION

- 50 A. Comply with manufacturer's written instructions for installing resilient flooring.
- 51 B. Acclimate flooring and allow it to stabilize before cutting and fitting.
- 52 C. Lay out flooring as follows:
- 53 1. Maintain uniformity of flooring direction per pattern identified
- 54 2. Minimize number of small cut pieces of at least 6 inches. .
- 55 D. Scribe and cut flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in
- 56 furniture, cabinets, pipes, outlets, and door frames.
- 57 E. Extend flooring into toe spaces, door reveals, closets, and similar openings.

FOR CONSTRUCTION
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- 1 F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on
- 2 flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- 3 G. Install flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall
- 4 continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere
- 5 flooring edges to substrates that abut covers and to cover perimeters.
- 6 H. Adhere flooring to substrates using a full spread of adhesive applied to substrate to produce a completed
- 7 installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks,
- 8 and other surface imperfections.
- 9 I. Cleaning: Follow Manufacturer's recommendations.
- 10
- 11 END OF SECTION 096516

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SECTION 09 67 23 – RESINOUS FLOORING

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PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. High-performance resinous flooring systems

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. In compliance with LEED V4 Low Emitting materials requirements
- B. Sustainable Design Submittals:
 - 1. Laboratory Test Reports: For floor covering products, indicating compliance with requirements for low-emitting materials.
 - 2. Product Data: For adhesives, indicating VOC content.
 - 3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 4. Product Data: For chemical-bonding compounds, indicating VOC content.
 - 5. Laboratory Test Reports: For chemical-bonding compounds, indicating compliance with requirements for low-emitting materials.
 - 6. Product Data: For sealants, indicating VOC content.
 - 7. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - 8. Environmental Product Declaration: For each product.
 - 9. Health Product Declaration and Environmental Product Declaration in compliance with LEED V4: For each product.
 - 10. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
- C. Installer Certificates for Qualification: Signed by manufacturer stating that installers comply with specified requirements.
- D. Material Certificates: For each resinous flooring component, from manufacturer.
- E. Samples: Submit two 6" X 6" samples of each resinous flooring system applied to a rigid backing. Provide sample which is a true representation of proposed field applied finish. Provide sample color and texture for approval from Owner in writing or approved by General Contractor prior to installation.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data
- B. Warranty

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.
 - 1. Engage an installer who is approved in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
 - 2. Installer Letter of Qualification: Installer to provide letter stating that they have been in business for at least 5 years and listing 5 projects in the last 2 years of similar scope. For each project provide: project name, location, date of installation, contact information, size of project, and manufacturer of materials with system information.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.
- C. Pre-installation Conference: Conduct conference at Project site before work and mockups begin.
- D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Do not cover up mockup area.
 - 1. Apply full-thickness mockups on 4 square foot floor area selected by Architect.
 - 2. Finish surfaces for verification of products, color, texture, and sheen.
 - 3. Simulate finished lighting conditions for Architect's review of mockups.

- 1 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial
- 2 Completion.
- 3 5. Mockup shall demonstrate desired slip resistance for review and approval by Owner's representative in
- 4 writing.
- 5 E. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating
- 6 brand name and directions for storage and mixing with other components.
- 7 1. Maintain containers in clean condition, free of foreign materials and residue.
- 8 2. Remove rags and waste from storage areas daily.
- 9 F. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate
- 10 temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring
- 11 application.
- 12 G. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting
- 13 conditions during resinous flooring application.
- 14 H. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless
- 15 manufacturer recommends a longer period.

16 PART 2 - PRODUCTS

17
18 **2.1 RESINOUS QUARTZ FLOORING**

- 19 A. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be
- 20 incorporated into the Work include, but are not limited to the following:
- 21 1. **The Sherwin Williams Company**
- 22 Basis of Design: Resufloor Deco Quartz BC23, 1/8" nominal thickness
- 23 Primer: Resuprime 3579 at 250 sq. ft. per gallon.
- 24 1st Receiver Coat: Resufloor 3561 at 140-145 sq. ft. per gallon
- 25 1st Broadcast: GP5900F to excess at 0.4 lbs. per sq. ft.
- 26 2nd Receiver Coat: Resufloor 3561 at 65-70 sq. ft. per gallon
- 27 2nd Broadcast: GP5900F to excess at 0.4 lbs. per sq. ft.
- 28 Grout Coat: Resufloor 3746 at 100 sq. ft. per gallon.
- 29 Topcoat: Resufloor 3746 at 200 sq. ft. per gallonType:

30
31 **2.2 MATERIALS**

- 32 A. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system,
- 33 that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA
- 34 Method 24).
- 35 1. Resinous Flooring: 100 g/L.
- 36 B. HIGH-PERFORMANCE RESINOUS FLOORING
- 37 1. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance, resin-based, monolithic
- 38 floor surfacing designed to produce a seamless floor.
- 39 2. System Characteristics:
- 40 a. Color and Pattern: As indicated on Materials Finish Schedule
- 41 b. Slip Resistance: Provide slip resistant finish.

42 **2.3 PREPARATION**

- 43 A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of flooring.
- 44 B. Inspection: Prior to commencing Work, thoroughly examine all underlying and adjoining work, surfaces and
- 45 conditions upon which Work is in any way dependent for perfect results. Report all conditions which affect Work.
- 46 No "waiver of responsibility" for incomplete, inadequate or defective underlaying and adjoining work, surfaces and
- 47 conditions will be considered, unless notice of such unsatisfactory conditions has been filed and agreed to in writing
- 48 before Work begins. Commencement of Work constitutes acceptance of surfaces.
- 49 C. Surface Preparation: Remove all surface contamination, loose or weakly adherent particles, laitance, grease, oil,
- 50 curing compounds, paint, dust and debris by blast track method or approved mechanical means (acid etch not
- 51 allowed). If surface is questionable, try a test patch. Create a minimum surface profile for the system specified in
- 52 accordance with the methods described in ICRI No. 03732 to achieve profile numbers as follows:
- 53 1. Thin film, to 10 mils CSP-1 to CSP-3
- 54 2. Thin and medium films, 10 to 40 mils CSP-3 to CSP-5
- 55 3. Self-leveling mortars, to 3/16" CSP-4 to CSP-6

- 1 4. Mortars and laminates, to 1/4" or more CSP-5 to CSP-10
2 D. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to
3 manufacturer's written instructions.
4 1. Moisture Testing: Perform tests indicated below.
5 a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation
6 only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water/1000 sq. ft. in 24 hours.
7 Perform tests so that each test area does not exceed 1000 sq. ft. and perform 3 tests for the first 1000 sq. ft.
8 and one additional test for every additional 1000 sq ft.
9 b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with
10 installation only after substrates have a maximum 75 percent relative-humidity-level measurement.
11

12 2.4 ENVIRONMENTAL CONDITIONS

- 13 A. All applicators and all other personnel in the area of the RF installation shall take all required and necessary safety
14 precautions. All manufacturers' installation instructions shall be implicitly instructions shall be implicitly followed.
15 B. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
16 C. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests
17 recommended by manufacturer. Proceed with application only after substrates pass testing.
18 D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written
19 instructions.
20 E. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written
21 instructions.
22 F. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous
23 flooring according to manufacturer's written instructions.

24 2.5 APPLICATIONS

- 25 A. Install resinous floor over properly prepared concrete surface in strict accordance with the manufacturer's
26 directions.
27 1. Install the primer and/or base coats over thoroughly cleaned and prepared concrete.
28 2. Install topcoat over flooring after excess aggregate has been removed.
29 3. Maintain a slab temperature of 60°F to 80°F for 24 hours minimum before applying floor topping, or as
30 instructed by manufacturer.
31 B. Apply components of resinous flooring system according to manufacturer's written instructions to produce a
32 uniform, monolithic wearing surface of thickness indicated.
33 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to
34 substrate, and optimum intercoat adhesion.
35 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent
36 contamination during application and curing processes.
37 3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written
38 instructions.
39 C. Sealant: Saw cut resinous floor topping at expansion joints in concrete slab. Fill sawcuts with sealant prior to final
40 seal coat application. Follow manufacturer's written recommendations.
41 D. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
42 E. Slip Resistant Finish: Provide grit for slip resistance.
43 F. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by
44 manufacturer.
45

46 2.1 COMPLETED WORK

- 47 A. Cleaning: Upon completion of the Work, clean up and remove from the premises surplus materials, tools,
48 appliances, empty cans, cartons and rubbish resulting from the Work. Clean off all spattering and drippings, and all
49 resulting stains.
50 B. Protection: Protect Work in accordance with manufacturer's directions from damage and wear during the
51 remainder of the construction period. Use protective methods and materials, including temporary covering,
52 recommended in writing by resinous flooring manufacturer.
53 C. Contractor shall insure that coating is protected from any traffic until it is fully cured to the satisfaction of the
54 coating manufacturer.
55

56 END OF SECTION 096723

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SECTION 09 68 13 – CARPET TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes walk off carpet tile (Entry Mat-type 2)

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. [Product Data](#): For adhesives, indicating VOC content.
 - 2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 3. [Laboratory Test Reports](#): For flooring products, indicating compliance with requirements for low-emitting materials.
 - 4. [Environmental Product Declaration](#): For each product.
 - 5. Health Product Declaration and Environmental Product Declaration in compliance with LEED V4: For each product.
- C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
 - 2. Carpet tile type, color, and dye lot.
 - 3. Type of subfloor.
 - 4. Type of installation.
 - 5. Pattern of installation.
 - 6. Pattern type, location, and direction.
 - 7. Pile direction.
 - 8. Type, color, and location of insets and borders.
 - 9. Type, color, and location of edge, transition, and other accessory strips.
 - 10. Transition details to other flooring materials.
- D. Samples: For each exposed product and for each color and texture required.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Extra materials: not less than 10% of the installation area.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.7 WARRANTY

- A. Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: (15) fifteen years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- 1 A. Basis of Design: Interface SR899 Step Repeat Collection
- 2 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be
- 3 incorporated into the Work include, but are not limited to the following
- 4 1. [Atlas Carpet Mills, Inc.](#)
- 5 2. [Beaulieu Group LLC.](#)
- 6 3. [Bentley Prince Street, Inc.](#)
- 7 4. [Interface, LLC.](#)
- 8 5. [J&J Invision; J&J Industries, Inc.](#)
- 9 6. [Julie Industries.](#)
- 10 7. [Mannington Mills, Inc.](#)
- 11 8. [Milliken & Company.](#)
- 12 9. [Mohawk Group \(The\); Mohawk Carpet, LLC.](#)
- 13 10. [Patcraft; a division of Shaw Industries, Inc.](#)
- 14 11. [Philadelphia Commercial; a division of Shaw Industries, Inc.](#)
- 15 12. [Schönox, HPS North America, Inc.](#)
- 16 13. [Shaw Contract Group; a Berkshire Hathaway company.](#)
- 17 14. [Tandus; a Tarkett company.](#)
- 18 C. Color: Refer to Material Finish Schedule
- 19 D. Pattern: Refer to Material Finish Schedule
- 20 E. Fiber Content: 100 percent Recycle nylon
- 21 F. Fiber Type: nylon.
- 22 G. Dye Method: 100% Solution Dyed
- 23 H. Pile Characteristic: Tufted Textured Loop.
- 24 I. Pile Thickness: 0.143 in according to ASTM D 6859.
- 25 J. Primary Backing/Backcoating: Manufacturer's standard composite materials
- 26 K. Applied Treatments:
- 27 1. Soil-Resistance Treatment: Protek
- 28 L. Sustainable Design Requirements:
- 29 1. [In compliance with LEED V4 requirements for materials and resource credit and low emitting materials.](#)
- 30 2. Sustainable Product Certification: Platinum level certification according to ANSI/NSF 140.
- 31 3. [Flooring products shall comply with](#) the requirements of the California Department of Public Health's
- 32 "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor
- 33 Sources Using Environmental Chambers."
- 34 4. Health Product Declaration and Environmental Product Declaration in compliance with LEED V4
- 35 M. Performance Characteristics:
- 36 1. Tufted Yarn Weight 26.00 oz/yd² 881.55 g/m²
- 37 2. Machine Gauge 1/12 in 47.2 ends/10cm
- 38 3. Pile Height 0.20 in 5.10 mm Pile
- 39 4. Thickness 0.14 in 3.60 mm
- 40 5. Stitches 10.00 /in 39.40 ends/10cm
- 41 6. Pile Density 6,545.00 oz/yd³ 242,687.10 g/m³
- 42 7. Size 19.69 in x 19.69 in 50cm x 50cm
- 43 8. Flooring Radiant Panel (ASTM E-648) Passes
- 44 9. Smoke Density (ASTM E-662) ≤ 450
- 45 10. Flammability Passes Methenamine Pill Test (DOC-FF1-70)
- 46 11. Lightfastness (AATCC 16 - E) ≥ 4.0 @ 60 AFU's
- 47 12. Static (AATCC - 134) < 3.0 KV
- 48 13. Traffic Classification Severe
- 49 14. Fiber Modification Ratio 1.9 to 2.2
- 50 15. Preservative Efficacy (AATCC 174 Parts 2&3) 99% Reduction/No Mold 7 Days (ASTM E-2471) Complete
- 51 Inhibition
- 52 16. Embodied Carbon (Cradle to Gate) 2.2 Kg CO₂/M² (based upon 20 oz face weight)
- 53 17. Full Life Cycle Carbon Emissions Certified Carbon Neutral Floors™
- 54 18. Biobased Content Interface Modular Carpet on CQuestGB contains 42% USDA certified biobased content
- 55 Total Recycled Content 79.99 %
- 56 19. Recycled Content Pre Consumer) 59.91 %
- 57 20. Recycled Content Post Consumer) 20.08 %
- 58 21. Indoor Air Quality Green Label Plus #GLP0820 CDPH 01350

- 1 22. Material Compostion Free of Added Heavy Metals, Formaldehyde, Fluorinated Chemicals (PFAS), and
2 Halogenated Flame Retardants.
3

4 2.2 INSTALLATION ACCESSORIES

- 5 A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or
6 recommended by carpet tile manufacturer.
- 7 B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor
8 conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by
9 carpet tile manufacturer for releasable installation.
 - 10 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 11 2. Adhesive shall comply with the testing and product requirements of the California Department of Public
12 Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from
13 Indoor Sources Using Environmental Chambers."

14 PART 3 - EXECUTION

15 3.1 EXAMINATION

- 16 A. Concrete Slabs:
 - 17 1. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft. (18.6 sq. m)** and perform
18 no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - 19 a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have
20 maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)**
21 in 24 hours.
 - 22 b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after
23 substrates have a maximum **75** percent relative humidity level measurement.
 - 24 c. Perform additional moisture tests recommended in writing by adhesive and carpet tile
25 manufacturers. Proceed with installation only after substrates pass testing.
 - 26 B. Wood Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with
27 adhesive bond or show through surface.
 - 28 C. Metal Subfloors: Verify that underlayment surface is free of irregularities and substances that may interfere with
29 adhesive bond or show through surface.
 - 30 D. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.
 - 31 1. Access Flooring Systems: Verify access floor substrate is compatible with carpet tile and adhesive, if any,
32 and underlayment surface is gaps greater than **1/8 inch (3 mm)** and protrusions more than **1/32 inch (0.8**
33 **mm)**.

34 3.2 PREPARATION

- 35 A. General: Comply with CRI's "CRI Carpet Installation Standards" and with carpet tile manufacturer's written
36 installation instructions for preparing substrates indicated to receive carpet tile.
- 37 B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks,
38 holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch (3 mm)** wide or
39 wider, and protrusions more than **1/32 inch (0.8 mm)** unless more stringent requirements are required by
40 manufacturer's written instructions.
- 41 C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible
42 with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods
43 recommended in writing by adhesive and carpet tile manufacturers.
- 44 D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer.
45 Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides,
46 immediately before applying adhesive.
- 47 E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.
48

49 3.3 INSTALLATION

- 50 A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile
51 manufacturer's written installation instructions.
- 52 B. Installation Method: [**As recommended in writing by carpet tile manufacturer**] [**Glue down; install every tile with**
53 **full-spread, releasable, pressure-sensitive adhesive**] [**Partial glue down; install periodic tiles with releasable,**
54 **pressure-sensitive adhesive**] [**Free lay; install carpet tiles without adhesive**].
- 55 C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- 56 D. Maintain pile-direction patterns [**indicated on Drawings**] [**recommended in writing by carpet tile manufacturer**].

FOR CONSTRUCTION
5/10/2023

- 1 E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including
- 2 cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile
- 3 manufacturer.
- 4 F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves,
- 5 and similar openings.
- 6 G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on
- 7 carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- 8 H. Install pattern parallel to walls and borders.
- 9 I. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill
- 10 seams of access flooring panels with carpet adhesive; keep seams free of adhesive.
- 11 J. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during
- 12 the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile
- 13 manufacturer.

14 END OF SECTION 096813

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SECTION 09 91 10 – PAINT AND COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Paint
 - 2. High Performance Coating
 - 3. Concrete Hardner
 - 4. Epoxy Floor Coating

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. [Product Data](#): For adhesives, indicating VOC content.
 - 2. Laboratory Test Reports: Indicating compliance with requirements for low-emitting materials.
 - 3. [Laboratory Test Reports](#): For products indicating compliance with requirements for low-emitting materials.
 - 4. VOC data: Submit Green Seal Certification to GS-11 and description of the basis for certification.
- C. Shop Drawings:
 - 1. Type, color, and location
 - 2. Type, color, and location of edge, transition, and other accessory strips.
 - 3. Transition details to other flooring materials.
- D. Samples: For each product and for each color and texture required.
- E. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Extra materials: not less than 10% of the installation area. Minimum one gallon of unopened can of each product and color.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.7 WARRANTY

- A. Verify available warranties and warranty periods for carpet tiles.
 - 1. Warranty Period: **10** years from date of Substantial Completion.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in manufacturer’s original, unopened packages and containers bearing manufacturer’s name and label and the following information:
- B. Product name or title of material.
- C. Product description (generic classification or binder type).
- D. Manufacturer’s stock number and date of manufacture.
- E. Contents by volume, for pigment and vehicle constituents.
- F. Thinning instructions.
- G. Application instructions.

- 1 H. Color name and number.
- 2 I. VOC content.
- 3 J. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of
- 4 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
- 5 K. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.
- 6

7 **1.9 PROJECT CONDITIONS**

- 8 A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90
- 9 deg F.
- 10 B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding are between 45 and 95
- 11 deg F.
- 12 C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less
- 13 than 5 deg F above the dew point; or to damp or wet surfaces.
- 14 D. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within
- 15 temperature limits specified by manufacturer during application and drying periods.
- 16
- 17

18 **PART 2 - PRODUCTS**

19 **2.1 PAINT**

- 20
- 21 A. Basis of Design: Sherwin Williams ProMar 200 Zero VOC Interior Latex
- 22 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be
- 23 incorporated into the Work include, but are not limited to the following
- 24 1. Benjamin Moore
- 25 2. Coronado Paint Company
- 26 3. Diamond Vogel Paints
- 27 4. Hallman/Lindsay
- 28 5. ICI Dulux
- 29 6. Mautz Paint Company
- 30 7. Pratt & Lambert
- 31 8. Sherwin-Williams Co.
- 32 C. Color: As indicated in Material Finish Schedule
- 33 D. Sheen: As indicated in Material Finish Schedule
- 34 E. INTERIOR PRIMERS
- 35 1. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
- 36 Basis of Design Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film
- 37 thickness of not less than 1.6 mils.
- 38 Basis of Design Sherwin-Williams; LOXON Concrete and Masonry Primer/Sealer: Applied at a dry film thickness
- 39 of not less than 3.0 mils.
- 40 2. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
- 41 Basis of Design Sherwin-Williams; DTM Acrylic Primer/Finish: Applied at a dry film thickness of not less than 3.0
- 42 mils.
- 43 3. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
- 44 Basis of Design Sherwin-Williams; Zinc Clad III HS 100 (Part A, Part B, and Zinc Clad Zinc Dust Part F): Applied at a
- 45 dry film thickness of not less than 2.0 mils.
- 46
- 47 F. INTERIOR FINISH COATS
- 48 1. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
- 49 Sherwin-Williams; SuperPaint Interior Latex Flat Wall Paint, A86 Series: Applied at a dry film thickness of not less
- 50 than 1.5 mils.
- 51 2. Interior Flat Latex-Emulsion Size: Factory-formulated flat latex-based interior paint.
- 52 Sherwin-Williams; SuperPaint Interior Latex Flat Wall Paint, A86 Series: Applied at a dry film thickness of not less
- 53 than 1.5 mils.
- 54 3. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel.
- 55 Sherwin-Williams; SuperPaint Interior Latex Satin Wall Paint A87 Series: Applied at a dry film thickness of not
- 56 less than 1.6 mils.
- 57 4. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.

- 1 Sherwin-Williams; SuperPaint Interior Latex Semi-Gloss Enamel A88 Series: Applied at a dry film thickness of not
2 less than 1.6 mils.
- 3 5. Interior Full-Gloss Acrylic Enamel: Factory-formulated full-gloss acrylic-latex interior enamel.
4 Sherwin-Williams; ProMar200 Interior Latex Gloss Enamel B21W201: Applied at a dry film thickness of not less
5 than 1.5 mils. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
6
7
- 8 G. Sustainable Design Requirements:
9 1. Sustainable Product Certification: Platinum level certification according to ANSI/NSF 140.
10 2. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard
11 Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using
12 Environmental Chambers."
13
- 14 **2.2 HIGH PERFORMANCE PROTECTIVE COATING ON GALVANIZED STEEL**
- 15 A. Basis of Design: Sherwin Williams
16 B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be
17 incorporated into the Work include, but are not limited to the following
18 1. Benjamin Moore
19 2. Coronado Paint Company
20 3. Diamond Vogel Paints
21 4. Hallman/Lindsay
22 5. ICI Dulux
23 6. Mautz Paint Company
24 7. Pratt & Lambert
25 8. Sherwin-Williams Co.
26 C. Color: As indicated in Material Finish Schedule
27 D. Surface Preparation: SSPC SP16 Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and
28 Non-Ferrous Metals
29 E. Application: Temperature minimum 55 degrees F and maximum 120 degrees F. Relative Humidity maximum 85%.
30 F. INTERIOR PRIMERS
31 1. Protective Coating Primer: Factory-formulated primer for exterior application.
32 Basis of Design Sherwin-Williams; MACROPOXY® 646-100 FAST CURE EPOXY. Applied at a dry film thickness of not less
33 than 5 mils and 10 mils maximum
34 G. INTERMEDIATE COAT:
35 2. Protective Coating: Factory-formulated primer for exterior application.
36 Basis of Design Sherwin-Williams; MACROPOXY® 646-100 FAST CURE EPOXY. Applied at a dry film thickness of not less
37 than 5 mils and 10 mils maximum
38 H. FINISH COAT:
39 3. Protective Coating: Factory-formulated waterbased Urethane
40 Basis of Design Sherwin-Williams; Pro Industrial Acrolon 100 B65-700 Series.
41 Recommended Spreading Rate per coat: Wet mils:4.0-8.0 Dry mils:1.8-3.6
42

43 PART 3 - EXECUTION

44 **3.1 EXAMINATION**

- 45 A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint
46 application.
47 B. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are
48 thoroughly dry.
49 C. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
50 D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system
51 for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible
52 primers.
53 E. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.
54 F. SITE ENVIRONMENTAL PROCEDURES
55 Indoor Air Quality: Provide temporary ventilation.
56
57

- 1 G. Concrete Slabs:
- 2 1. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft.** and perform no fewer than
- 3 three tests in each installation area and with test areas evenly spaced in installation areas.
- 4 a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have
- 5 maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m)** in 24
- 6 hours.
- 7 b. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation only after substrates
- 8 have a maximum **75** percent relative humidity level measurement.
- 9 c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers.
- 10 Proceed with installation only after substrates pass testing.
- 11 H. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer.
- 12 1. Access Flooring Systems: Verify access floor substrate is compatible with carpet tile and adhesive, if any, and
- 13 underlayment surface is gaps greater than [**1/8 inch (3 mm)**] and protrusions more than **1/32 inch (0.8 mm)**.
- 14

15 3.2 PREPARATION

- 16 A. General: Comply with CRI General: Remove hardware and hardware accessories, plates, machined surfaces, lighting
- 17 fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of
- 18 size or weight of the item, provide surface-applied protection before surface preparation and painting.
- 19 After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades
- 20 involved.
- 21 B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of
- 22 the various coatings. Remove oil and grease before cleaning.
- 23 Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly
- 24 painted surfaces.
- 25 C. Surface Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer's instructions for
- 26 each particular substrate condition and as specified.
- 27 Provide barrier coats over incompatible primers or remove and reprime.
- 28 D. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement
- 29 panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as
- 30 required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface
- 31 preparation.
- 32 1. Use abrasive blast cleaning methods if recommended by the paint manufacturer.
- 33 2. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are
- 34 sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application. Do
- 35 not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
- 36 3. Clean concrete floors to be painted with 5 percent solution of muriatic acid or other etching cleaner. Flush the
- 37 floor with clean water acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
- 38 E. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as
- 39 required. Sand surfaces exposed to view smooth and dust off.
- 40 1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot
- 41 sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic
- 42 wood filler. Sand smooth when dried.
- 43 2. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back
- 44 sides of wood, including cabinets, counters, cases, and paneling.
- 45 3. If transparent finish is required, backprime with spar varnish.
- 46 4. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back
- 47 side.
- 48 5. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on
- 49 delivery.
- 50 F. Ferrous Metal Surfaces: Clean nongalvanized ferrous-metal surfaces that have not been shop coated; remove oil,
- 51 grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply
- 52 with recommendations of the Steel Structures Painting Council (SSPC) recommendations.
- 53 1. Blast steel surfaces clean as recommended by the paint system manufacturer and in accordance with
- 54 requirements of SSPC specification SSPC-SP 6/NACE No. 3.
- 55 2. Treat bare and sandblasted or pickled clean metal with a metal treatment was coat before priming.
- 56 3. Touch up all bare areas and shop-applied prime coats that have been damaged. Wire-brush clean with solvents
- 57 recommended by paint manufacturer, and touch up with same primer as the shop coat.
- 58 G. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain materials before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- H. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 INSTALLATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surface" includes areas visible when permanent or built-in fixtures, grilles convector covers, covers for finned-tube radiation, and similar components are in place. Extend coating in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Finish interior of walls and base cabinets and similar field-finished casework to match exterior.
 10. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practical after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of a uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommend spreading rate to achieve dry film thickness indicated. Provide a total dry film thickness of the entire system as recommended by the manufacturer
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in occupied spaces.
- F. Mechanical items to be painted include, but are not limited to, the following:
Uninsulated metal piping.

- 1 Uninsulated plastic piping.
2 Pipe hangers and supports.
3 Tanks that do not have factory-applied final finishes.
4 Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
5 Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
6 Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- 7 G. Electrical items to be painted include, but are not limited to, the following:
8 Panelboards.
9 Electrical equipment that is indicated to have a factory-primed finish for field painting.
- 10 H. CLEANING
11 Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from
12 Project site.
13 After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping
14 without scratching or damaging adjacent finished surfaces.
- 15 I. PROTECTION
16 Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning,
17 repairing, or replacing, as approved by Architect.
18 Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary
19 protective wrappings provided by others to protect work.
20 After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with
21 procedures specified in PDCA P1.
22
- 23 J. Gypsum Board and Plaster: Provide the following finish systems over interior gypsum board and plaster surfaces:
24 Flat Acrylic Finish: Two finish coats over a primer.
25 Primer: Interior gypsum board primer.
26 Finish Coats: Interior flat acrylic paint.
27 Location: Ceiling surfaces.
28
- 29 K. Ferrous Metals: Provide the following finish systems over ferrous metal:
30 Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
31 Primer: Interior ferrous-metal primer.
32 Finish Coats: Interior semigloss acrylic enamel.
33 Colors: As indicated on Drawings.
34
- 35 L. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:
36 Low-Luster or Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
37 Primer: Interior zinc-coated metal primer.
38 Finish Coats: Interior low-luster or semigloss acrylic enamel.
39 Colors: As indicated on Drawings
40
- 41 M. All-service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:
42 Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew proof.
43 Finish Coats: Interior flat latex-emulsion size.
44
- 45 END OF SECTION 096813

1 **SECTION 10 21 13.19 – PLASTIC TOILET COMPARTMENTS**

2 PART 1 - GENERAL

3 **1.1 SUMMARY**

- 4 A. Section includes solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

5
6 **1.2 ACTION SUBMITTALS**

- 7 A. Product Data: For each type of product.
8 B. Sustainable Design Submittals:
9 1. [Product Data](#): For recycled content, indicating postconsumer and preconsumer recycled content and cost.
10 C. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.
11 D. Samples for each type of toilet compartment material indicated.
12 E. Color Selections options
13 F. Health Product Declaration (HPD)

14
15 **1.3 INFORMATIONAL SUBMITTALS**

- 16 A. Product certificates.
17 B. Warranty

18
19 **1.4 CLOSEOUT SUBMITTALS**

- 20 A. Maintenance data.

21 PART 2 - PRODUCTS

22 **2.1 PERFORMANCE REQUIREMENTS**

- 23 A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products
24 with appropriate markings of applicable testing agency.
25 1. Flame-Spread Index: 26-75 (Class B) or less.
26 2. Smoke-Developed Index: 450 or less.
27 B. [Recycled Content](#): Postconsumer recycled content plus 100% of postconsumer content
28 C. Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as
29 accessible.

30
31 **2.2 SOLID-PLASTIC TOILET COMPARTMENTS (TPTN)**

- 32 A. Basis of Design: Bradley Bradmar Partitions, Ceiling hung- Series 600
33 B. [Manufacturers](#): Subject to compliance with requirements, available manufacturers offering products that may be
34 incorporated into the Work include, but are not limited to the following:
35 1. [Accurate Partitions Corp.; ASI Group](#).
36 2. [AJW Architectural Products](#).
37 3. [All American Metal Corp.](#)
38 4. [American Sanitary Partition Corporation](#).
39 5. [Ampco Products, LLC](#).
40 6. [Bradley Corporation](#).
41 7. [General Partitions Mfg. Corp.](#)
42 8. [Global Partitions; ASI Group](#).
43 9. [Hadrian Manufacturing Inc.](#)
44 10. [Knickerbocker Partition Corporation](#).
45 11. [Marlite](#).
46 12. [Metpar Corp.](#)
47 13. [Partition Systems International of South Carolina](#).
48 14. [Scranton Products](#).
49 15. [Weis-Robart Partitions, Inc.](#)
50 C. Toilet-Enclosure Style: Ceiling hung
51 D. Urinal-Screen Style: Wall hung
52

- 1 E. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than
2 **1 inch (25 mm)** thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of
3 material.
4 1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
5 2. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom
6 edges of solid-plastic components to hinder malicious combustion.
7 3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full
8 range.
9 F. Door Construction: **1 inch (25 mm)** thick.
10 G. Panel Construction: **1 inch (25 mm)** thick.
11 H. Pilaster Construction: **1 inch (25 mm)** thick.
12 I. Pilaster Sleeves Caps: Manufacturer's standard design; stainless steel.
13 1. Polymer Color and Pattern: Matching pilaster
14 J. Brackets (Fittings):
15 1. Stirrup Type: Ear or U-brackets, stainless steel.
16 2. Full-Height (Continuous) Type: Manufacturer's standard design stainless steel.
17 a. Polymer Color and Pattern: Matching panel.
18 K. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid
19 polymer.
20 L. Source Limitations: Obtain toilet compartment components and accessories from single manufacturer.
21 M. Color: Refer to Materials Finish Schedule.
22
23 2.3 HARDWARE AND ACCESSORIES
24 A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
25 1. Material: Stainless steel
26 2. Provide units that comply with regulatory requirements for accessibility at compartments designated as
27 accessible.
28 B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in
29 manufacturer's standard finish.
30 C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the
31 items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For
32 concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel
33 compatible with related materials.
34 D. Hardware, Heavy Duty: Manufacturer's heavy-duty stainless steel, including stainless steel tamper-resistant
35 fasteners:
36 1. Hinges: Self-closing continuous spring-loaded type adjustable to hold doors open at any angle up to 90
37 degrees, with emergency access by lifting door.
38 2. Latch and Keeper: Surface-mounted slide latch with flat rubber-faced combination door strike and keeper,
39 with provision for emergency access, meeting requirements for accessibility at accessible compartments.
40 3. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-
41 mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without
42 stop at outswing doors. Mount with stainless steel through-bolts.
43 4. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.
44
45 2.4 FABRICATION
46 A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and
47 provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
48 B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and
49 anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
50 C. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling
51 adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that
52 support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of
53 pilasters to conceal anchorage.
54 D. Door Size and Swings: Unless otherwise indicated, provide **24-inch- (610-mm-)** wide, in-swinging doors for standard
55 toilet compartments and **36-inch- (914-mm-)** wide, out-swinging doors with a minimum **32-inch- (813-mm-)** wide,
56 clear opening for compartments designated as accessible.
57 E. Door and Panel Height: 60-inch
58 F. Urinal Panel Height: 36-inch

1 PART 3 - EXECUTION

2 3.1 INSTALLATION

3 A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb.
4 Secure units in position with manufacturer's recommended anchoring devices.

5 1. Maximum Clearances:

6 a. Pilasters and Panels: **1/2 inch (13 mm)**.

7 b. Panels and Walls: **1 inch (25 mm)**.

8 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

9 a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.

10 b. Align brackets at pilasters with brackets at walls.

11 3.2 Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum 3
12 years.

13 3.3 FINAL CLEANING

14 A. Remove packaging and construction debris and legally dispose of off-site.

15 B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's
16 recommendations.

17 3.4 ADJUSTING

18 Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for
19 proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position
20 when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

21 END OF SECTION 102113.19

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1 **SECTION 10 28 00 -TOILET ACCESSORIES**

2 **PART 1 - GENERAL**

3 **1.1 SUMMARY**

- 4 A. Section Includes:
- 5 1. Public-use washroom accessories.
 - 6 2. Custodial Accessories
 - 7 3. Stainless-Steel Framed Mirror
- 8 B. Related Sections:
- 9 1. Division 01 Section "General Conditions".

10 **1.2 SUBMITTALS**

- 11 A. Product Data: For each type of product indicated. Include construction details, material descriptions, core
- 12 descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- 13 B. Product Schedule:
- 14 Identify locations using room designations indicated on Drawings.
- 15 Identify products using designations indicated on Drawings.
- 16 C. Samples for Verification:
- 17 1. Samples are only required by request of the architect

18 **1.3 PROJECT CONDITIONS**

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

20 **1.4 COORDINATION**

- 21 A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions
- 22 for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver
- 23 such items to Project site in time for installation.
- 24 B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to
- 25 successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data
- 26 integration and data reliability of their Work into the coordinated BIM applications.

27 **1.5 WARRANTY**

- 28 A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in
- 29 materials or workmanship within specified warranty period.
- 30 B. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that
- 31 develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
- 32 Warranty Period: 15 years from date of Substantial Completion.

33 **PART 2 - PRODUCTS**

34 **2.1 MATERIALS**

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

- 1 **2.2 TOILET AND BATH ACCESSORIES**
- 2 A. Toilet Tissue Dispenser: **TPH**
- 3 1. Basis-of-Design Product: Royce Rolls Ringer Co. Model # STP
- 4 2. Type: Double-roll dispenser with paddle lock feature.
- 5 3. Mounting: Surface mounted with concealed anchorage
- 6 4. Material: Stainless steel.
- 7 5. Operation: Controlled delivery
- 8 6. Capacity: Designed for 4-1/2- or 5-inch- diameter-core tissue rolls.
- 9
- 10 B. Liquid-Soap Dispenser: **SD**
- 11 1. (Supplied by Owner installed by Contractor.)
- 12
- 13 C. Grab Bar: **GB**
- 14 1. Material: Stainless steel, 0.050 inch (1.3 mm) thick.
- 15 2. Mounting: Concealed.
- 16 3. Gripping Surfaces: Smooth, satin finish.
- 17 4. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications.
- 18 5. Lengths: 42" (horizontal), 36" (horizontal), 18" (vertical)
- 19
- 20 D. Sanitary Napkin Disposal Unit: **SND**
- 21 1. Basis-of-Design Product: Royce Rolls Ringer Co. Model # SNR
- 22 2. Mounting: Surface.
- 23 3. Material: Stainless steel, No. 4 finish (satin).
- 24 4. Door or Cover: Self-closing.
- 25 5. Receptacle: Removable.
- 26
- 27 E. Mirror Unit: **MIR**
- 28 1. Basis-of-Design Product: Royce Rolls Ringer Co. Stainless-Steel Mirror set in tamper-proof stainless-steel
- 29 frame size as indicated on drawings.
- 30
- 31 F. Changing Station: **BCS**
- 32 1. Basis of Design: Model KB301-01, grey color, with external stainless steel bag hook, with external stainless
- 33 steel bag hook, as manufactured by Koala Kare Products, a Division of Bobrick.
- 34 2. Material: Stainless Steel, 16 gage, 304 brushed stainless steel
- 35 3. Mounting: surface mount with additional flange
- 36 4. Operation: fold down horizontal surface mount with pneumatic cylinders
- 37 5. Capacity: Unit will deflect less than 1 degree from 90 degrees with a 200 lb. static load placed in the center
- 38 of the changing surface, has been tested to 300 lbs. Units exceed static load requirements called out by ASTM
- 39 Standard F 2285, Standard Consumer Safety Performance Specification for Diaper Changing Stations for
- 40 Commercial Use.
- 41 6. Features: injected molded polypropylene with Microban antimicrobial additive and ISO 22196 tested for
- 42 efficacy. Surface is contoured, concave and smooth. Bed surface shall be minimum 535sq in
- 43 7. Dual Cavity Liner Dispenser: injection molded polypropylene with integral spring tab dispenses one liner at a
- 44 time. Total 50 liner capacity. Equipped with tumbler lock, keyed alike Bobrick restroom accessories.
- 45 8. External Bag Hook: 18-8, Type 304, 3/4 inch (19mm) diameter, solid stainless steel rod with satin-finish.
- 46 9. Operation: Concealed pneumatic cylinder providing controlled, slow opening and closing of the changing
- 47 station bed.
- 48 10. Safety Straps: Replaceable, restraining straps.
- 49 11. Frame and Hinge Mechanism: Concealed 11-gauge chassis, will comprise of 1" diameter integral steel-tubing
- 50 that supports the changing bed and interacts with 11-gauge steel wall mounting bracket to provide steel-on-
- 51 steel hinge stop. The wall frame shall serve as wall-mounting bracket
- 52 12. Mounting: Factory-drilled mounting holes (6). Mounting screws included.
- 53 13. Warranty: 5 years from manufacture defects
- 54 14. Compliance: ADA, ANSI, CPSIA
- 55
- 56 G. Changing Station: **CS**
- 57 1. Basis of Design: Foundations Model 100SSE-SM Special Needs Changing Station
- 58 2. Material: Stainless Steel, 16 gage, 304 brushed stainless steel

- 1 3. Mounting: surface mount with additional flange
- 2 4. Operation: fold down horizontal surface mount with pneumatic cylinders
- 3 5. Capacity: 400 lbs load rating, meets or exceeds ASTM F2285
- 4 6. Features: ABS replaceable tray liner, nylon belt with thermoplastic polyurethane coating
- 5 7. Size: 62 inch
- 6 8. Warranty: 5 years from manufacture defects
- 7 9. Compliance: ADA, ANSI, CPSIA

- 8
- 9 H. Mop and Broom Holder: **MBH**
- 10 1. Basis-of-Design Product: Bobrick B-223-24
 - 11 2. Mounting: Surface
 - 12 3. Tyle 304 stainless steel
 - 13 4. Spring-loaded rubber cam grips

- 14
- 15 I. Warm-Air Dryer: **EHD**
- 16 1. Basis-of-Design Product: Excel Model HO-1W
 - 17 2. Type: Electronic-sensor activated.
 - 18 3. Mounting: Surface.
 - 19 4. Material: Steel, with white epoxy finish

20 PART 3 - EXECUTION

21 **3.1 FABRICATION**

- 22 A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six
- 23 keys to Owner's representative

24 **3.2 EXAMINATION**

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

28 **3.3 INSTALLATION**

- 29 A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate
- 30 indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at
- 31 heights indicated.
- 32 B. Grab Bars: Install to withstand a downward load of at least 250 lbf , when tested according to ASTM F 446Hollow
- 33

34 **3.4 ADJUSTING AND CLEANING**

- 35 A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in
- 36 complete and proper operating condition. Remove and replace defective work, including metal work that is warped,
- 37 bowed, or otherwise unacceptable.

38 END OF SECTION 102800

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SECTION 10 31 00 - MANUFACTURED GAS FIREPLACE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Gas fireplaces and accessories including the following:
 - 1. Manufactured steel box gas fireplace.
 - 2. Chimney flue and associated roof flashings.
- B. Related Requirements:
 - 1. Division 22 – Gas piping to fire box.
 - 2. Division 23 – Required ductwork exhaust and ductwork / grille for intake.
 - 3. Division 26 – Electrical wiring for controls.

1.2 DEFINITIONS

- A. ANSI Z21.44 - Gas-Fired Gravity and Fan Type Direct Vent Wall Furnaces.
- B. Z21.50b - Vented Gas Fireplaces.
- C. ANSI Z223.1 - National Fuel Gas Code.
- D. CSA 2.22b - Vented Gas Fireplaces.
- E. CAN/ULC S610 - Factory-Built Fireplaces.
- F. UL 127 - Standard for Factory-Built Fireplaces.
UL 907 - Standard for Fireplace Accessories

1.3 ACTION SUBMITTALS

- A. Product Data: Provide fire box cabinet dimensions, clearances required from adjacent dissimilar construction, applicable regulatory agency approvals, electrical characteristics of fan and required gas input.
- B. Shop Drawings: Indicate fire box rough openings dimensions, rough opening sizes for chimney flue, fan size.
- C. Manufacturer’s Certificates: Certify that fireplaces components meet or exceed UL requirements for the purpose specified and indicated.
- D. Manufacturer’s Instructions: Indicate installation procedures and component installation sequence, clearances and tolerances from adjacent construction.
- E. Operations and maintenance data.
- F. Sustainable Design Submittals:
 - 1. **Product Certificates:** For materials manufactured within **100 miles (160 km)** of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
- B. Installer Qualifications: Minimum 2 year experience installing similar products.
- C. Convene minimum two weeks prior to starting work of this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS INDOOR GAS FIREPLACE

- A. Single Sided, Metal Box, gas fired unit with cool touch technology
- B. Basis of Design: Ortal, model 130 front screen
 - Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Ortal heat, ortalheat.com
 - b. Heat & Glo Fireplaces: www.heatnglo.com
 - c. Montigo The Art of Fireplaces: www.montigo.com
 - d. Regency: www.regency-fire.com

- 1 C. Single Sided Gas Fireplace:
- 2 1. Size: 58 5/8 inches x 18 inches
- 3 2. Weight: 247 lbs
- 4 3. Glass Size: 50 5/16 inches x 13 3/4 inches.
- 5 4. BTU/Hour Input: 31,167 (NG).
- 6 5. Heat Barrier: Double glass
- 7 6. Interiors: black reflective glass, standard matte.
- 8 7. Vent: 5x8 co-axial direct vent pipe

9

10 **2.2 ACCESSORIES**

- 11 A. Termination Caps: Vertical Venting Gas.
- 12 B. Controls:
 - 13 1. 3-Way Wall Switch with timer and auto shut off.
- 14
- 15 C. Media: Glass Media, Color: Ebony.
- 16 D. Log Set: Driftwood Logs.
- 17 Circulating Fans: Manufacturer's standard circulating fan compatible with specified fireplace

18 **PART 3 - EXECUTION**

19 **3.1 PROJECT CONDITIONS**

- 20 A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by
- 21 manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's
- 22 recommended limits.
- 23 B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction
- 24 progress

25

26 **3.2 EXAMINATION**

- 27 A. Do not begin installation until substrates have been properly prepared.
- 28 B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before
- 29 proceeding.

30

31 **3.3 PREPARATION**

- 32 A. Clean surfaces thoroughly prior to installation.
- 33 B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate
- 34 under the project conditions.

35

36 **3.4 INSTALLATION**

- 37 A. Install in accordance with manufacturer's instructions, ANSI Z21.44 and the requirements of authorities having
- 38 jurisdiction.
- 39 B. Use manufacturer's guidelines for minimum clearances to combustibles, walls, and finishes.
- 40 C. Anchor all components firmly in position for long life under hard use.

41

42 **3.5 FIELD QUALITY CONTROL**

- 43 A. Upon completion of installation, visually inspect all exposed surfaces. Touch up scratches and abrasions with touch-
- 44 up paint recommended by the manufacturer
- 45 B. Test for proper operation, control and safety devices.
- 46 C. Complete Installer's Warranty Validation Card.

47

48 **3.6 PROTECTION**

- 49 A. Protect installed products until completion of project.

50

END OF SECTION 103100

1 **SECTION 10 44 13 – FIRE PROTECTION CABINETS**

2 **PART 1 - GENERAL**

3 **1.1 SUMMARY**

- 4 A. Section Includes:
5 1. fire-protection cabinets for portable fire extinguishers.

6 **1.2 ACTION SUBMITTALS**

- 7 A. Product Data: For each type of product indicated. Include construction details, material descriptions, profiles,
8 anchors, fire-resistance rating, and finishes.
9 B. Samples for Verification:
10 1. Samples are only required by request of the architect

11 **1.3 PROJECT CONDITIONS**

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

13 **1.4 COORDINATION**

- 14 A. Coordinate installation and size of fire-protection cabinets to ensure that type and capacity of fire extinguishers
15 indicated are accommodated.

16 **1.5 CLOSEOUT SUBMITTALS**

- 17 A. Maintenance data
18 B. Warranty
19

20 **PART 2 - PRODUCTS**

21 **2.1 FIRE-PROTECTION CABINET (FEC)**

- 22 A. Cabinet Type: Suitable for fire extinguisher.

23 **2.2 Products**

- 24 A. Subject to compliance with requirements, available products that may be incorporated into the Work include, but
25 are not limited to, the following:
26 Guardian Fire Equipment, Inc.
27 JL Industries, Inc.; a division of the Activar Construction Products Group.
28 Larsen's Manufacturing Company.
29 Potter Roemer LLC.

30 **2.3 MATERIALS**

- 31 A. Cabinet Construction: Non-rated.
32
33 B. Cabinet Material: Cold-rolled steel sheet.
34
35 C. Semi recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface
36 with exposed trim face and wall return at outer edge (backbend).
37 Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
38
39 D. Cabinet Trim Material: Steel sheet.
40
41 E. Door Material: Steel sheet.
42
43 F. Door Style: Vertical duo panel with frame.
44

- 1 G. Door Glazing: Acrylic sheet.
2 Acrylic Sheet Color: Clear transparent acrylic sheet.
3
4 H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and
5 door material and style indicated.
6
7 I. Materials: Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
8 Finish: Baked enamel or powder coat.
9 Color: Red
10
11 J. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or pol-
12 ished). Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness unless
13 otherwise indicated.
14
15 K. Brass: ASTM B 19, ASTM B 16 (ASTM B 16M), or ASTM B 30.
16
17 L. Aluminium: ASTM B 221 (ASTM B 221M), Alloy 6063-T6 or 6463-T6.
18 Sheet Steel: ASTM A 1008/A 1008M, 0.0359-inch (0.9-mm) minimum nominal thickness.
19
20 M. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60 (Z180).
21
22 N. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
23
24 O. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when
25 exposed, and of galvanized steel when concealed. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel
26 (CS), Type B; suitable for exposed applications.
27

28 2.4 FABRICATION

- 29 A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit
30 cabinet type, trim style, and door style indicated.

31 PART 3 - EXECUTION

32 3.1 INSTALLATION

- 33 A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate
34 indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at
35 heights indicated.
36
37 B. Prepare recesses for semi recessed fire-protection cabinets as required by type and size of cabinet and trim style.
38
39 C. Install fire-protection cabinets in locations and at mounting heights indicated on drawings.
40
41 D. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
42
43 E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate
44 properly.

45 3.2 EXAMINATION

- 46 A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation
47 tolerances and other conditions affecting performance of the Work.
48
49 B. Proceed with installation only after unsatisfactory conditions have been corrected.

50 END OF SECTION 104413

