PENN PARK

SHELTER RENOVATION &

CONCESSION/RESTROOM BLDG

2101 FISHER STREET, MADISON, WI

CITY OF MADISON PARKS DIVISION

CITY OF MADISON CONTRACT # 7917/MUNIS # 17137

TECHINICAL SPECIFATIONS

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DOCUMENT 00 01 10

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PART 1 – GENERAL

1.1. SUMMARY

A. Each project has varying requirements for permits, inspections, and fees based on the scope, size, and location of the project.

B. The City of Madison (Owner) is subject to all permits, inspections and associated fees for construction, demolition, utility connection, storm water management, and other similar requirements that may be required to complete the scope of work associated with these contract documents.

C. The General Contractor (GC) shall be responsible for obtaining all permits, inspections and paying for all associated fees unless specifically identified within this specification.

1.2. REFERENCES

A. The following references are not intended to be all inclusive. It shall be the GC's responsibility to determine all requirements based on the scope of work in the contract documents.

B. City of Madison Ordinances: Review all ordinances that may require a permit or fee that may be connected with a required permit. Contact the following City Agencies to determine the exact requirements during bidding

1. Building Inspection
2. Zoning
3. Engineering
4. Water Utility
5. Traffic Engineering
6. Others as may be specified by the contract documents.

B. State Statutes

C. Other Regulatory Regulations

D. Other Agencies or companies that may have related requirements

1. Madison Metropolitan Sewerage District
2. Local gas and electric utility companies
3. Other utility companies

1.3. GENERAL CONTRACTORS REQUIREMENTS

A. The GC shall be responsible for all of the following:

1. Execute application for all required permits as may be required by the scope of work described within the contract documents.
2. Paying all fees associated with the application of any required permits.
3. Scheduling all required inspections that may be conditions of any required permits.

B. The GC shall provide high quality scanned images of all required permits and inspectionsand upload them to the Contract Documents-Regulatory Documents Library on the Project Management Web Site.

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END OF SECTION

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PART 1 – GENERAL

1.1. SUMMARY

A. The City of Madison uses a specific list of preferred products for various specification items to establish standards of quality, utility, and appearance required.

B. The City of Madison will not allow substitutions for specified Products except as follows:
   1. The Product is no longer produced or the product manufacturer is no longer in business.
   2. The manufacturer has significantly changed performance data, product dimensions, or other such design criteria for the specified Product(s).
   3. Products specified by naming one or more Products or manufacturer's and "or approved equal" or "approved equivalent."

C. The City of Madison will not allow substitutions for specified Products as follows:
   1. For Products specified by naming only one Product and manufacturer, no substitute product will be considered.
   2. For Products specified by naming several Products or manufacturers select any one of the products or manufacturers named, which complies with the specifications. No substitute product will be considered.

D. Request for substitutions from any party other than the General Contractor (GC) will not be accepted.

1.2. RELATED SPECIFICATIONS

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

PART 2 – PRODUCTS

2.1. SUBSTITUTION REQUEST FORM

A. During bidding all contractors (General and Sub-contractors) and suppliers of materials or products shall provide hard copy of the Substitution Request form and all required attachments directly to the Project Architect. Submission shall use the form located at the end of this specification.
   1. Contractors and suppliers shall use the screen shot of the form located at the end of this specification to print a hard copy for all pre-bid substitution requests.

B. After bidding only the GC shall submit a request and shall use the form located on the Project Management Web Site.

PART 3 - EXECUTION

3.1. REQUESTING A SUBSTITUTION DURING BIDDING

A. In the event that a substitution is requested during the bidding phase the Contractor or Supplier shall meet the substitution request deadline listed in the bidding documents. No substitution request will be considered during the bidding period after the stated substitution request deadline. In general this procedure shall be as follows:
   1. Submit the Substitution Request Form including all required supporting documentation to the City Project Manager and Project Architect by the substitution request deadline specified in Section A of the Contract Documents. Utilize the Substitution Request Form found at the end of this Section.
   2. Submit a Substitution Request Form for each product, supported with complete data, drawings and samples as appropriate, including:

i. Comparison of qualities of the proposed substitutions with that specified.
ii. Changes required in other elements of the Work because of the substitution.
iii. Effect on the construction schedule.
iv. Cost data comparing the proposed substitution with the Product specified.
v. Any required license fees or royalties.
vi. Availability of maintenance service and source of replacement materials.

3. The Owner and Architect will review the Substitution Request Form and if approved the City of Madison will publish a bidding addendum authorizing the replacement. The Owner and Architect may reject any substitution request without providing specific reasons.

B. Substitutions submitted and approved during the bidding phase shall be announced by the City of Madison by addenda prior to the bid due date.

3.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT

A. A substitution request will only be considered after award of contract if it meets the qualifying provisions as described in 1.1.B.1 and .2 above.

B. The GC shall submit a substitution request using the digital form on the Project Management Web Site located in the Construction Administration-Substitution Request library.

1. Click on *Add document* to open a new digital form, fill out form, provide required attachments, then click the Submit button.
2. Consulting Staff, Owner and Owners Representatives will review the request and provide the appropriate approvals and feed back to the GC.

3.3. UNAUTHORIZED SUBSTITUTIONS

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

END OF SECTION

Substitution Request

Today's Date: 1/27/2015

Project Title:

Project Number: Contract Number:

Description	Spec Section	Page	Paragraph

The undersigned requests consideration of the following:

Proposed Substitution:

Attachments

Click here to attach a file

Insert item

- Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
- Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The undersigned General Contractor representative certifies that the following paragraphs are correct.

1. ***The function, appearance, and quality of the proposed substitution are equal or superior to the specified item.***
2. ***The proposed substitution does not affect dimensions shown on drawings.***
3. ***The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the request.***
4. ***The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.***
5. ***Maintenance and service parts will be locally available for the proposed substitution. Provide supporting documentation.***

Submitted By:

****By typing my name and entering the date I hereby give my electronic signature****

Name: Title: Date:

Firm: Address:

Phone:

SECTION 01 26 13
REQUEST FOR INFORMATION (RFI)

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3.3. RFI RESPONSES 2
3.4. COMMENCEMENT OF WORK RELATED TO AN RFI 2

PART 1 – GENERAL

1.1. SUMMARY

A. Contractors shall use the RFI form/process to request additional information or clarification regarding the construction documents.

B. All RFI documentation will be processed through the through the Construction Administration-Request for Information Library on the Project Management Web Site (PMWS).

1.2. RELATED SPECIFICATIONS

A. Section 01 26 46 Construction Bulletin (CB)

B. Section 01 26 57 Change Order Request (COR)

C. Section 01 26 63 Change Order (CO)

D. Section 01 31 23 Project Management Web Site (PMWS)

1.3. PERFORMANCE REQUIREMENTS

A. RFI issues initiated by any contractor shall be done through the General Contractor (GC).

1. RFIs submitted by any Sub-contractor under the GCs control shall be returned with no response.

B. Submit a new RFI for each issue. Only multiple questions that are of a similar nature may be combined into one RFI shall be allowed and responded to.

1.4. QUALITY ASSURANCE

A. The GC shall be responsible for all of the following:

1. Ensure that any request for additional information is valid and the information being requested is not addressed in the construction documents.
2. Ensure that all requests are clearly stated and the RFI form is completely filled out.
3. Ensure that all Work associated an RFI response is carried out as intended.

B. The PA shall be responsible for the following:

1. Ensure that all responses to contractor initiated RFIs are properly responded to in a timely fashion.
   a. The CPM, Owner, consulting staff, and other City staff shall be responsible for the initial review of the RFI. The PA shall be responsible for codifying all consultant and Owner/City staff comments into a unified RFI response.

PART 2 – PRODUCTS

2.1. REQUEST FOR INFORMATION FORM

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

PART 3 - EXECUTION

3.1. CONTRACTOR INITIATED RFI

A. Immediately on discovery of the need for additional information or interpretation of the Contract Documents any contractor may initiate an RFI for additional information or clarification through the GC.

B. The GC shall select the "Submit an RFI" link on the Project Management Web Site and completely fill out the form as follows:

1. Contract related information will be automatically populated on the form.
2. Thoroughly explain the issue at hand, provide backup information (photographs, sketches, drawings, data, etc) as necessary, and clearly state the question or problem that requires a resolution. Combine like or related issues but do not include multiple issues on one form.
    a. Example. If a duct interferes with other critical piping and electrical work include all issues into one RFI.
    b. Example. If you have a question regarding the chiller and another regarding toilet partitions create separate RFIs.
3. Check all relevant boxes for trades affected. This will assist the design team in determining who should be reviewing the RFI.

C. Upon completing the RFI click the "Submit" button. The PMWS software will automatically route the RFI to the appropriate reviewers.

3.3. RFI RESPONSES

A. Responses to simple RFI issues shall use the response section of the RFI form and shall be completed within five (5) working days of the RFI form being submitted.

B. Responses to more complex issues may require additional time or may require a Construction Bulletin to be published. The initial RFI shall be responded to within five (5) working days stating that the RFI is being reviewed and provide an estimated date for the response.

C. The following GC generated RFIs will be returned without action:

1. Requests for approval of submittals
2. Requests for approval of substitutions
3. Requests for approval of Contractor's means and methods.
4. Requests for coordination information already indicated in the Contract Documents.
5. Requests for adjustments in the Contract Time or the Contract Sum.
6. Requests for interpretation of A/E's actions on submittals.
7. Incomplete RFI or inaccurately prepared RFI.

3.4. COMMENCEMENT OF WORK RELATED TO AN RFI

A. The GC shall only proceed with the Work of an RFI where, additional information is notbe required..

B. The GC shall not proceed with any Work associated with an RFI while it is under review.

C. The GC shall not proceed with any Work associated with an RFI that clearly states a CB will be issued in response to the RFI.

D. The GC will be required to immediately remove and replace unauthorized Work and all costs required to conform to the Contract Documents shall be borne by the GC.

END OF SECTION

1

SECTION 01 26 46
CONSTRUCTION BULLETIN (CB)

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PART 1 – GENERAL

1.1. SUMMARY

A. Construction Bulletins (CB) are formal published construction documents that modify the original contract bid documents after construction has commenced. CBs may be published for many reasons, including but not limited to the following:
   1. Clarification of existing construction documents including specifications, plans, and details
   2. Change in product or equipment
   3. A response to a Request for Information
   4. Change in scope of the contract as either an add or a deduct of work

B. CBs provide a higher degree of detail in response to a Request for Information (RFI) through directives, revised plans/details, and specifications as necessary.

C. The CB may change the original contract documents through additions or deletions to the Work.

D. Where the directives of a CB are significant enough to warrant a Change Order Request (COR) the GC shall use all information provided in the CB to assemble all required back-up documentation for additions and deletions of materials, labor and other related contract costs for the COR.

E. All CB documentation will be processed through the through the Construction Administration-Construction Bulletin Library on the Project Management Web Site (PMWS).

1.2. RELATED SPECIFICATIONS

A. Section 01 26 13 Request for Information (RFI)
B. Section 01 26 57 Change Order Request (COR)
C. Section 01 26 63 Change Order (CO)
D. Section 01 31 23 Project Management Web Site

1.3. PERFORMANCE REQUIREMENTS

A. Project Architect (PA): The PA shall be the only person authorized to publish a CB as needed for any reason indicated in section 1.1.A above. The PA shall consult as necessary with any of the following while drafting the CB and shall confirm final direction with the CPM prior to issuing a CB:
   1. City Project manager (CPM)
   2. Owner
   3. Members of the consulting staff
   4. Members of city staff
   5. The General Contractor
   6. Sub-contractors

B. General Contractor: The GC shall be responsible for the following as needed:
   1. Executing the directives of the CB when he/she believes that no changes in labor, materials, equipment, or contract duration will be required for additions or deletions.
   2. Submit a COR when he/she believes that a change in labor, materials, equipment or contract duration will be required for additions or deletions.

1.4. QUALITY ASSURANCE

A. The PA shall be responsible for ensuring the final CB sufficiently provides direction, details, specifications and other information as necessary for the GC to perform the intended Work.

B. The PA shall be responsible for ensuring the final CB is published as expeditiously as practical based on the complexity of the CB being written. CBs that may affect the GC critical path shall be given priority.

PART 2 – PRODUCTS

2.1. CONSTRUCTION BULLETIN FORM

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

PART 3 - EXECUTION

3.1. WRITING THE CONSTRUCTION BULLETIN

A. The PA shall draft a CB as needed using the Construction Bulletin form on the Project Management Web Site.
   1. The PA and/or consulting staff as necessary shall provide specifications, model numbers and performance data, details and other such information necessary to clearly state the intentions of the CB.
   2. The consulting staff, CPM, Owner, and other City Staff shall review the draft and recommend changes as needed.
   3. The PA shall amend the draft as necessary into a final CB for review

B. Once the final CB has been approved the PA shall "Submit" the CB through the Project Management Web Site to the GC.

3.2. EXECUTING THE CONSTRUCTION BULLETIN

A. The GC shall acknowledge receipt of the CB on the Project Management Web Site as instructed in the Tutorial Manual provided to the awarded contractor.

B. The GC shall notify all Sub-contractors of the CB and publish the CB to all field sets of drawings and specifications as appropriate.

C. The GC shall execute the directives of the CB or submit COR documentation as necessary during the execution and implementation of the CB.
   1. See Specification 01 26 57 Change Order Request (COR)

END OF SECTION

SECTION 01 26 57
CHANGE ORDER REQUESTS (COR)

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PART 1 – GENERAL

1.1. SUMMARY

A. Except in cases of emergency no changes in the Work required by the Contract Documents may be made by the General Contractor (GC) without having prior approval of the City Engineer or his representative.

B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in the Work by written Change Order (CO). Such changes may include additions and/or deletions.

C. Where the City desires to make changes in the Work through use of written Change Order Request (COR), the following procedures apply:

1. If requested by the City, the GC shall prepare and submit a detailed proposal, including all cost and time adjustments to which the GC believes it will be entitled if the change proposed is incorporated into the Contract. The City shall be under no legal obligation to issue a Change Order for such proposal.
2. The parties shall attempt in good faith to reach agreement on the adjustments needed to the Contract to properly incorporate the proposed change(s) into the Work. In the event that the parties agree on such adjustments, the City may issue a Change Order and incorporate such changes and agreed to adjustments, if any.
3. In some instances, it may be necessary for the City to authorize Work or direct changes in Work for which no final and binding agreement has been reached and for which unit prices are not applicable. In such cases the following shall apply.
    a. Upon written request by the City, the GC shall perform proposed Work
    b. The cost of such change may be determined in accordance with this specification.
    c. In the event agreement cannot be accomplished as contemplated herein, the City may authorize the Work to be performed by City forces or to hire others to complete the Work. Such action on the part of the City shall not be the basis of a claim by the GC for failure to allow it to perform the changed Work.

D. Where changes in the Work are made by the City through use of a force account basis, the GC shall as soon as practicable, and in no case later than ten (10) working days from the receipt of such order, unless another time period has been agreed to by both parties, give the City written Notice, stating:

1. The date, circumstances and source of the extra work; and,
2. The cost of performing extra work described by such Order, if any; and,
3. Effect of the order on the required completion date of the Project, if any.

E. The giving of each Notice by the GC as prescribed by this specification, shall be a requirement to liability of the City for payment of any additional costs incurred by the GC in implementing changes in the Work. Under this specification, no order or statement of the City shall be treated as a Change Order, or shall entitle the GC to an equitable adjustment of the terms of this Contract or damages for costs incurred by the GC on any activity for which the Notice was not given.

F. In the event Work is required due to an emergency as described in this specification the GC must request an equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the commencement of such emergency.

G. All GC requests for equitable adjustment shall be submitted to the CPM per the specifications below. Such requests shall set forth with specificity the amount of and reason(s) for the proposed adjustment and shall be accompanied by supporting information and documents.

H. No adjustment of any kind shall be made to this Contract, if asserted by the GC for the first time, after the date of final payment.

I. This specification shall be used by the GC when preparing documentation for any COR to ensure each has been properly and completely filled out as required by the City of Madison.

J. All COR documentation will be processed through the through the Construction Administration-Change Order Request Library on the Project Management Web Site (PMWS).

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 26 13 Request for Information (RFI)

B. Section 01 26 46 Construction Bulletins (CB)

C. Section 01 26 63 Change Order (CO)

D. Section 01 31 23 Project Management Web Site

E. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public Works Construction".

1. Use the following link to access the Standard Specifications web page:
   http://www.cityofmadison.com/business/pw/specs.cfm
   a. Click on the "Part" chapter identified in the specification text. For example if the specification says "Refer to City of Madison Standard Specification **2**10.2" click the link for Part II, the Part II PDF will open.
   b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you to the referenced text.

1.3. DEFINITIONS AND STANDARDS

A. LABOR: The amount of time and cost associated with the performance of human effort for a defined scope of Work. Labor is further defined as follows:

1. Labor rate is the total rate which includes the base rate, taxes, insurance and fringe benefits required by agreement or custom.
2. Unit labor is the labor hours anticipated to install the corresponding unit of material.
3. Labor cost is the labor hours multiplied by the hourly labor rates.

B. MATERIAL: Actual material cost is the amount paid, or to be paid, by the GC for materials, supplies and equipment entering permanently into the Work, including cost of transportation and applicable taxes. The cost shall not exceed the usual and customary cost for such items available in the geographical area of the project

C. LARGE TOOLS AND MAJOR EQUIPMENT: Large tools and major equipment are those with an initial cost greater than $1,000, whether from the GC or other sources.

1. Tool and equipment use and time allowed is only for extra work associated with change orders.
   a. Rental Rate is the machine cost associated with operating a piece of equipment for a defined length of time (hour, day, week, or month) and shall not exceed the usual and customary amount for such items available in the geographical area of the project.
   b. Rental cost is the rental rate multiplied by the anticipated duration the equipment shall be required.
2. The GC shall provide a breakdown of all rental rates to indicate what items and costs are associated with the rate. Examples of items to include in the breakdown would be fuel consumption, lubrication, maintenance and other similar expenses but not including profit and overhead.
3. When large tools and equipment needed for Change Order work are not already at the job site, the actual cost to get the item there is also reimbursable.

D. BOND COST: The cost shall be calculated at 1% of the total proposed change order.

E. SUB-CONTRACTOR COSTS: Sub-contractor costs are for those labor, material, and equipment costs required by subcontracted specialties to complete the Change Order work including allowable markups as outlined within this specification.

F. OVERHEAD AND PROFIT Markup: The allowable markup percentage to a COR by the GC and Sub-contractors for overhead and profit. All of the following are expenses associated with overhead and profit and shall not be reimbursable as individual items on any COR:

1. CHANGE ORDER PREPARATION: All costs associated with the preparing and processing of the change order.

2. DESIGN, ESTIMATING, AND SUPERVISION: All such efforts, unless specifically requested by Owner as additional Work to be documented as a COR or portion thereof.
3. INSTALLATION LAYOUT: The layout required for the installation of material and equipment, and the installation design, is the responsibility of the GC.
4. SMALL TOOLS AND SUPPLIES: The cost of small hand tools with an initial cost of $1,000 or less, along with consumable supplies and expendable items such as drill bits, saw blades, gasoline, lubricating or cutting oil, and similar items.
5. GENERAL EXPENSE: The general expense, which is those items that are a specific job cost not associated with direct labor and material such as job trailers, foreman truck, and similar items.
6. RECORD DRAWINGS: The preparation of record or as-built drawings.
7. OTHER COSTS: Any miscellaneous cost not directly assessable to the execution of the Change Order including but not limited to the following:
   a. All association dues, assessments, and similar items.
   b. All education, training, and similar items.
   c. All drafting and/or engineering, unless specifically requested by Owner as additional Work to be documented as a Change Order proposal or portion thereof.
   d. All other items including but not limited to review, coordination, estimating and expediting, field and office supervision, administrative work, etc.

G. Contract Extension: The necessary amount of time to be added to the contract deadlines for the completion of a change order.

1.4. CONTRACT EXTENSION

A. The GC shall not assume that every COR will require a Contract Extension. If the GC feels a contract extension is warranted he/she shall provide sufficient scheduling information that shows how the COR being requested impacts the critical path of the project.

B. The City of Madison strongly encourages the GC to explore alternative methods and practices prior to submitting a COR with a request for contract extension.

1.5. OVERHEAD AND PROFIT MARKUP

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

1.6. PERFORMANCE REQUIREMENTS

A. The GC shall become thoroughly familiar with this specification as it will identify procedures and expenses that are or are not allowed under the Change Order and Change Order Request process.

B. The GC shall be responsible for all of the following:
   1. Carefully reviewing the CB that is associated with the COR.
   2. Collecting required supporting documentation from all contractors that quantify the need for a COR.
      a. Labor hours and wage rates
      b. Material costs
      c. Equipment costs

C. The following shall apply to establishing prices for labor, materials, and equipment costs:
   1. Where Work to be completed has previously been established by individual bid items in the contract bid proposal the GC shall use the unit bid prices previously established.
   2. Where Work to be completed was bid as a Lump Sum without individual bid items the GC shall provide a breakdown of all labor, materials, equipment including unit rates and quantities required.

D. The completion date is determined by Owner. The schedule, however, is the responsibility of the GC. Time extensions for extra Work will be considered when a schedule analysis of the critical path shows that the Change Order Request places the Work beyond the completion date stated in the Contract.

1.7. QUALITY ASSURANCE

A. The GC shall be responsible for ensuring that all COR supporting documentation meets the following requirements prior to completing the COR form on the Project Management Web Site:
   1. Sufficiently indicates labor, material, and other expenses related to completing the intent of the CB.
   2. No costs exceed the usual and customary amount for such items available in the geographical area of the project, and no costs exceed those established under the contract.

B. The Project Architect (PA), City Project Manager (CPM), other members of the consulting staff, and city staff shall review all COR requests to ensure that the intent of the CB will be met under the proposal of the COR or request additional information as necessary.

PART 2 – PRODUCTS

2.1. CHANGE ORDER REQUEST FORM

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

PART 3 - EXECUTION

3.1. ESTABLISHING A CHANGE ORDER REQUEST

A. Upon receipt of a Construction Bulletin (CB) where the GC believes a significant change in contract scope warrants the submittal of a COR the GC shall do all of the following within ten (10) working days after receipt of the CB:
   1. Review the CB with all necessary trades and sub-contractors required by the change in scope.
      a. Additions or deletions to the contract scope shall be as directed within the CB.
      b. Additions or deletions of labor and materials shall be determined by the GC based on the directives of the CB.
   2. Assemble all required back-up documentation for additions and deletions of materials, labor and other related contract costs as previously outlined in this specification.
   3. Submit a COR request form on the Project Management Web Site.

B. Submitting a COR does not obligate the GC to complete the work associated with the COR nor does it obligate the Owner to approve the COR as a change to the contract.

3.2. SUBMIT A CHANGE ORDER REQUEST FORM

A. This specification shall provide a subject overview only. In depth instructions shall be provided to the awarded Contractor in a PDF Instructional Manual.

B. The GC shall select the “Submit a COR” link on the Project Management Web Site.

C. The software will open a new COR form and the GC shall provide all of the following information:
   1. DO NOT perform any calculations on this worksheet, only provide the raw data as requested below. All calculations, totals, and markups shall be computed as described within this specification.
   2. Provide a summary description of the COR request, and justification for any requested time extension to the contract, indicate the number of calendar days being requested for the extension and add any attachments to the form as needed.
   3. Provide all GC self performance data including all of the following:
      a. Materials description, quantities, and unit costs.
      b. Labor hours and rates for all Foremen, Journeymen, and Apprentices by trade.
      c. Equipment descriptions, quantities, unit costs and rates.
   4. Provide all Sub-contractor data including all of the following:
      a. Materials description, quantities, and unit costs.
      b. Labor hours and rates for all Foremen, Journeymen, and Apprentices by trade.
      c. Equipment descriptions, quantities, unit costs and rates.
   5. Ensure all calculations performed by the form have been completed correctly. Contact the CPM directly if you suspect an error before hitting the save button.

C. At any time after creating a COR you must at a minimum click “Save as Draft” to save your work.

D. When all data has been entered and verified click on the “Submit COR” button. This will kick off the COR Review and Approval process.

3.3. CHANGE ORDER REQUEST REVIEW, APPROVAL, AND PROCESSING

A. The PA and CPM shall review all CORs submitted by the GC.
   1. Additional consulting staff and city staff having knowledge of the components of the COR shall review and advise the PA and CPM as to the accuracy of the items, quantities, and associated costs of the COR as directed by the CB.
   2. The CPM shall review the COR with the Owner.

B. If required the PA and CPM, shall in good faith, further negotiate the COR with the GC as necessary. All amendments to any COR shall be documented within the Project Management Web Site software.

C. After final review of the COR the CPM and Owner may accept the COR.

D. The CPM shall prepare the COR in the form of an official Board of Public Works Change Order for final review and approval as outlined in Section 01 26 63 Change Order (CO).

E. The GC shall not act upon any accepted COR until it has received final approval through the Public Works process as an official CO to the Work unless instructed to do so by the CPM. Proceeding without the final approval of a fully authorized Change Order is at the GC's own risk.

3.4. EMERGENCY CHANGE ORDER REQUEST

A. In the event Work is required due to an emergency as described in the Contract Documents, the GC must request an equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the commencement of such emergency.

B. The GC shall provide full documentation of all labor, materials and equipment used during the period of emergency as part of the COR submittal.

END OF SECTION

SECTION 01 26 63
CHANGE ORDER (CO)

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATION SECTIONS 1
1.3. BOARD OF PUBLIC WORKS PROCEDURE 1
PART 2 – PRODUCTS 2
2.1. CHANGE ORDER FORM 2
PART 3 - EXECUTION 2
3.1. PREPARATION OF THE CHANGE ORDER 2
3.2. EXECUTION OF THE CHANGE ORDER 2

PART 1 – GENERAL

1.1. SUMMARY

A. Except in cases of emergency, no changes in the Work required by the Contract Documents may be made by the General Contractor (GC) without having prior approval of the City Project Manager (CPM).

B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in the Work by written Change Order. Such changes may include additions and/or deletions.

C. The Change Order (CO) is a Board of Public Works (BPW) form that is reviewed and approved by a specific process.

D. The CO form is typically made up of multiple Change Order Requests (CORs) and/or Bid Items as appropriate depending on the type of project and how the contract was bid.

E. All CO documentation shall be processed through the Construction Administration-Change Order Library and digital workflow on the Project Management Web Site (PMWS).

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 26 13 Request for Information (RFI)
B. Section 01 26 46 Construction Bulletin (CB)
C. Section 01 26 63 Change Order Request (COR)
D. Section 01 31 23 Project Management Web Site

1.3. BOARD OF PUBLIC WORKS PROCEDURE

A. The Board of Public Works has a very explicit procedure for the review and approval of all change orders associated with any Public Works Contract as follows:
   1. The Supervisory Chain of the CPM shall review and approve any CO under $10,000 provided it does not include either of the following:
      a. The CO does not request a time extension to the contract.
      b. The CO does not cause the contract contingency sum to be exceeded.
   2. The Board of Public Works shall review and approve any CO that requires any of the following:
      a. Any CO over $10,000.
      b. Any CO requesting a time extension to the contract regardless of the monetary value of the CO.
      c. Any CO that that causes the contract contingency sum to be exceeded.

B. The Board of Public Works generally meets every other week and only once in August and December. The GC is cautioned that, under normal scheduling, a CO requiring a BPW review will take a minimum of two (2) weeks to achieve final approval.
   1. The City shall not be responsible for additional delays to the Work caused by the scheduling constraints of the Board of Public Works.

C. *SPECIAL NOTE:* The GC is cautioned to never proceed unless told to do so by the CPM. Only in rare instances may the CPM give a written notice to proceed on a COR without an approved CO. Proceeding without the written notice of the CPM or an approved CO is at the GC's own risk.

PART 2 – PRODUCTS

2.1. CHANGE ORDER FORM

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

PART 3 - EXECUTION

3.1. PREPARATION OF THE CHANGE ORDER

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

3.2. EXECUTION OF THE CHANGE ORDER

A. Upon saving the CO as described in section 3.1 above the software associated with the Project Management Web Site shall notify the GC that the CO has been drafted and is ready for review. The GC shall do the following:
   1. Open the appropriate CO form in the Construction Administration-Change Order Library and review all items on the form.
   2. The GC shall notify the CPM immediately of any errors or discrepancies on the form and shall not sign or save it.
      a. The CPM shall make any corrections as needed, re-save the form, and notify the GC.
   3. If/when the GC concurs with the CO form as drafted the GC shall digitally sign the form and click SAVE.

B. After the GC digitally signs/saves the CO it shall be routed through the Project Management Web Site for additional review and/or approvals. The CPM shall do the following:
   1. Monitor the review process to ensure the software is working properly at each review step.
   2. Ensure that proper BPW procedures are executed as needed by the CO approval process.
      a. Schedule the CO on the next available BPW agenda if required.
         i. Attend the BPW meeting to speak on the CO to board members and answer questions.
         ii. The GC and/or PA may be required to attend the BPW meeting to address specific information as it relates to the Work and/or materials associated with the CO.
   3. Monitor final approval and distribution of the CO.
   4. Notify the GC that the CO has been completed.
   5. Ensure that the CO is posted to the next Public Works payment schedule.
   6. Verify that the GC's next Progress Payment-Schedule of Values show the CO as part of the contract sum.

C. Upon final approval of the CO the GC may proceed with executing the Work associated with the CO.

END OF SECTION

SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. RELATED DOCUMENTS 1
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PART 2 – PRODUCTS – THIS SECTION NOT USED 2
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3.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT 2
3.2. AIA DOCUMENT G703 – CONTINUATION SHEET 2
3.3. INITIAL SCHEDULE OF VALUES SUBMITTAL 3
3.4. SOV FOR PROGRESS PAYMENT REQUESTS 3

PART 1 – GENERAL

1.1. SUMMARY

A. The Schedule of Values (SOV) is a Contractor provided statement that allocates portions of the total contract sum to various portions of the contracted work and shall be the basis for reviewing the Contractors Progress Payment Requests.

B. AIA Document G702 – Application and Certificate for Payment and AIA Document G703 Continuation Sheet shall be filled out in sufficient detail to be used as a guideline in determining work completed and materials stored on site when verifying Progress Payment Requests.

C. The General Contractor shall be responsible for filling out, updating, and providing these work sheets with each Progress Payment Request.

1.2. RELATED SPECIFICATIONS

A. Section 01 26 63 Change Order (CO)
B. Section 01 29 76 Progress Payment Procedures
C. Section 01 31 23 Project Management Web Site
D. Section 01 32 26 Construction Progress Reporting
E. Section 01 33 23 Submittals

F. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public Works Construction".

1. Use the following link to access the Standard Specifications web page:
   http://www.cityofmadison.com/business/pw/specs.cfm
   a. Click on the "Part" chapter identified in the specification text. For example if the specification says "Refer to City of Madison Standard Specification **2**10.2" click the link for Part II, the Part II PDF will open.
   b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you to the referenced text.

1.3. RELATED DOCUMENTS

A. The following documents shall be used as the basis for initiating and maintaining the SOV worksheets throughout the execution of this contract.

1. Drawing documents and specifications (including general provisions) as provided with the bid set documents and any published addendums.
2. Documents associated with revisions or clarifications to number 1 above after awarding of the contract, including but not limited to:
   a. Construction Bulletins
   b. Request for Information
   c. Approved Change Orders
3. The latest daily/weekly Construction Progress Report
4. Other specifications as identified in Section 1.2 above

1.4. BASIS OF VALUES

A. The Contractor shall provide a breakdown of the Contract Sum in sufficient detail to assist the Architect and City Project Manager in evaluating Progress Payment Requests.

B. The total sum of all items shall equal the Contract Sum.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT

A. The Contractor shall use AIA Document G-702 Application and Certificate for Payment with each Progress Payment Request.

B. Completely fill out the Project Information section as follows:
   1. TO OWNER; provide all owner related information as provided in the contract documents.
   2. PROJECT; provide all contract information including contract number, title and address.
   3. FROM CONTRACTOR; provide all contractor related information.
   4. VIA ARCHITECT; provide all the architect's related information including the architect's project reference number if different from the owners.
   5. Indicate the current APPLICATION NO., PERIOD TO date, and CONTRACT DATE.

C. Completely fill out the Contractors Application for Payment section.
   1. Fill out lines 1 through 9 to reflect the current status of the contract through the payment date being requested.
   2. The City of Madison calculates retainage on Public Works Contracts as follows:
      a. In general, across the duration of the contract, 2.5% of the total contract sum, including change orders, is withheld for retainage as referenced from the City of Madison Standard Specification 110.2:
         i. Beginning with Progress Payment 1, 5% retainage will be withheld until such time that 50% of the total contract sum has been paid out.
         ii. No additional retainage will be withheld after 50% of the total contract sum has been paid, unless additional change orders have been approved after the 50% milestone has been reached. Per City of Madison Standard Specification 110.2, additional retainage up to 10%, may be held in the event there are holds placed by Affirmative Action or liquidated damages by BPW.
         iii. Retainage for additional change orders after the 50% milestone will be withheld at the rate of 2.5% of the total cost of the change order.
         iv. Retainage is based on the change orders posted to the City's contract worksheet at the time the progress payment is processed.

D. Completely fill out the Change Order Summary section. Only change orders that have been finalized and posted to the City of Madison's Application for Partial Payment worksheet may be itemized into the SOV documents.

E. The Contractor shall sign and date the application and it shall be properly notarized.

F. The Contractor shall not fill in any information in the Architects Certificate for Payment section.

3.2. AIA DOCUMENT G703 – CONTINUATION SHEET

A. The Contractor shall use AIA Document G-703 Continuation Sheet to itemize his/her SOV for this contract. Provide additional sheets as necessary.

B. Provide information in Column A (Item No.), Column B (Description of Work), and Column C (Scheduled Value) by any method that allocates portions of the total contract sum to various portions of the contracted work. Possible methods include combinations of the following:
   1. By division of work
   2. By contractor, sub-contractor, sub sub-contractor
   3. By specialty item or group
   4. Other methods of breakdown as may be requested by the City Project Manager or City Construction Manager at the pre-construction meeting.

C. Provide total cost of the item/description of work including proportionate shares of profit and overhead related to the item.

3.3. INITIAL SCHEDULE OF VALUES SUBMITTAL

A. The Contractor shall upload his/her initial SOV to the Project Management Web Site, Submittals Library, no later than five (5) working days after the Pre-construction Meeting.
   1. The initial SOV shall provide information in Column A (Item No.), Column B (Description of Work), and Column C (Scheduled Value) only.
   2. The level of detail shall be as described in section 3.2 above.

B. The Project Architect (PA) and the City Project Manager (CPM) shall review the SOV as any other submittal and may require modifications to reflect additional detail as necessary.

C. The Contractor shall resubmit the SOV as necessary until such time as the PPA and CPM have sufficient detail for assessing and approving future Progress Payment Applications.

D. Progress Payment Application 1 will not be processed until such time as the Contractor has met this requirement regardless of the amount of work completed per the application.

3.4. SOV FOR PROGRESS PAYMENT REQUESTS

A. The Contractor shall update the initial SOV with each Progress Payment Application as follows:
   1. Initial items and values as part of Section 3.3 above will not be adjusted once the original Schedule of Values submittal has been approved.
   2. Change orders shall be added as additional items and values at the bottom of the SOV as they become approved and posted to the City's contract worksheet. The value for each change order shall be the value indicated on the SOV and shall stand alone. Values shall not be split out or combined with other existing items with similar work descriptions on the original SOV.
   3. Fill out Columns D, E, F and G to properly reflect the work completed and materials received since the last Progress Payment Application.
   4. Only materials delivered and stored on the project site may be reflected on SOV progress updates.

B. Provide updated G702 and G703 sheets with each Progress Payment application.

C. See Specification 01 29 76 Progress Payment Procedures for additional information on submitting Progress Payment Applications.

END OF SECTION

SECTION 01 29 76
PROGRESS PAYMENT PROCEDURES

PART 1 – GENERAL 1
1.1. SUMMARY 1
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PART 3 - EXECUTION 4
3.1. GENERAL CONTRACTOR PROCEDURE 4
3.2. PROJECT ARCHITECT PROCEDURE 5
3.3. CITY PROJECT MANAGER PROCEDURE 5

PART 1 – GENERAL

1.1. SUMMARY

A. The General Contractor (GC) shall review this and all related specifications prior to submitting progress payment requests.

B. Progress payment requests (Partial Payment-PP) for this contract shall be uploaded digitally by the GC to the Project Management Web Site

C. The Project Architect (PA) and City Project Manager (CPM) shall review and amend or approve the PP on the Project Management Web Site.

D. After approval of the PP by the CPM, he/she shall forward the PP to the appropriate agencies for BPW contractural review and payment processing.

1.2. RELATED SPECIFICATIONS

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

1.3. RELATED DOCUMENTS

A. The following documents shall be used when evaluating PP requests.

1. Daily and weekly construction progress reports filed since the last payment request.
2. Contractors Schedule of Values as updated from the last payment request. See Specification 01 29 73.
3. Any document that may be required to be submitted for review and approval, as noted by the specifications listed in Section 1.2 above, or the Progress Payment Milestone Schedule in Section 1.4 below, to achieve a required bench mark of contract progression or contract requirement.

1.4. PROGRESS PAYMENT MILESTONES

A. City Engineering-Facility Management has developed the Project Payment Milestone Schedule (Section 1.4 below) to assist the GC in providing required construction specific documentation and general contractural documentation in a timely manner.

B. The Progress Payment Milestone Schedule is not an all inclusive list. Multiple agencies review progress payment requests and contract closeout requests. Missing, incomplete, or incorrect documentation for any agency may

be a cause for not processing progress payments. It shall be the sole responsibility of the Contractor for providing documentation as required or requested to the appropriate agencies.

C. The milestone schedule is based on the contract total sum and shall be valid for most contracts. Milestone submittals will be required with whatever progress payment hits the percentage of contract total indicated in the schedule.

D. The CPM shall review the milestone schedule with each progress payment request and at his/her option may elect to hold processing the progress payment until such time as the contractor has met the requirements for providing construction specific documentation.

E. It shall be the General Contractors responsibility to comply with all BPW Contract Administration requirements and related deadlines as outlined in the Award Letter, Award Checklist, and Start Work Letter.

Progress Payment (PP) Milestone Schedule		
Milestone Description	***Due Before***	***Remarks***
BPW Contract Administration Documentation • 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	• 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 • Contractors Project Directory • Schedule of Values • Submittals Schedule • Waste Management Plan • Closeout Requirement Checklist • Warranty Checklist	PP-1	References • Specification 01 31 23 • Specification 01 29 73 • Specification 01 32 19 • Specification 01 74 19 • Specification 01 77 00 • Specification 01 78 36
Construction Progress Milestones • Early submittals, per submittal schedule • Detailed Contract Schedules	PP-1	See specifications for specific requirements • 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 • 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 • 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 • Weekly payroll reports • Best Value Contracting Reports • SBE Reports	25% CT or PP 2	See 1.4.E above. *This progress payment will be with held by BPW for any missing contractural documentation.*

Progress Payment (PP) Milestone Schedule		
Milestone Description	***Due Before***	***Remarks***
Construction Progress Milestones • Construction/Contract Closeout Meeting #1 • Submittals/Re-submittals complete	50% CT	• Specification 01 31 19 • Specification 01 33 23
Operation and Maintenance (O & M) drafts	60% CT	Specification 01 78 23
Construction/Contract Closeout Meeting #2 • Construction closeout checklist	70% CT	See specification 01 31 19 • Specification 01 77 00
BPW Contract Administration Documentation • Request Finalization Review from BPW	80% CT	This is a recommendation to the GC and is not a requirement of this PP. • Specification 01 77 00
Construction Progress Milestones • Operation and Maintenance (O & M) finals, accepted • All major QMO issues resolved • As-Built Drawings, Division Trades ready for GC review	80% CT	• 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: • 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: • Governing ordinances and statutes • Specification 01 45 16 • Specification 01 79 00 • Specification 01 78 43 • Specification 01 74 13
Construction Closeout Procedures: • 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	See 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 • Construction Closeout has been completed • Contractor requests final payment of retainage • All BPW contractural requirements are verified	Final	See Specification 01 77 00 • Contractor must provide any missing BPW Contractural Documentation
*** 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.
   2. The GC shall sign and date the form where indicated.
   3. The GC shall provide the dates from and to for the PP being requested.
   4. The GC shall provide the list of all contractors/sub-contractors that were actively working during the dates indicated above.

a. All contractors/sub-contractors named must be in compliance with all City requirements (Pre-qualified, Affirmative Action Plan on file, etc). The PP will be held and not processed by the City of Madison until all contractors/sub-contractors are in compliance.
b. Do not list the names of suppliers or manufacturers, doing so will slow down processing and require a re-submittal of the paperwork.

C. The General Contractor (GC) shall scan all of the documents listed below in the order shown, save the scan as a single PDF file for each PP request.
1. City cover sheet – Application and Certificate for Payment
2. City tabulation sheet(s)
3. AIA G702 - Application and Certificate for Payment
4. AIA G703 - Continuation Sheet(s)
5. Any miscellaneous documents that may be requested as backup documentation for the pay request.
a. Lien waivers are not required and shall not be submitted.
b. Do not provide contractural administrative documents such as pay reports with pay requests.
c. Do not supply progress deliverables with pay requests.

F. Upload the pay request PDF to the Contract Documents-GC Partial Pay Apps library on the Project Management Web Site.

3.2. PROJECT ARCHITECT PROCEDURE

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

3.3. CITY PROJECT MANAGER PROCEDURE

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

END OF SECTION

SECTION 01 31 13
PROJECT COORDINATION

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. GENERAL REQUIREMENTS 1
1.4. GENERAL CONTRACTOR PERFORMANCE REQUIREMENTS 2
1.5. SUB-CONTRACTOR PERFORMANCE REQUIREMENTS 2
PART 2 – PRODUCTS – THIS SECTION NOT USED 3
PART 3 – EXECUTION – THIS SECTION NOT USED 3

PART 1 – GENERAL

1.1. SUMMARY

A. Project Coordination covers many areas within the execution of the Contract Documents and the requirements of proper coordination are the applicable to all contractors executing the Work of this contract.

B. This specification provides general information regarding project coordination for the General Contractor and all Sub-contractors. All contractors shall be familiar with project coordination requirements and responsibilities that may be defined in other specification within these Contract Documents.

C. The General Contractor shall at all times be responsible for the project, project site, and execution of the Contract Documents.

1.2. RELATED SPECIFICATIONS

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

1.3. GENERAL REQUIREMENTS

A. The following general requirements shall applicable to all contractors:
   1. Cooperate with the Owner, all authorized Owner Representatives, Project Architect and all consultants of the Owner.
   2. Materials, products, and equipment shall be new, as specified and to industry standards except where otherwise noted.
   3. Labor and workmanship shall be of a high quality and to industry standards.

B. Existing conditions:
   1. Verify all existing conditions noted in the contract documents with actual field locations. Verify dimensions, sizes and locations, of structural, equipment, mechanical and utility components.
   2. Report any inconsistencies, errors, omissions, or code violations in writing to the General Contractor (GC) immediately.
   3. Annotate any inconsistencies, errors, omissions on the GC As-Built record drawings immediately for future reference.

C. Contract Documents:
   1. The Contract Documents are intended to include everything necessary to perform the work. Every item required may not be specifically mentioned, shown, or detailed.
      a. Except where specifically stated all systems and equipment shall be complete, installed, and fully operable.
      b. If a conflict exists within the contract documents the contractor shall furnish the item, system, or workmanship of the highest quality, largest, largest quantity, or most closely fits the intent of the contract documents.

c. Manufacturers recommended installation details shall be verified and used prior to installation of products and equipment so as to not void warranties.

D. Errors and Omissions
1. No Contractor shall take any advantage of any apparent error or omission in the construction documents.
2. The City of Madison shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the construction documents.

E. Owners Representatives
1. All contractors shall be familiar with various Owner Representatives having Quality Management responsibilities for the duration of this project including but not limited to the following:
a. Project Architect, responsible for all decisions affecting the code compliance and design intent of the construction documents.
b. Consulting Architects and Engineers, responsible for providing consulting services to the Project Architect, Owner, and City Project Manager, also responsible for Quality Management of the construction documents.
c. Owner, the designated representative of the City Agency that will occupy the project upon completion.
d. City Project Manager, responsible for all day to day decisions regarding the execution and performance of this Public Works Contract.
e. Consulting City Staff, responsible for providing consulting services to the Project Architect, Owner, and City Project Manager, also responsible for Quality Management of the construction documents.
2. Owner Representatives shall be attending progress meetings, pre-installation meetings, performing or being present for final testing and acceptance and quality management reporting during the execution of the contract documents as outlined in other specifications.

1.4. GENERAL CONTRACTOR PERFORMANCE REQUIREMENTS

A. Assume the responsibility for all Work specified in the Contract Documents except where specifically identified to be performed by the Owner or other contractor separately hired by the Owner.
1. Coordinate all work by Owner, equipment provided Owner, or contractor hired by the Owner into the project schedule.

B. Provide all construction management responsibilities as specified in other Division 1 specifications including but not limited to:
1. Scheduling of work
2. Coordination of work between other Trades and Sub-contractors
3. Construction administration and management
4. Site layout, cleanliness, and protection of completed work/stored materials
5. Waste Management
6. Quality Assurance and Quality Control

C. Use Diggers Hotline and private utility locating companies to accurately locate all public and private utilities on the property as needed. The GC is responsible for any repair or replacement to any public or private utility damaged during the execution of the Work

D. Report any inconsistencies, errors, omissions, or code violations in writing to the Project Architect immediately. Failure to report inconsistencies prior to beginning work shall indicate that the GC accepted all existing conditions.

E. The GC shall be responsible for assigning work and related responsibilities where the Contract Documents may not clearly state who is responsible for providing the work, material, or product.

F. Provide construction management oversight of all items described in Section 1.5 below.

1.5. SUB-CONTRACTOR PERFORMANCE REQUIREMENTS

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

B. Coordinate your Work with all adjacent work and existing conditions.
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.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 – EXECUTION – THIS SECTION NOT USED

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. PROJECT MEETING TYPES 1
1.4. GENERAL REQUIREMENTS 1
PART 2 – PRODUCTS – NOT USED IN THIS SECTION 1
PART 3 - EXECUTION 1
3.1. PRECONSTRUCTION MEETING 1
3.2. PROJECT MANAGEMENT WEB SITE – TUTORIAL MEETING 2
3.3. CONSTRUCTION PROGRESS MEETINGS 2
3.4. PRE-INSTALLATION MEETINGS 2
3.6 PRE-CONTRACT CLOSEOUT MEETINGS 3
3.7 OTHER SPECIAL MEETINGS 3

PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to identify various project related meetings and the responsible parties for scheduling, agendas, minutes, and required attendance.

B. This specification is not intended to be inclusive of all meeting types or a complete list of required meetings.

C. This specification is not intended to cover planning and execution meetings between the General Contractor (GC) and his/her sub-contractors.

1.2. RELATED SPECIFICATIONS

A. 01 31 23 Project Management Web Site

B. 01 32 16 Construction Progress Schedules

C. 01 43 39 Mockups

1.3. PROJECT MEETING TYPES

A. The following project meeting types may be used but not limited to the following

1. Preconstruction Meeting
2. Project Management Web Site – Tutorial Meeting
3. Construction Progress Meetings
4. Pre-installation Meetings (including mock-up review meetings)
5. Weekly Trade Meetings
6. Special Meetings

1.4. GENERAL REQUIREMENTS

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

PART 2 – PRODUCTS – NOT USED IN THIS SECTION

PART 3 - EXECUTION

3.1. PRECONSTRUCTION MEETING

A. After execution of the Contract the City Project Manager (CPM) shall schedule and conduct the Preconstruction Meeting at the Owner's facilities. The CPM shall coordinate the meeting agenda with the Project Architect and the GC Project Manager.

B. The CPM shall be responsible for the final agenda.

C. The CPM and Project Architect shall take notes on the meeting and post completed meeting minutes.

D. Attendance shall be required by all of the following:

1. Owner Representative(s)
2. Architect and applicable sub consultant(s)
3. General Contractor and applicable subcontractors and suppliers

4. City Quality Management Staff
5. 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
5. Project Meeting scheduling
   a. Section 01 31 19 Project Meetings
6. Construction Schedule

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 contractural 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

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

PART 1 – GENERAL

1.1. GENERAL DESCRIPTION

A. The City of Madison (CoM) has established a web based Project Management Tool (PMT) using a Microsoft product called SharePoint (SP).

B. The software is used throughout the design, construction and warranty process of major remodels and new construction projects executed as a City of Madison, Board of Public Works project.

C. Initially deployed in mid 2013, the PMT software has been successfully deployed on several projects, and we continue to modify/update/enhance the PMT on a regular basis.

1.2. SHAREPOINT PROCEDURE OVERVIEW

A. The CoM PMT is a system of consolidated Document & Form Libraries and Data Lists that assist in performing day to day functions of design/construction management while reducing the use of surface mail, email and email attachments.

1. Document libraries store a wide variety of documents in many different formats including but not limited to Word, Excel, PDF, photographs (all popular formats), etc.
2. Data Lists contain consolidated data information that can be generated and stored for further use. Punch Lists and Warranty issues will be examples of Data Lists.
3. Form libraries contain snapshot information associated with a particular Data Entry form. An example of this is the Quality Management Observation form.

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

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 26 13 Request for Information (RFI)
2. 01 26 46 Construction Bulletins (CB)
3. 01 26 57 Change Order Request (COR)
4. 01 26 63 Change Order (CO)
5. 01 29 76 Progress Payment Procedures
6. 01 31 19 Project Meetings
7. 01 32 16 Construction Progress Schedules
8. 01 32 26 Construction Progress Reporting
9. 01 32 33 Photographic Documentation
10. 01 33 23 Submittals
11. 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 7, 8 and 9 (32 bit).
   a. At this time SharePoint is not fully supported by Internet Explorer versions 10 and 11.
   b. At this time SharePoint is not entirely 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.
2. A blank Project Directory in an Excel spread sheet format. The contractor shall provide the following information for GC and SC staffs as indicated on the spreadsheet. This will generally be the Project Manager for the GC as well as the Sub-contractors and the GC Site Supervisor.
   a. Last Name, First Name
   b. Company Name
   c. Email address (valid, work related)
   d. Work Phone Number (required, include area code)
   e. Cell Phone Number (not required, include area code)

3. The GC shall provide the above information for all SC's where the GC is not self-performing the work.
4. The GC may provide project foreperson information for work being self performed if he/she so desires.

3.2. POST PRE-CONSTRUCTION MEETING

A. The GCPM will return the completed Project Directory spread sheet to the CPM no later than the Pre-construction meeting.

B. The CPM is responsible for uploading all project directory data into SharePoint and coordinating with CoM Information Technology (CoM-IT) for creating the logins and passwords of non-city staff (GC/SC staffs).

C. All GC/SC staff will be notified through an automated email from CoM IT that logins and passwords are available. It is the responsibility of each GC/SC to call the CoM-IT number provided in the email to receive his/her login/password over the phone. Logins and passwords will not be released via email.

D. Once the GCPM has received his/her login/password uploading of contract related documents can begin. This would include but not be limited to project schedules, submittals, RFI's, and other documents as needed.

E. All workflows, review of documentation, and general archiving of construction related documentation will be conducted on the PMWS. These documents will generally not be emailed.

F. The following documents related to the execution of the contract will not be part of the PMWS:
   1. All documentation related to executing the contract, such as:
      a. Sub Contractors list
      b. Affirmative Action documentation
      c. Bonding documentation
      d. Documentation associated with payroll verification
      e. Final documentation associated with closing out the contract
   2. Any documentation required/generated by ordinance, code or statute, such as;
      a. Erosion Control inspections
      b. Building Inspection Department inspections

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULES

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

PART 1 – GENERAL

1.1. SCOPE

A. This specification is to identify various project related schedules associated with indicating construction progress and outlook. The following schedules are the responsibility of the General Contractor (GC).
   1. Overall Project Schedule
   2. 6 Week Look-out Schedule

B. This specification is not intended to include internal schedules generated by the contractors during their planning and execution of the 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 31 19 Progress Meetings
D. Section 01 74 13 Progress Cleaning
E. Section 01 77 00 Closeout Procedures
F. Section 01 78 23 Operation and Maintenance Data
G. Section 01 78 36 Warranties
H. Section 01 78 39 As-Built Drawings
I. Section 01 78 43 Spare Parts and Extra Materials
J. Section 01 79 00 Demonstration and Training
K. Other specification within the construction documents that may indicate the need for scheduling any event with Owner, Project Architect, Owner Representatives, including any owner provided equipment.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. OVERALL PROJECT SCHEDULE (OPS)

A. The GC shall prepare an OPS that covers the duration of the contract from the pre-construction meeting through the end of construction to final contract closeout.
   1. The GC shall review Specification 01 77 00 Closeout Procedures to become familiar with definitions, differences, and requirements for closing out the construction and contract including the association with progress payments.

B. The GC shall provide copies and lead a discussion on the OPS during the pre-construction meeting.
C. The OPS shall indicate start and end dates of each task associated with the project.
D. The OPS shall clearly indicate the critical path of the project.
E. The GC shall update the OPS as often as necessary during the duration of the project. Updates will be briefed as needed during bi-weekly progress meetings.

3.2. 6 WEEK LOOK-OUT SCHEDULES (LOS)

A. The GC shall prepare the initial LOS to include detail of daily tasks for the first six (6) weeks of construction in depth for the Pre-construction meeting. The LOS shall be compatible and complimentary to the OPS.
B. The GC shall provide copies and lead a discussion on the LOS during the pre-construction meeting.
C. The LOS shall indicate start and end dates of each major task, associated related sub-tasks, and required parallel or pre-requisite tasks required to complete the major task on time.

D. The LOS shall also include identifying and scheduling such events as:
   1. Pre-installation meetings and mock-up review meetings.
   2. Quality management reviews of installations before they are covered.
   3. Owner provided equipment as designated by the contract documents.
   4. Work by others as designated by the contract documents.
   5. Critical submittal dates.

E. The GC shall update the LOS prior to each bi-weekly progress meeting to indicate the next 6 weeks of scheduled work. Updates will be briefed during each bi-weekly progress meeting.

3.3. PROJECT MANAGEMENT WEB SITE (PMWS)

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

END OF SECTION

SECTION 01 32 19
SUBMITTALS SCHEDULE

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. RELATED DOCUMENTS 1
1.4. SUBMITTAL DEFINITIONS 1
1.5. SUBMITTAL REQUIREMENTS 1
1.6. ADMINITRATIVE SUBMITTALS 2
PART 2 – PRODUCTS – THIS SECTION NOT USED 2
PART 3 - EXECUTION 2
3.1. OVERALL RESPONSIBILITIES OF ALL CONTRACTORS 2
3.2. GENERAL CONTRACTORS RESPONSIBILITIES 2
3.3. STAFF REVIEW RESPONSIBILITIES 3

PART 1 – GENERAL

1.1. SUMMARY

A. The General Contractor shall submit a complete and comprehensive list of all submittals anticipated during the execution of this contract.

B. The GC shall include the Administrative submittals identified in item 1.5 below and shall be required to up load them to the Project Management Web Site.

C. The initial Submittals Schedule shall be based on the original contract documents used at the time of bidding and any posted addenda through awarding of the contract.

D. The Submittal Schedule may be appended during the execution of the contract based on amendments to the contract in the form of Change Orders, Construction Bulletins, and other related documents that add, or change the scope of the work.

1.2. RELATED SPECIFICATIONS

A. Section 01 29 76 Progress Payment Procedures
B. Section 01 31 23 Project Management Web Site
C. Section 01 33 23 Submittals

1.3. RELATED DOCUMENTS

A. The following documents shall be used as the basis for initiating the original Submittals Schedule.
   1. Drawing documents and specifications (including general provisions) as provided with the bid set documents and any published addenda.

B. The following documents shall be used to amend the submittals schedule as needed during the execution of this contract.
   1. Documents associated with revisions or clarifications to number A.1 above after awarding of the contract, including but not limited to:
      a. Construction Bulletins
      b. Approved Change Orders

1.4. SUBMITTAL DEFINITIONS

A. Administrative Submittal: Any submittal that may be required by a Division 1 Specification and as noted in Section 1.5 below.

B. Critical Path Submittal: Any early submittal that needs a priority review due to early construction use or long lead times where a delay could affect the critical path of the construction schedule

C. Submittal: Any material, product, equipment, or general requirement as outlined in this and other specifications that require a favorable review or acceptance prior to proceeding with procuring the item or proceeding with the Work.

1.5. SUBMITTAL REQUIREMENTS

A. The GC and all Sub-contractors shall review the construction documents including the specifications of their individual Division or Trade to compile a complete list of all materials, products, or equipment that will require a positively reviewed submittal to be completed prior to procurement and installation.

1. Submittals shall include but not be limited to any of the following that may apply:
    a. Shop Drawings
    b. Product Data
    c. Assembly Drawings
    d. Engineered Drawings
    e. Product Samples

B. The following items will require an approved submittal, verify with specifications for specific needs and requirements:
1. Contractor certifications for specialized work such as asbestos removal, well drilling, controls, AV, etc.

1.6. ADMINISTRATIVE SUBMITTALS

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

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. OVERALL RESPONSIBILITIES OF ALL CONTRACTORS

A. All contractors shall be responsible for reviewing the drawings and specifications within their Divisions of Work to provide a complete and comprehensive list of submittals to the General Contractor.

B. Each list shall indicate the title of the submittal, the associated specification of the submittal, whether the submittal can be considered an early/middle/late submittal, the anticipated date the submittal will be provided and the anticipated date the submittal needs to be approved.

C. Contractors shall be aware that the goals for submittal review by the Architect staff and City staff will be as follows:
1. For items on the Critical Path as identified by the GC, five (5) working days
2. For most other submittals ten (10) working days
3. Additional time may be needed for complex submittals or if re-submittals are required.

D. The general format of the Submittal Schedule shall be tabular as per this example:

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	

3.2. GENERAL CONTRACTORS RESPONSIBILITIES

A. The General Contractor shall be responsible for all of the following:
1. Consolidating all submittal lists from individual contractors into one master list.
2. Reviewing all submitted lists for completeness, timing with the overall contract, etc. The GC shall meet with individual contractors to make changes as necessary.
3. Upload the completed Submittals Schedule to the Submittal Library on the Project Management Web Site for review as SD 003.0. See Specification 01 33 23 Submittals for more information on this procedure.
4. Resubmit the schedule as needed after initial reviews have been completed.

B. The GC shall work with other contractors to amend the Submittals Schedule throughout the execution of the project based on changes and modifications as needed.

C. The GC and Project Architect shall be responsible for reviewing and briefing the submittal schedule and submittals status at each bi-weekly construction meeting.

3.3. STAFF REVIEW RESPONSIBILITIES

A. The Project Architect, consulting staff, Owner, and city staff will review the Submittal Schedule for completeness per the plans and specifications within their divisions of work. The reviewing staff may provide comments as needed. Some examples might include the following:

1. Submittal not required
2. Provide photos of samples with digital submittal
3. Insure one submittal for complete system
4. Append the schedule to include…
5. See Specification <xyz> for additional requirements

B. The Project Architect and City Project Manager will finalize review comments regarding the Submittal Schedule. Re-submittal of the submittal schedule may be required.

END OF SECTION

SECTION 01 32 26
CONSTRUCTION PROGRESS REPORTING

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATION SECTIONS 1
1.3. PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS 1
PART 2 – PRODUCTS - THIS SECTION NOT USED 1
PART 3 - EXECUTION 1
3.1. DAILY PROGRESS JOURNAL 1
3.2. CONSTRUCTION PROGRESS MEETINGS 2

PART 1 – GENERAL

1.1. SUMMARY

A. Daily records of project activities, resources used, weather conditions, and other information related to the ongoing progress of the project are extremely important at all levels of Construction Management.

B. Daily records provide the base for weekly progress reports and updating progress schedules.

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 31 19 Project Meetings

B. Section 01 31 23 Project Management Web Site

C. Section 01 32 23 Photographic Documentation

1.3. PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS

A. The General Contractor (GC) shall be responsible for all Construction Progress Reporting as outlined in this and other specifications as noted.

B. The GC shall maintain daily progress journals in a format of his/her choosing provided it is legible and contains the information as outlined in Section3.1 below.

C. The journal shall be located in the job trailer and shall be reviewable by the Project Architect or City Project Manager if so requested.

PART 2 – PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. DAILY PROGRESS JOURNAL

A. The GC shall maintain a daily progress journal of daily Work activities for each day on which Work is performed by any employee or entity for which the GC is responsible. Such reports shall include all relevant data concerning the progress of Work activities the GC and Subcontractors are responsible for and the effect of that activity on the time of performance of the Contract.

B. Journal entries shall be made on the Daily Work Report Form located in the Construction Progress-Daily Journal Library on the Project Management Web Site. The form consists of the following areas:

1. Weather; include temperature, humidity, precipitation, wind and other related information such as significant storm events, times, and details.
2. Work completed by trade
3. Delays encountered
4. Deliveries received or delayed
5. Hot issues that need to be addressed
6. Safety issues
7. Photograph progress and upload to the Photo Library on the Project Management Web Site.
8. Other including inspections, testing, etc.
9. Space for attaching documents

C. Daily Work activity reports shall be completed and signed by the GC's Job Superintendent or other on-site representative authorized by the GC confirming each such report is current, accurate and complete.

D. If applicable the GC shall include schedules of quantities and costs, progress schedules, wage rates, reports, estimates, invoices, records and other data as requested by the CPM concerning Work performed or to be

performed under this Contract if the CPM determines such information is needed to substantiate Change Order proposals, claims, or to resolve disputes.

3.2. CONSTRUCTION PROGRESS MEETINGS

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

END OF SECTION

SECTION 01 32 33
PHOTOGRAPHIC DOCUMENTATION

PART 1 – GENERAL 1
1.1. SCOPE 1
1.2. RELATED SPECIFICATION SECTIONS 1
PART 2 – PRODUCTS - THIS SECTION NOT USED 1
PART 3 - EXECUTION 1
3.1. REQUIREMENTS FOR DIGITAL PHOTOGRAPHS 1
3.2. PICTURE CONTENT 1
3.3. PROJECT MANAGEMENT WEB SITE 1

PART 1 – GENERAL

1.1. SCOPE

A. The General Contractor (GC) shall be required to take weekly digital photographs of construction progress and upload the photos directly to the Project Management Web Site (PMWS).

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 31 23 Project Management Web Site
B. Section 01 32 26 Construction Progress Reporting

PART 2 – PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. REQUIREMENTS FOR DIGITAL PHOTOGRAPHS

A. All digital photographs shall be taken with a good quality digital camera, cell phone, tablet, and other such digital device.
B. Digital photographs shall be properly zoomed in/out to capture a specific level of detail as necessary.
C. Digital photographs shall be formatted to achieve a good, clear, and detailed image where the final file size is between 600 KB and 1.2 MB (1200KB).
D. The camera default naming convention is acceptable. The GC does not need to rename or specifically identify pictures in the title.
E. All digital photographs shall be saved in a JPEG (.jpg) format and uploaded directly to the PMWS.

3.2. PICTURE CONTENT

A. The GC shall take exterior photographs from at least two (2) different angles.
   1. This requirement shall only be applicable when there is exterior work connected with the project.
   2. When applicable this requirement shall begin prior to commencing any site work.
   3. This requirement shall end when the exterior work has been substantially completed.
   4. This requirement may be suspended due to weather conditions or substantial delays in exterior progress.
B. The GC shall take interior photographs of interior construction, equipment installation, rough-ins and other such progress that helps document weekly progress reporting. Interior photographs should focus on specific significant installations as well as general progress throughout the progress of the contract.

3.3. PROJECT MANAGEMENT WEB SITE

A. The GC shall upload the digital photographs to the appropriate progress folder in the Project Images Library.
B. Progress folders are labeled with the Construction Week Number and the date for Monday of that week.
C. The GC shall notify the City of Madison Project Manager if additional progress folders need to be created.

END OF SECTION

SECTION 01 33 23
SUBMITTALS

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED REFERENCES 1
1.3. SUBMITTAL REQUIREMENTS 1
PART 2 – PRODUCTS – THIS SECTION NOT USED 2
PART 3 - EXECUTION 2
3.1. GENERAL CONTRACTORS PROCEDURES 2
3.2. SUBMITTAL REVIEW 2
3.3. PROJECT ARCHITECTS REVIEW 3

PART 1 – GENERAL

1.1. SUMMARY

A. The General Contractor (GC) shall be responsible for providing submittals for review of all contractors and sub-contractors as designated in the construction documents. Submittals shall include but not be limited to all of the following:
   1. Equipment specified and pre-approved in the specification; to ensure quality, construction, and performance specifications have not changed since final design.
   2. Equipment specified by performance in the specification; to ensure that the intended quality, construction, and performance specified is met by the selected material or product.
   3. Shop, piece, erection, and other such drawings as indicated in the specifications to ensure all structural, dimensional, and assembly requirements are being met.
   4. Submittals indicating installation sequencing
   5. Submittals indicating control sequencing
   6. Contractor licensing, certification, and other such regulatory documentation when required by a specification.
   7. Other submittals as may be required by individual specifications.

B. The submittal process shall not be used to determine alternates to specified products or equipment. All considerations shall be reviewed during the bidding process and acceptable alternates shall be acknowledged by addendum prior to the closing of bidding. See bidding instructions for the information on submitting alternates for consideration.

D. In the event that a manufacturer has significantly changed a product (discontinued a model, changed dimension or performance data changed available colors, etc.) since bid opening the GC shall submit a Request for Information (RFI) to the Project Architect requesting other approved alternates prior to uploading a digital submittal.

E. Contractors and sub-contractors shall be responsible for knowing the submittal requirements of ALL sections within their scope of work under the contract. The Owner reserves the right to request documentation on any materials, equipment, or product being installed where a submittal is not on file. If the material, equipment, or product installed is determined not to meet the intent of the specification the contractor/sub-contractor shall be required to remove and replace the items involved. The GC shall be solely responsible for all costs associated with the removal and replacement.

1.2. RELATED REFERENCES

A. Section 01 29 76 Progress Payment Procedures
B. Section 01 31 23 Project Management Web Site
C. Section 01 32 19 Submittals Schedule
D. Section 01 32 26 Construction Progress Reporting
E. All Technical Specifications, contract documents, construction drawings, and any published addendums during the bidding process.
F. All contract documents generated during the execution of the contract including but not limited to Requests for Information (RFI) and Construction Bulletins (CB).

1.3. SUBMITTAL REQUIREMENTS

A. A completed submittal shall meet the following requirements:

1. Digital submittal shall be original PDF of manufacturer's data sheets or high quality color scan of the same.
    a. Submittals shall not include sales fliers or other similar documents that typically do not provide complete manufacturers data.
2. Documents within the PDF submittal shall be printable to a sized sheet no less than 8-1/2 by 11 inches and no larger than 24 by 36 inches.
3. At the beginning of each submittal the contractor shall identify the plan reference (WC-1, EF-3, etc.) in RED block letters that the submittal is for.
4. Where multiple model numbers appear in a table the contractor shall identify the specific model being submitted by using a RED square, box, or other designation to distinguish the correct model from others on the page.

B. A complete submittal will include all information associated with the product or equipment as presented in plans, equipment tables, and specifications. Information shall include but not be limited to the following:
1. Dimensional data
2. Performance data
3. Resource requirements, power, water, waste, etc
4. Clearance and maintenance requirements
5. Finish information, colors, textures, etc.
6. Warranty information

C. Where a submittal includes material samples (carpet, tile, paint draw downs, etc.) the contractor shall do the following:
1. The Contractor shall submit the sample(s) as indicated in the specification.
2. The Contractor shall include a quality photograph(s) of the product with the digital submittal. Photographs shall meet the following requirements:
    a. Formatted to be between 500Kb and 1.0 Mb in file size
    b. Have no glare or flash reflection on the sample
    c. Sample fills the frame of the photo and shows detail as needed. Include multiple photos from other angles as needed.
    d. Scanned copies of products or photos are not acceptable.

D. Uploaded submittals should be relative and related to a specific written specification.
1. Do not upload submittals under a broad category or division (I.E. HVAC 23 00 00). Always upload by the specific specification that identifies a required product or performance to be met.
2. Group related items together if the specification is written that way. (I.E. all of the plumbing fixtures and trim relative to one specific specification should be submitted together).

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. GENERAL CONTRACTORS PROCEDURES

A. All required submittals will be uploaded to the Construction Administration-Submittal Drawings Library on the Project Management Web Site (PMWS) by the GC.
1. The GC shall open a new Submittal Form in the Submittals Drawings Library for each required submittal from the Submittals schedule.
2. Fill in required information on the form that will be used for routing the review and comments.
3. Attach all documentation as described in Section 1.3 above.
    a. Submit samples under separate cover to the Project Architect when necessary.

B. Uploading the submittal indicates that the GC has reviewed and approved the submittal against the contract document requirements.

C. The GC shall discuss submittal status at all progress meetings and shall monitor submittal review/approval/re-submittal so as to not incur delays in the project schedule.

D. A completed upload of the submittal to the PMWS initiates the review process workflow.

E. The GC and sub-contractors shall provide re-submittals as required.

3.2. SUBMITTAL REVIEW

A. Upon completion of the submittal upload by the GC the PMWS automatically notifies the appropriate Architect/Engineer and Owner Representative by Division/Specification number that there is a submittal for review.

B. The submittal shall be reviewed internally by the required Architect/Engineer and Owner Representative in a timely fashion and provide commentary on missing items, incorrect information, or incomplete shop drawings, etc as needed.

C. When the internal review is completed the PMWS will notify the Project Architect the submittal is ready for final review.

3.3. PROJECT ARCHITECTS REVIEW

A. Upon completion of the internal review the Project Architect shall review all internal review comments, confer with the CPM as needed and determine the appropriate disposition status for the submittal (approved or resubmit).

C. The Project Architect shall summarize final internal review comments onto the submittal cover sheet, provide a final disposition of the submittal and update the review status of the submittal to “Complete…” (with or w/o comments) or “Rejected”.

D. A completed Final Review status initiates the PMWS to notify the GC and appropriate sub-contractor(s) that the review of the submittal has been completed.

END OF SECTION

SECTION 01 43 39
MOCKUPS

PART 1 – GENERAL 1
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1.2. RELATED SPECIFICATIONS 1
1.3. RELATED DOCUMENTS 1
1.4. PERFORMANCE REQUIREMENTS 1
1.5. QUALITY ASSURANCE 1
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2.1. MATERIALS 2
PART 3 - EXECUTION 2
3.1. REVIEW THE PLANS AND SPECIFICATIONS 2
3.2. MOCKUP CONSTRUCTION 2
3.3. MOCKUP REVIEW 2
3.4. FINAL SUBMITTAL 3

PART 1 – GENERAL

1.1. SUMMARY

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

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

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

1.2. RELATED SPECIFICATIONS

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

1.3. RELATED DOCUMENTS

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

1.4. PERFORMANCE REQUIREMENTS

A. All Contractors shall be responsible for providing and constructing mockups as specified in their Division of Work in the plans and specifications.

B. Materials to be used shall be as specified in the construction documents, full sized and properly assembled.

C. Completed mockups shall be of sufficient size to provide visible detail of all components as needed for the sample.

1.5. QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1. MATERIALS

A. The materials used in mockups shall be only those materials indicated in the plans, specifications, and favorably reviewed submittals.

B. Mockups shall be made of full scale materials as delivered to the project site.

C. All materials associated with a particular detail, construction method, manufacturer's installation instructions shall be properly represented and visible in the mockup. This includes but is not limited to finished mortar joints, sealants, backer rods, tie bars, rebar, etc.

PART 3 - EXECUTION

3.1. REVIEW THE PLANS AND SPECIFICATIONS

A. The GC shall review the plans and specifications with all required contractors prior to constructing the mockup.

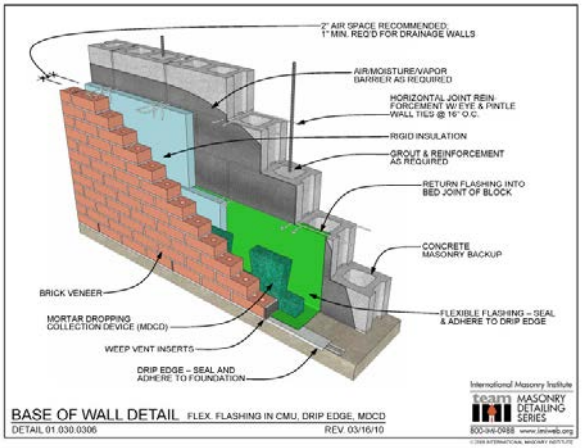
1. Mockups that will be built and remain in place, if favorably reviewed, will be installed in an area easily accessible for review.
2. Mockups that will not be built in place or will not remain will be constructed in a space on the project site protected from weather, construction traffic, and other such disturbances until such time as the associated work has been completed.
3. Insure all products being represented in the mockup meet the plans, specifications, and any published changes.

3.2. MOCKUP CONSTRUCTION

A. Mockups shall be of sufficient size to show various material adjacencies, connectivity, patterns, and other such related features.

B. Mockups shall be constructed in a layered fashion so that all products being used can be seen and evaluated.

C. The construction detail below is an example of a properly layered mockup.



3.3. MOCKUP REVIEW

A. The General Contractor and all associated Sub-contractors (Contracting Team) shall meet with the Owner, Owners Representative, Architect and Consultants (Design Team) as necessary to review the mock-up. Contractors shall be prepared to answer questions on materials and methods as necessary.

B. The Contracting and Design Teams shall review the mockup in detail for materials, methods, and workmanship with respect to the intent of the contract documents. Improvements or adjustments shall be discussed as needed.

C. If the mockup is incomplete or does not show sufficient detail of products and workmanship the General Contractor shall resubmit a new mockup.

D. Re-submittal of mockups to meet the intent of the contract documents shall be the responsibility of the General Contractor. No Change Orders will be processed for additional time or materials associated with re-submitting a mockup for approval.

1. In the event that a submitted mockup meets the criteria of the contract documents but does not meet the expectations of the design team and alternative methods or materials are discussed the following procedure shall be used:
    a. Project Architect shall publish a Construction Bulletin (CB) to detail the required/recommended changes.
    b. The GC shall prepare and submit a new mockup.

3.4. FINAL SUBMITTAL

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

END OF SECTION

SECTION 01 45 16
FIELD QUALITY CONTROL PROCEDURES

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATION SECTIONS 1
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3.4. QMO CLOSEOUT PROCEDURE 3
3.5. CONSTRUCTION CLOSEOUT 3

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 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".
      a. By using the QMO process the City of Madison's goal is to have a zero item punch list prior to the 90% progress payment and owner occupancy.

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.

C. It is the intent of this specification to outline the requirements, expectations, and responsibilities of the General Contractor (GC), Project Architect, and other representatives of the Owner for items of Quality Assurance and Quality Control.
   1. This specification is not intended to conflict with Specification 01 40 00 Quality Requirements or other specifications requiring testing and inspecting services.
   2. This specification does not relieve the GC from any requirements associated with regulatory inspections performed by the City of Madison Building Inspection Unit, or inspectors from other agencies as required by code.
   3. Any testing performed by an Owner's Representative does not relieve the GC from performing any testing that may required by the construction documents.

1.2. RELATED SPECIFICATION SECTIONS

A. Section 01 26 13 Request for Information (RFI)
B. Section 01 29 76 Progress Payment Procedures
C. Section 01 31 13 Project Coordination
D. Section 01 31 23 Project Management Web Site
E. Section 01 40 00 Quality Requirements
F. Section 01 77 00 Closeout Procedures
G. Section 01 78 13 Completion and Correction List

1.3. PERFORMANCE REQUIREMENTS

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

B. The GC shall be responsible for all of the following:

1. Monitor the quality of all workmanship, supplies, materials, and products being installed by all contractors and installers to ensure they meet or exceed the minimum requirements set forth by the construction documents.
2. Submit a Request for Information (RFI) whenever manufacturers' instructions or referenced standards conflict with the construction documents before proceeding with the Work.
3. Ensure that Work requiring special certifications or licensing is being performed by is being performed and supervised by personnel that meet the appropriate requirements.
    a. Ensure that all certificates and licenses are current throughout the execution of the project.

C. The CoM and its representatives shall perform quality assurance and quality control activities throughout the execution of this project. This in no way relieves the GC of maintaining an acceptable QA/QC program. =

1.4. QUALITY ASSURANCE

A. The GC shall be responsible for the following:
1. All materials, equipment, and products shall be new, clean, undamaged, and meet the performance specifications defined within the construction documents including favorably reviewed submittals.
    a. Any material, equipment, or product that does not meet the requirements of the construction documents shall be removed and replaced, including any adjacent and related work, at the GCs expense.
2. All Work shall be performed by persons properly trained and/or qualified to produce workmanship of the quality specified in the construction documents.
3. Providing access to updated as-builts, addenda, submittals, bulletins and other related construction documents at the project site.

B. The CoM and its representatives may be responsible for any of the following:
1. Attend pre-installation meetings
2. Attend construction progress meetings
3. Review all submittals
4. Conduct field visits for QA/QC purposes, provide feedback to the GC and sub-contractors using Quality Management Observation (QMO) reports.
5. Review delivered equipment
6. Witness equipment installations, startups, testing as specified in other specifications

1.5. QUALITY MANAGEMENT OBSERVATION REPORT

A. The Quality Management Observation report or QMO is used as a QA/QC tool by those entities responsible for QA/QC activities, including but not limited to, the GC, CoM, PA, CX agent, etc.

B. QMOs are designed to be an early observation of non-conforming construction work before it becomes buried by follow on work. As such it is most often used as an "in progress punch list".

C. QMO forms are part of the Quality Control Library on the Project Management Web Site.

PART 2 – PRODUCTS - THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. QUALITY MANAGEMENT RESPONSIBILITIES

A. While making routine progress visits to the construction project the GC, CPM, and A/E, and applicable others shall observe the details of the construction and installations to ensure that the intent of the construction documents is being followed.

B. If during the progress visit there is a determination of contract non-conformance a QMO report shall be initiated to begin the documentation process.
1. The GC field superintendent shall be informed immediately of any issue that may cause harm, damage to finished work, or be buried prior to properly filing a QMO report.

C. The following information when filing a QMO report:
1. Open a QMO report in the Quality Control Library on the Project Management Web Site
2. Enter the date and time of the field visit
2. Provide references to construction documents if any (examples; specification, drawing page, details, approved submittals, RFI, CB, etc)
3. Provide a short title for the observation being made
4. Provide a detailed description of the observation being made

5. Select all categories (Sitework, Structure, Enclosure, Interior, etc) from the given list that may apply to the observation being reported.
    a. For each category selected additional boxes shall open with contractor names associated with each category.
6. Select all contractors from the lists provided that may need to be aware of the observation.
7. Provide any attachments that may help provide reference to the observation.
8. Click the SAVE button before closing the form.

D. The software for the Project Management Website will email notifications that a QMO report has been initiated. The software will automatically select and notify the following:
1. The GC, PA, and CPM for all observation reports being filed.
2. Others depending on the observation categories selected.
3. Contractors based on the selections made in the sub-contractors lists.

3.2. RESPONDING TO A QMO

A. All contractors receiving email notification of a QMO Observation shall review the details of the observation.

B. The GC shall be responsible for determining the course of action required to remedy the non-conforming issue and shall coordinate and direct the contractor(s) responsible for any work related to the observation.

C. All contractors assigned to remedy the observation by the GC shall provide follow-up responses on the QMO report as follows:
1. Open the QMO report in the Quality Control Library on the Project Management Web Site.
2. In the “Follow-Up Response” area enter a description of your follow-up response in the box provided.
    a. Click “Insert Item” if additional boxes are required.
3. Add attachments (pictures) if needed to show the work has been completed.
4. Click the SAVE button before closing the form.

3.3. GENERAL CONTRACTORS FOLLOW-UP

A. The GC shall inspect the work to ensure that all assigned contractors have remedied the observation to the intent of the construction documents.

B. The GC shall respond with any additional comments in his/her response box.
1. If no comments are to be made the GC at a minimum must date the response box to trigger the next work flow.

C. Click the SAVE button before closing the form.

D. The software will email a notification to the CPM and the person who initiated the QMO that the issue has been remedied.

3.4. QMO CLOSEOUT PROCEDURE

A. The person who initiated the QMO shall review the remedied work and if properly corrected shall close and date the QMO form.
1. Click SAVE and the software will email a notification to the CPM that final review of the Observation is required.
2. In the event there are still issues the Quality Manager can add additional comments in the response area, click SAVE and re-issue the QMO for additional review as needed.

B. Once the person who initiated the QMO has closed the item the CPM shall review and verify with the PA that the Observation has been properly remedied and provide final closure on the QMO.

3.5. CONSTRUCTION CLOSEOUT

A. The GC shall note that successful close out QMOs are required for construction closeout as follows:

1. Certain progress payments as identified in Specification 01 29 76 are contingent QMO reports being properly closed out.

2. Specification 01 77 00 defines all construction closeout requirements.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

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PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to provide general guidelines and responsibilities related to the receiving, handling, and storage of all materials and products from arrival on the job site through installation.
   1. Immediate inspection of delivered goods means a timely replacement if damaged.
   2. Proper storage helps prevent damage and loss by weather, vandalism, theft, and job site accidents.
   3. Proper storage helps with job site performance and safety.
   2. Proper handling helps prevent damage and job site accidents.

B. Each Contractor shall be directly responsible for the receiving, handling, and storage of all materials and products associated with the Work of their Division or Trade.

C. Each Contractor responsible for Work associated with Owner provided materials or products shall be responsible for the receiving, handling and storage of the material/product as outlined in Section 3.8 below..

1.2. RELATED SPECIFICATIONS

A. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public Works Construction".
   1. Use the following link to access the Standard Specifications web page:
      http://www.cityofmadison.com/business/pw/specs.cfm
      a. Click on the "Part" chapter identified in the specification text. For example if the specification says "Refer to City of Madison Standard Specification **2**10.2" click the link for Part II, the Part II PDF will open.
      b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you to the referenced text.
      c. City Standard Detail Drawings (SDD) may be located from the index in Part VIII.

B. Section 01 57 21 Indoor Air Quality

C. Section 01 74 13 Progress Cleaning

D. Section 01 76 00 Protecting Installed Construction

E. Other Divisions and Specifications that may address more specifically the requirements for the storage and handling of materials and products associated Work of other Divisions or Trades.

1.3. QUALITY ASSURANCE

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

b. Immediately report any damaged products or equipment to the GC, begin arrangements for immediate replacement.
c. Materials or equipment that have been damaged, are incomplete, or do not comply with the construction documents shall not be permitted to be installed.

2. All materials and products shall be stored within the designated limits of the project site. Only store the amount of material necessary for upcoming operations so as not to interfere with other construction activities and access to Work by the Owner and Architect. Any offsite storage shall be at the expense of the contractor storing the material or product. All offsite storage requirements shall comply with this specification. All offsite storage of materials is subject to Owner Representative Quality Management review at any time.
3. Large storage containers may be used but shall be weather tight, securable, placed on concrete blocks, timbers, or jack stands and shall be level.
4. When lifting equipment is required the equipment rating shall be greater than the loading requirements of the item being lifted. In addition all of the following shall apply as necessary:
   a. Only designated and/or designed lift points shall be used.
   b. Large items shall have tag lines and handlers at all times during lifting operations.
   c. Lift at multiple points as needed to prevent bending.
5. Materials and products stored inside of the structure shall comply with all of the following:
   a. Storage shall not be allowed to impede the flow of work in progress.
   b. Storage shall not be allowed to hide completed work from review and inspections.
   c. Storage shall not exceed the design loads of the structural components it is being stored upon.
6. All materials and products shall be stored according the manufacturers minimum recommended requirements. All of the following shall be considered before storing any product or material:
   a. Dust and dirt
   b. Moisture and humidity, including rain and snow
   c. Excessive temperatures, direct sun, etc
   d. Product or material weight and size
   e. Potential for breakage
   f. Product incompatibility with other products such as corrosiveness, chemical reactions, flammability, etc.
   g. Product or material value and replacement cost
7. The Contractor shall be responsible for providing fully functional tarps or plastic wrap, to protect materials and products from the weather. All coverings shall be free of large holes and tears, and shall be tied, strapped, or weighted down to resist blowing.
8. The Contractor shall be responsible for any temporary heating, cooling, or other utility requirement that may be associated with the storage of a material or product.
9. The Contractor shall be responsible for securing materials and products of value such as copper, A/V equipment, etc. Such items shall be stored in securable shipping containers, job trailers or other such storage devices. Container shall be kept secured when not in use.

B. The GC shall inspect the job site daily to ensure that all products and materials stay weather tight and are secured against vandalism or theft as required by this specification.
C. The Owners Representative may at any time request improvements regarding storage of any material or product being provided under these construction documents.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. GENERAL CONTRACTOR REQUIREMENTS

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

1. When openings are required in completed Work (new or existing) the GC shall be responsible for providing an appropriate opening and for restoring the opening to the original or better condition upon completion. Restoration shall be weather tight and complete.

C. Repeated moving and handling of items being stored shall not be allowed. The GC shall be responsible for any damage and replacement because of mishandling or excessive handling.

3.2. BULK MATERIAL

A. Bulk material such as sand, gravel, top soil and other types of fill shall be stored away from the construction area and shall be stock piled as follows:
1. All bulk material shall be piled safely and efficiently in as small an area as practical. Only store the amount of material necessary for upcoming operations so as not to interfere with other construction activities and access to Work by the Owner and Architect.
2. All stock piles shall have silt fence/sock properly installed around the perimeter to prevent erosion and loss of material. Refer to City of Madison Standard Specification Section 210.1(f) and other related specification or details.
3. Fine grained material shall be protected with tarps to prevent blowing. Tarps shall be weighted or staked to stay in place.

B. Bulk material such as brick, concrete block, stone, and other palletized materials shall be stored on original shipping pallets until ready for use.

3.3. DRY PACKAGED MATERIAL

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

3.4. STRUCTURAL AND FRAMING MATERIAL

A. All structural and framing material shall be stored in an organized manner arranged by type, size and dimension. Materials shall be stored on pallets or timbers as necessary and shall not be allowed to lie directly on the ground.

B. Long and heavy items shall be supported at several points to prevent bending and warping.

3.5. EQUIPMENT

A. Equipment delivered to the site shall be stored away from all construction activities until the item can either be moved inside or properly installed.

B. Equipment shall be stored on slightly elevated ground or clear stone pad to keep water away from the base of the equipment.

3.6. FINISH PRODUCTS

A. Finish products such as flooring, tile, counters, lockers, toilets, partitions, lighting, and other similar items should not be delivered and stored until the structure has been enclosed, is weather tight, temperature controlled and the contractor is ready for such items to be installed.
1. Storage of finished products outside for any length of time shall not be allowed.

B. Products that cannot be stored inside the structure shall be stored in secured containers or job trailers until such time as they are ready to be installed.

C. Products with a high potential for breakage such as glass, mirrors, tiles, toilet fixtures, etc. shall be stored with additional protection as necessary such as but not limited to the following:
1. Store in original shipping containers until ready for installation.
2. Do not store in high traffic areas.
3. Shield with other materials such as cardboard, plywood, or similar products.

3.7. DUCTWORK, PIPING, AND CONDUIT

A. All piping and conduit shall be stored horizontally unless otherwise specified by the manufacturer or Division and Trade Specifications.
1. Do not store directly on grade.
2. Cover metal pipes and tubes to prevent rust and corrosion, allow ventilation to prevent condensation.
3. Whenever possible use pipe stands for storing pipe and conduit to prevent tripping and rolling hazards.

B. All ductwork shall be stored horizontally or vertically as necessary unless otherwise specified by the manufacturer or Division and Trade Specifications.
1. During storage, both ends of each duct shall be protected with plastic sheathing to prevent dust and dirt 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 74 13
PROGRESS CLEANING

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PART 1 – GENERAL

1.1. SUMMARY

A. Throughout the execution of this contract all contractors shall be responsible for maintaining the project site in a standard of cleanliness as described in this specification.

B. All contractors shall also comply with the requirements for cleaning as described in other specifications.

C. Work included in this specification shall include but not be limited to:

1. Safety Cleaning
2. Project Site Cleaning
3. Progress Cleaning
4. Final Cleaning

1.2. RELATED SPECIFICAITONS

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

1.3. QUALITY ASSURANCE

A. The General Contractor (GC) shall conduct daily inspections, more often if necessary, of the entire project site to ensure the requirements of cleanliness are being met as described within these specifications.

B. All contractors shall comply with other regulatory requirements as they apply to waste recycling, reuse, hauling, and disposal requirements of any governmental authority having jurisdiction.

C. The Owner reserves the right to have work done by others in the event any contractor fails to perform cleaning as described within these specifications. The cost of any Owner provided cleaning shall be charged to the contractor through a deduct change order.

PART 2 - PRODUCTS

2.1. CLEANING MATERIALS AND EQUIPMENT

A. The Contractor shall provide all required personnel, equipment, and materials necessary to maintain the required level of cleanliness as described in this specification.

B. Use only cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer, or as approved by the A/E.

C. Use only cleaning materials, equipment, and methods as recommended in the manufacturers care and use guide of the material, finish or equipment being cleaned.

PART 3 - EXECUTION

3.1. SAFETY CLEANING

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

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

3.2. PROJECT SITE CLEANING

A. This section applies to the general cleanliness of the project site as a whole for the duration of the execution of this contract.

B. Exterior Project Site Areas
   1. The GC and other Contractors as appropriate shall ensure the following levels of cleanliness are applied to the exterior project site areas.
      a. The overall appearance of the project site is neat and orderly. Defined areas for material storage, material waste, job trailers, and the project area are clean and well maintained.
      b. The construction fence is maintained, erect with no gaps, and properly posted per all regulatory requirements.
      c. All erosion control measures are properly maintained, cleaned, and repaired as necessary.
      d. All loose materials (construction or waste) are properly tied or weighted down to resist blowing.
      e. All construction materials are properly covered with fully functional tarps or plastic wrap, protected from the weather, coverings are tied, strapped, or weighted down to resist blowing.
      f. Dust control is applied as necessary or as required by any regulatory requirement.

C. Interior Project Site Areas
   1. All Contractors shall ensure the following levels of cleanliness are applied to the interior project site areas.
      a. The overall appearance of the project site is neat and orderly. Defined areas for material storage, material waste, and project area are clean and well maintained.
      b. Stored materials are kept in original shipping containers whenever possible. Stored materials not in shipping containers are properly stored and protected according to other applicable specifications.
      c. All scraps and debris shall be properly disposed of as often as necessary to keep work areas, passageways, stairs, and ramps free of debris and clear for emergency exiting.
      d. Boxes, pallets, and other such shipping containers, are broken down, stored in a consolidated area or, disposed of as often as is necessary.
      e. Hand tools, supplies, materials, electrical cords not being used are picked up and sptored in gang boxes, not left as walking hazards in work areas, passageways, etc.

D. Job Trailer
   1. The interior of the job trailer shall be kept clean and available as a work space at all times. The GC shall ensure that the following is provided for within the job trailer:
      a. Meeting space including tables and chairs.
      b. Sufficient space for all contractors to access the official construction documents, provide updates, etc.

3.3. PROGRESS CLEANING

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

c. Large items shall be properly stored, returned to designated areas, or disposed of as necessary.
d. Loose materials shall be properly secured.
e. Flammable or hazardous materials are properly stored or disposed of.

3. Weekly cleaning shall be conducted by all contractors as designated by the GC. Weekly cleanings shall include all the above for a daily cleaning and other necessary cleaning as designated by the GC.

B. This sub-section shall apply to Progress Cleaning in preparation for the installation of finishes, fixtures, and trim.
a. Surfaces receiving finishes shall be thoroughly cleaned prior to contractors applying finish materials. The GC shall be responsible for inspecting the area and surfaces being cleaned for finish prior to the sub-contractor applying the finish. This shall include but not be limited to the following:
i. Wall surfaces shall be wiped clean of dirt and oily residues, vacuumed free of dust, and shall be free of surface imperfections prior to painting or installing wall coverings.
ii. Metal surfaces shall be wiped clean of dirt and oily residues, and be free of surface imperfections prior to painting.
iii. Flooring shall be broom swept of large and loose items then vacuumed clean of dust and small particles, and damp mopped clean and dried prior to installing any flooring finish. Additional cleaning may be required depending on the preparation requirements recommended by the flooring material manufacturer.

C. This sub-section shall apply to Progress Cleaning after the installation of finishes, fixtures, and trim.
1. For the purposes of this section "clean" shall be defined as a level of cleanliness free of dust and other material capable of damaging or visually disfiguring finished work, finishes, fixtures, and trim.
2. Progress Cleaning at this point in the contract shall be conducted immediately as follows:
a. Dust, dirt, etc shall be swept and vacuumed off of finish flooring and trim.
b. Liquid spills shall be cleaned up according to the spill type. This shall include drips and spills caused by paint, stain, sealants, and other such items.
3. The Contractor(s) at no additional cost to the Owner shall be responsible for replacing any finished work, finishes, fixtures, and trim damaged or disfigured because of inadequate or improper cleaning.

3.4. FINAL CLEANING

A. As noted in Specification 01 29 76 Progress Payment Procedures, Progress Payment Milestone Schedule, Final Cleaning shall not be conducted prior to requesting the 90% contract total progress payment and all of the following shall be complete:
1. All final regulatory inspections including but not limited to Building Inspection Department and Madison Fire Department inspections have been successfully completed.
2. All Quality Management Observation (QMO) reports have been closed out.
3. All Demonstration and Training has been completed.
4. All Attic Stock has been consolidated and located to its designated area
5. All protection for installed construction shall be removed prior to final cleaning by the contractor responsible for providing the protections. This shall include the removal of any adhesive residues left behind from tapes. Contractors shall only use manufacturer authorized cleaning materials for removing adhesives, etc.

B. For the purposes of this section "clean" shall be defined as a level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

C. The GC shall be responsible for ensuring that all requirements under this section are being met.

D. General Requirements
1. Employ experienced personnel or professional cleaners for final cleaning as necessary for the areas or equipment being cleaned.
2. Cleaning equipment used shall be commercial grade equipment commonly used by professional cleaners.
3. Cleaning equipment and materials shall be cleaned, rinsed, or replaced to ensure a uniform level of cleanliness is being maintained during the final cleaning. This shall include but not be limited to the following:
a. Vacuum cleaner bags and/or filters are changed and/or cleaned as often as necessary.
b. Dust & wipe down rags are washed, rinsed, or replaced before starting each room.
c. Mopping equipment
i. Mop water for washing shall have cleaning solution added to the amount and temperature per manufacturer's recommendations. Mop washing water shall be replaced often to maintain the levels of the cleaning solution and temperature required.
ii. Mop water for rinsing shall remain clean, clear, and be replaced as often as necessary.

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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PART 1 – GENERAL

1.1. SUMMARY

A. This specification includes administrative and procedural requirements for the recycling, re-use, salvaging, and disposal of non-hazardous construction and demolition waste.

B. The General Contractor (GC) shall be fully responsible for complying with all applicable ordinances and other such regulatory requirements during the execution of this contract.

1.2. RELATED SPECIFICAITONS

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

1.3. CITY ORDINANCES

A. There are two (2) Madison General Ordinances (MGO) that the City of Madison has regarding construction and demolition waste.
   1. MGO 10.185, Recycling and Reuse of Construction and Demolition Debris, describes the requirements associated with this ordinance including definitions, documentation requirements, and penalties.
   2. MGO 28.185, Approval of Demolition (Razing, Wrecking) and Removal, describes the requirements associated with applying for and receiving a demolition permit.

B. All City of Madison, Board of Public Works, contracts being conducted by City Engineering, Facility Management, for construction, remodeling, or demolition shall comply with the above ordinances regardless of project type or size.

1.4. DEFINITIONS

A. Clean: Untreated and unpainted material, free of contamination caused by oils, solvents, caulks, and other chemicals.

B. Construction and Demolition Debris: Materials resulting from the construction, remodeling, repair, and demolition of utilities, structures, buildings, and roads.

C. Disposal: Off-site removal of construction and demolition debris and the subsequent sale, recycling, reuse, or deposit in authorized landfill or incinerator.

D. Hazardous: Exhibiting the characteristics of hazardous substance, i.e. ignitability, corrosiveness, toxicity, or reactivity and including but not limited to asbestos containing materials, lead, mercury and PCBs.

E. Non-hazardous: Exhibiting none of the characteristics of a hazardous substance.

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

1.5. PERFORMANCE REQUIREMENTS

A. The GC shall develop a Waste Management Plan that results in end-of-project rates for salvage/recycling/reuse of 75 percent (minimum) by weight of the total waste generated by the Work. Percentages may be adjusted on a project by project basis depending on selected LEED goals associated with the project.
B. The GC shall salvage or recycle 100 percent of all uncontaminated packaging materials including but not limited to the following:
    1. Paper
    2. Cardboard
    3. Beverage containers
    4. Boxes
    5. Plastic Sheet and film
    6. Polystyrene packaging
    7. Wood crates and pallets
    8. Plastic pails and buckets
C. Promote a resourceful use of supplies and materials through proper planning and handling. Generate the least amount of waste possible by minimizing errors, poor planning, breakage, mishandling, contamination or other similar factors.
D. Use all reasonable means to divert construction waste from landfills and incinerators through recycling, reuse, or salvage as appropriate.

1.6. SUBMITTALS AND DELIVERABLES

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

2. Records of Sales: Indicate receipt and acceptance of itemized salvageable waste sold to individuals or organizations. Indicate if the organization is tax exempt.
3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts and invoices.
4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts and invoices.
5. Statement of Refrigerant Recovery: The Refrigerant Recovery Technician responsible for recovering refrigerant shall provide the GC with a statement indicating all of the following:
    a. All recovery was performed according to EPA Regulations.
    b. All refrigerant present was recovered; indicate the total quantity recovered by unit.
    c. Date of Recovery.
    d. Name, address, company name, and phone number of technician performing the recovery.
    e. Technician shall sign and date the statement.

C. LEED Submittal: The GC shall provide the following information using the appropriate LEED letter template upon project completion: indicating that the requirements of the credit have been met. *NOTE: This requirement shall only apply to projects having a LEED certification goal.*
1. Total waste material generated.
2. Total waste material diverted by diversion method; recycling, salvage, re-use, etc.
3. Statement that the credit requirements have been met.
4. GC shall sign the letter.

1.7. QUALITY ASSURANCE

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

D. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

1.8. WASTE MANAGEMENT PLAN

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

iii. Designated locations on the project site for waste material containers.

B. If project requires demolition incorporate the ordinance required (MGO 28.185) Recycling and Reuse Plan into the Waste Management Plan.

C. Provide all of the following for the Waste Management Coordinator:

1. Name, employer, employer address, phone number, and email address of the designated coordinator.
   a. The GC shall also provide this information with the required Project Directory Submittal at the beginning of the project.

D. If at the option of the GC, he/she chooses to contract with a Waste Management Disposal Company that allows comingled and unsorted waste materials, the GC shall include with his/her Waste Management Plan the following:

1. Name, address, phone number, state permitting information, and other pertinent information about the disposal company.
2. Documentation from the disposal company indicating company policies and procedures regarding comingled and unsorted waste materials to include:
   a. GC responsibilities on the project site.
   b. Disposal company procedures for receiving, sorting, recycling, and disposing of comingled and unsorted waste material.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. PLAN IMPLEMENTATION

A. Implement the approved waste management plan. Provide adequate containers, storage space, signage, transportation and other items required to implement the plan during the execution of this contract.

B. The GC and Waste Management Coordinator shall be responsible for monitoring and reporting the status of the Waste Management Plan and shall monitor the waste management practices on site as frequently as needed.

C. Train all workers, sub-contractors, and suppliers on proper waste management procedures as appropriate for the work being conducted on the project site.

1. Distribute the waste management plan to everyone concerned within seven (7) days of submittal approval.
2. Distribute the waste management plan to new workers, sub-contractors, and suppliers when they first appear on the project site.
3. Conduct additional training as needed during the execution of the contract to keep a positive focus on the waste management plan.

D. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent and used facilities.

1. Designate and label specific areas on the project site necessary for separating materials to be salvaged, recycled, reused, donated, and sold.
2. Comply with any specification or regulatory requirements pertaining to dust, dirt, environmental protection, and noise control.

3.2. HAZARDOUS AND TOXIC WASTE

A. The Owner shall be responsible under separate contract for the removal of any asbestos related materials. All other materials shall be removed by the GC.

B. All hazardous and toxic waste shall be separated, stored, and disposed of according to all applicable regulations.

C. All hazardous and toxic materials on site shall have a Material Safety and Data Sheet (MSDS) available that indicates storage requirements, emergency information, and disposal requirements as necessary.

3.3. GENERAL GUIDELINES FOR ALL WASTES

A. Recycle all paper and beverage containers used by workers, sub-contractors, suppliers and visitors to the project site.

B. All revenues, savings, rebates, tax credits, and other such incentives received from recycling, reusing, or salvaging waste materials shall accrue to the GC unless specified otherwise in the contract documents.

C. Separate recyclable, reusable, and salvageable waste from other waste materials, trash, and debris except where Waste Management Disposal Company allows comingled waste materials, see section 1.8.D above.

1. Separate by type in appropriate containers or designated areas according to the approved waste management plan away from the construction area. Do not store within the drip lines of existing trees.

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

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

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

N. Piping and conduit: Reduce all piping and conduit to straight lengths, sort and store by size, material and type. Remove supports, hangers, valves, boxes, sprinkler heads, and other such components, sort and store by size, material and type. Transport to authorized recycling facilities according to material types.

O. Roofing: Roofing materials shall be sorted and containerized by type, transport to authorized recycling facilities according to material types.

P. Site-Clearing Waste: Sort all site waste by type.

1. Only stockpile soils types and quantities required for re-use on the project site. All remaining quantities shall be transported off site to an authorized facility that receives such materials.
2. Brush, branches, and trees with no marketable re-use shall be transported to facilities for chipping into mulch.
3. Trees with a marketable re-use shall be salvaged and transported to facilities that specialize in processing trees for future use as wood products.

3.5. GUIDELINES FOR DISPOSAL OF WASTES

A. The following guidelines shall be adjusted as needed by the methods and procedures identified in the Waste Management Plan.

B. Any waste that is contaminated, organic, or cannot be recycled, re-used, or salvaged shall be legally disposed of in an authorized landfill or incinerator. Disposal methods shall follow all applicable regulatory requirements.

C. No waste material of any kind, except those types designated as clean fill in section 3.4 above, shall be allowed to be buried on the project site at any time.

D. No burning of any kind of waste material shall be permitted on this project site at any time.

E. Paint and Stain: Paints, stains, and their containers shall be disposed of as follows:

1. Whenever possible containers should be thoroughly cleaned immediately after emptying and sorted with as appropriate (metal or plastic) for recycling
2. Empty containers, regardless of type or base material, may be disposed of with lids off with general garbage.
3. Latex paint may be placed with general garbage if properly solidified as follows:
   a. Small amounts (an inch or less in can): Remove lids and allow paint to dry out in the can and harden. Protect cans from rain and freezing.
   b. Large amounts (more than one inch): Mix paint with equal amounts of cat litter, stir and allow to completely dry. Alternate method: mix with commercial paint hardener.
4. Oil-based or combustible paints and stains, regardless of liquid or solid, shall be transported to an approved facility that takes such items such as Dane County Clean Sweep Sites.

F. Treated Wood Materials: Treated wood materials including but not limited to wood that has been painted, stained, or chemically treated shall not be recycled or incinerated.

END OF SECTION

SECTION 01 76 00
PROTECTING INSTALLED CONSTRUCTION

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PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to provide clear responsibilities, guide lines, and requirements related to providing protection to already installed construction.

B. Already installed construction shall include but not be limited to the following:

1. Any existing site feature such as pavement, curbs, drainage features, utilities, landscaping features (trees, shrubbery, plantings, flagpoles, etc) and other such exterior items not associated with the building whether on or adjacent to the project site.
2. Any existing structure on or adjacent to the project site.
3. Any existing interior work that may be adjacent to the new work including all paths of ingress/egress to areas associated with accessing the Work.
4. Any existing feature of any kind within the public right-of-way that may be on the project site property, adjacent to the project site or across the street from the project site.

C. All contractors shall be familiar with the specifications of their Division of Work for specific requirements on protection of the Work.

D. The requirements noted within this specification do not relieve any contractor of the responsibility for compliance with any code, statute, ordinance, or other such regulatory requirement having jurisdictional authority over these contract documents.

1.2. QUALITY ASSURANCE

A. It shall be the responsibility of every contractor and worker assigned to the project to be diligent in protecting all existing work, and newly installed construction.

B. It shall be the General Contractors' (GC) responsibility under the contract to provide all reasonable protection methods, materials, or precautionary measures required to protect new or existing construction as described in within this specification to the project as a whole.

1. The GC shall be responsible to ensure any damaged new or existing construction is repaired or replaced at no additional cost to the Contract.
2. The GC at his/her discretion may direct other contractors to provide and maintain protection of completed work associated with their Division of Work. I.E.: The carpet installer may be required by the GC to provide carpet protection along traveled paths, ingress/egress, etc after installation.

C. It shall be the responsibility of the GC to ensure that all materials being used to protect installed construction are compatible with, and/or adjacent to, the materials being protected. This shall include but not be limited to the material used as covering, tapes used to fasten protective materials, etc.

1.3. RELATED SPECIFICATIONS

A. Parts of this specification will reference articles within "The City of Madison Standard Specifications for Public Works Construction".
   1. Use the following link to access the Standard Specifications web page:
      http://www.cityofmadison.com/business/pw/specs.cfm
      a. Click on the "Part" chapter identified in the specification text. For example if the specification says "Refer to City of Madison Standard Specification **2**10.2" click the link for Part II, the Part II PDF will open.
      b. Scroll through the index of Part II for specification 210.2 and click the text link which will take you to the referenced text.
      c. City Standard Detail Drawings (SDD) may be located from the index in Part VIII.

B. Section 01 60 00 Product Requirements

C. Section 01 74 13 Progress Cleaning

PART 2 - PRODUCTS

2.1. FENCING MATERIALS AND BARRICADES

A. Except where noted in other areas of the construction documents the responsible contractor may provide any of the following that sufficiently provide a sturdy physical barrier and/or visual barrier as necessary for the intended application.
   1. Standard orange construction barrels each with a standard rubber base ring and reflective tape
      a. Provide flashing amber lights as needed to increase night time visibility
   2. Steel "T" style fence posts
   3. 4'0" high standard orange construction fence
   4. Traffic barricades
   5. Jersey barriers
   6. Other types of fencing or barricades typically used in the construction industry

B. The contractor responsible for providing the fencing materials and barricades shall also be responsible for maintaining them. This shall include but not limited to fixing damaged fencing, standing up barrels that have been knocked over, realigning barrels, and ensuring flashing lights are fully operational at all times.

C. The following fencing and barricade designations, and their use descriptions shall be used throughout this specification to provide uniformity in describing protection requirements.
   1. Type A, Jersey Barriers, to be used as permanent blocking devices to deny access to alternate project site entrances or exits.
   2. Type B, Traffic Barricades, to be used as temporary blocking devices to deny access to alternate project site entrances or exits.
   3. Type C, Construction Barrels without construction fencing shall be used for lane closures, temporary blocking devices to deny access and the protection of single locations (I.E. identify the location of an access structure) that do not require fencing.
   4. Type D, Construction Barrels with construction fencing where it becomes necessary to surround an object with a complete visual barricade and it is impractical or unacceptable to install fence posts. The surround shall be constructed in such a manner as to provide a buffer zone around and access to the item being protected.
   5. Type E, Steel "T" Fence Posts with construction fencing to surround an object with a complete visual barricade and it is practical to install fence posts. The surround shall be constructed in such a manner as to provide a buffer zone around and access to the item being protected.
   6. Type X, Other fencing or barricade types that may be designated and detailed within the construction documents shall use additional alpha numeric designations.

2.2. EROSION CONTROL PROTECTION

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

2.3. INTERIOR FINISH PROTECTION MATERIALS

A. Except where noted in other areas of the construction documents or this specification the responsible contractor:
   1. Shall not provide the cheapest or least effective method as an effort to meet any protection requirement.

2. Shall provide materials of sufficient quality, and durability to provide adequate protection based on the seasonal conditions and the anticipated duration at the time the protection will be needed.
3. Shall provide sufficient quantity of protection material to protect the construction as needed.

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

PART 3 - EXECUTION

3.1. GENERAL EXECUTION REQUIREMENTS

A. The GC shall be responsible for ensuring all of the following procedures and requirements are implemented as needed for the duration of the Work performed under this contract.

B. The GC shall also be responsible for the following:
1. Reporting any incident of damage to existing property, right-of-way, or utility to the CPM immediately upon rendering the incident safe, and notifying emergency response teams, and emergency utility crews as needed.
2. Conduct a site walk through prior to leaving at the end of each day to assess:
   a. Protection measures are properly in place, provide correction actions as necessary.
   b. Note damage to existing completed work and schedule repair/replacement as needed.
3. Ensure all contractors and workers are being diligent in protecting existing work, and newly installed construction.

3.2. PROTECT ADJACENT PROPERTIES

A. Whenever possible through the design process the City of Madison shall have previously provided notice to adjacent property owners that work will be occurring on or near their property. The City of Madison shall also have obtained any permanent or temporary easements that may be necessary to complete any Work on adjacent properties.

B. It shall be the responsibility of the GC to do the following for all Work under this contract being performed on or adjacent to the property line:
1. Contact the adjacent property owner and provide him/her with information on the work to be done, equipment to be used, and estimated duration of the work. Information to be updated and communicated to property owner(s) as construction progresses and site conditions change.
   a. If any adjacent property is a rented or leased space the GC shall also make contact and provide the same information to the tenants.
   b. Determine from the owner and/or tenants if there are any concerns for children, pets, special plantings, or other concerns.
2. Discuss the following with all contractors performing work on or near the property line.
   a. Work to be completed and timeline.
   b. Concerns of adjacent property owners/tenants from item 1 above.
   c. Which protective measures will be necessary to protect adjacent properties and address the concerns of adjacent property owners/tenants.
3. Ensure all protective measures are placed and maintained during the execution of Work on or adjacent to the property line. Interact with the adjacent property owners/tenants as needed.

C. Any contractor doing work on or adjacent to the property line shall install and maintain any protective measure identified in the contract documents, this specification, or as directed by the GC.

D. The GC shall be responsible for restoring any damage to structure and property located on or adjacent to the property line.
1. Restoration shall include but not be limited to repair or replacement using like materials and finishes to its original condition or better.
2. Restoration of landscaping materials shall include watering of any seed, sod, or other planting of any kind for a reasonable period of time to encourage germination and root development.

E. The GC shall keep the CPM informed directly to any issues pertaining to adjacent property owners and tenants.

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.

B. When additional protection for traffic control is required, the use of barricades, guardrails, lane closures and other such procedures will be detailed within the construction documents.

C. When additional protection for overhead sidewalk cover is required the contract documents shall indicate the specific location and structural requirements of the protective structure.

3.6. PROTECT STORED MATERIALS

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

3.7. PROTECT WORK - EXTERIOR

A. Provide all temporary services that may be required to protect the installed material from heat, cold, humidity, etc, while materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.

B. Open trenches, pits, and other such excavations shall be properly covered, lined, or shored as needed during periods of inclement weather to prevent the caving of soils onto existing work in progress. Refer to the appropriate specifications and/or regulatory requirements governing this type of work as necessary.

C. Provide adequate protection at all openings with heavy duty tarps, plastic sheathing, or wood framing and sheathing as needed to protect interior work in progress from inclement weather as needed.

D. Protect exterior finishes of all kinds with heavy duty tarps or plastic sheathing as needed while landscaping is being installed through full germination of seeded areas or installation of filter fabric and mulches to keep dust, dirt, and mud off of finished exterior surfaces.

E. Designate specific curb mounting points and provide wood blocking where small vehicles, skid loaders and other such equipment may need access to areas being landscaped.

F. Provide plywood turning pads for skid loaders to turn on to prevent tire marking on new pavement.

G. Do not permit the parking of vehicles with any kind of fluid leaks to park on new pavement.

H. The contractor shall be responsible for cleaning, repairing, or replacing any completed work or work in progress under this specification as deemed necessary by the CPM without additional cost to the contract.

3.8. PROTECT WORK - INTERIOR

A. The GC shall do all of the following:

1. Provide all temporary services that may be required to protect the installed material from heat, cold, humidity, etc, while materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.
2. Provide adequate visual and/or physical protection as needed to protect newly completed interior work such as paint, flooring material, sealants, grouts, etc that may be drying and/or curing.
3. Provide adequate space and materials for cleaning boots, tool boxes, supplies, and other items coming into the project site once finish work has begun.
4. Clean dirtied areas and repair/replace damaged areas immediately.

B. The contractors responsible for interior work shall be responsible for protecting their work and finishes from dirt, mud, snow, spills, splatters, and physical damage after installation as follows:

1. Protect vinyl composite, rubber composite, painted/stained concrete, and tiled flooring as follows:
   a. Define foot traffic areas and protect with Ramboard Temporary Floor Protection products as a minimum basis of design or other protection product(s) compatible with installed flooring product if Ramboard is not compatible. Products to be used shall be new.
      i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other material between the installed flooring and the protection material.
      ii. Repair tears immediately, replace worn areas with like material as necessary.
2. Protect carpeted areas as follows:
   a. Define foot traffic areas and protect with a minimum of 6mil, clear, polyethylene sheeting 3 feet wide. Products to be used shall be new.
      i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other material between the installed flooring and the protection material.
      ii. Repair tears immediately, replace worn areas with like materials as necessary.
3. Protect all finished walls in high traffic areas with Ramboard Temporary Wall protection products or approved equal.
      i. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other material between the installed flooring and the protection material.
      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

A. The purpose of this specification is to clearly define and quantify the requirements associated with closing a City of Madison Public Works Contract for facility related work.

B. All contracts have two distinct but related paths. Each path needs to be properly closed independently in order to close the contract as a whole.

1. Construction closeout is related to closing out all of the Work associated with the construction documents.
   a. It shall be the responsibility of all contractors to be fully aware of the required Work and closeout requirements involved in their individual trades.
2. Contract closeout is related to closing out all of the administrative aspects of the contract in general.
   a. It shall be the responsibility of all contractors to be fully aware of the administrative requirements required by the contract and to provide the supporting documentation required.
3. Construction Closeout must be completed before Contract Closeout can begin.

C. This specification will provide general knowledge associated with the following areas:

1. Construction Closeout Requirements
2. Construction Closeout Procedure
3. Contract Closeout Requirements
4. Contract Closeout Procedure
5. Final Payment and Certificate of Completion

1.2. RELATED SPECIFICATIONS

A. Contractors shall review all references to other specifications including specifications relating to the execution of the Work associated with their Division or Trade.

B. Section 01 29 76 Progress Payment Procedures
C. Section 01 31 23 Project Management Web Site
D. Section 01 32 26 Construction Progress Reporting
E. Section 01 45 16 Field Quality Control Procedures
F. Section 01 74 13 Progress Cleaning
G. Section 01 45 16 Construction Waste Management and Disposal
H. Section 01 76 00 Protecting Installed Construction
I. Section 01 78 13 Completion and Correction List
J Section 01 78 23 Operation and Maintenance Data
K. Section 01 78 36 Warranties
L. Section 01 78 39 As-Built Drawings
M. Section 01 78 43 Spare Parts and Extra Materials
N. Section 01 79 00 Demonstration and Training
O. Other requirements as noted in the contract documents signed by the General Contractor

1.3. DEFINITIONS

A. ***Substantial Compliance***: A letter provided to the City of Madison Building Inspection and signed by the Project Architect indicating that all Work has been completed to a level that would allow Owner Occupancy and that all construction is in compliance with the construction documents. A copy of this letter is also provided to the State of Wisconsin Department of Health and Safety as necessary to clear plan review requirements. This letter does not represent construction closeout.

B. ***Certificate of Occupancy***: The Regulatory letter from the City of Madison Building Inspection Department indicating that all regulatory requirements and inspections have been completed and the building may now be occupied for its intended use. This letter does not represent construction closeout.

C. ***Certificate of Substantial Completion***: A letter provided by the Department of Public Works, signed by the City Engineer indicating that Construction activities are substantially complete. This letter does represent construction closeout and the date of this letter begins the date of the Warranty Period.

D. ***Construction Closeout***: The point in the contract where all contractural requirements associated the execution of the Work as described in the plans, specifications, and other documents have been successfully met and the items described in 1.3.A, .B, and .C above have been completed.

E. ***Final Progress Payment***: The progress payment associated with achieving Construction closeout as described in 1.3.D above. At this point the contractor may request all monies associated with the contract be paid with the exception of held retainage.

F. ***Contract Closeout***: The point in the contract where all contractural requirements associated with the City of Madison, Board of Public Works contract has been successfully met.

G. ***Final Payment***: The final contract payment submittal that may be approved by the City of Madison after all contractural requirements of the Public Works Contract have been met and any remaining monies (retainage) due to the contractor may be released for the Final Payment.

1.4. QUALITY ASSURANCE – CONSTUCTION CLOSEOUT

A. All contractors shall be responsible for properly executing the construction closeout requirements associated with their Work as described in the specifications governing their Work.

B. The GC shall be responsible for all of the following:

1. Ensuring that all contractors have met the construction closeout requirements associated with their Work.
2. Coordinate the collection of all construction closeout deliverables from all contractors, provide the deliverables to the Project Architect and City Project Manager for review as necessary, and ensure all contractors correct deficiencies of deliverables and resubmit as needed for final acceptance.
3. Ensure all closeout requirements identified in the Construction Closeout Checklist below have been completed as intended by the construction documents.

1.5. QUALITY ASSURANCE – CONTRACT CLOSEOUT

A. The City of Madison, Department of Civil Rights (DCR) monitors contract compliance for construction and procurement contracts to ensure that local, state and federal regulations are followed by contractors working on City of Madison Public Works (PW) projects. DCR will monitor all PW projects from contract award through the final payment at the close of the project. Contractors will be required to submit reporting paperwork throughout the PW project process.

1. Contractors are encouraged to visit the web site identified below for additional information, checklists, forms, and other information provided by DCR as it relates to Contract Compliance.
   http://www.cityofmadison.com/Business/PW/contractCompliance.cfm
2. Questions regarding the process should be directed to parties and offices as identified on the various forms, documents, and instructions or contact:
   City of Madison, Department of Civil Rights
   210 Martin Luther King Jr. Blvd., Room 523
   Madison, WI 53703
   (608) 266-4910

B. All Sub-Contractors have submitted the applicable required documents described in item 1.5.D below to the General Contractor (GC) for Contract Closeout.

C. The GC has submitted the required applicable documents described in item 1.5.D below for all contractors to the appropriate City of Madison Agency per instructions associated with each submittal.

D. The documents required for submittal to the City of Madison for Contract Closeout may include any/all of the items listed below depending on contract type. It is the sole responsibility of all contractors to know and submit the required and complete documentation in a timely fashion.

1. Weekly Payroll Reports
2. Employee Utilization Reports
3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination
4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination
5. Documentation required for Small Business Enterprise (SBE) goals
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.

Title	Specification	Description	Responsibility	Completed
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.

a. The first meeting shall be held at the 50% Contract Total Payment milestone. This meeting shall discuss the requirements associated with various construction/contract closeout documentation and events when they are due with respect to progress payments.
b. The second meeting shall be held at the 70% Contract Total Payment milestone. This meeting shall review the contractors progress regarding the closeout checklist, begin making plans for upcoming deadlines such as scheduling training, where to put attic stock, and when they are due with respect to progress payments.

2. The GC, PA, and CPM, shall utilize the Construction Closeout checklist to ensure that all construction closeout requirements have been met.

3.3. CONSTRUCTION CLOSEOUT PROCEDURE

A. Upon successful completion and final acceptance of all Construction Closeout Requirements the GC may submit to the CPM and PA the request for Final Progress Payment (100% contract total, less retainage).

B. The PA will confirm with the design consultants, CPM, and other City of Madison staff that all requirements of the Work have been completed and will do the following:
1. Approve the final progress payment application
2. Provide the required signed payment documents to the CPM
3. Provide the required Letter of Substantial Compliance to the following as required:
a. State Safety and Building Division
b. Local Building Inspection office
c. GC
d. CPM

C. The CPM shall draft the City Letter of Substantial Completion for signature by the City Engineer. This letter shall state any of the following that may still be tied to the contract and/or warranty:
1. Indicate that the date of the letter shall also be the beginning of the Warranty period.
2. Indicate any allowed due outs, reasons for them, and anticipated dates of finalization.
a. QMO issues such as off season testing of equipment
b. Off season training of equipment

D. The GC and all subcontractors shall finalize all warranty letters associated with their Work using the date noted on the City Letter of Substantial Completion, and provide the CPM with all warranties as described in Specification 01 78 36 Warranties. Upon receipt and final approval of the Warranties the CPM may initiate final processing of the Final Progress Payment (100% contract total, less retainage).

3.4. CONTRACT CLOSEOUT REQUIREMENTS

A. The GC and all sub-contractors shall follow all requirements associated with documenting contract compliance and provide documentation as required or requested by DCR or PW staff. All contractors are encouraged to stay current with submissions of the following documentation:
1. Weekly Payroll Reports no later than the Progress Payment equal to 50% of the contract total.
2. Employee Utilization Reports
3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination
4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination
5. Documentation required for Small Business Enterprise (SBE) goals
6. Other documents as maybe required or requested through the Finalization Review Process

B. Near the Progress Payment equal to 80% of the contract total the GC shall request in writing a Finalization Review. At that time DCR or PW staff shall prepare a report of all contract documentation submitted to date. A list of missing items or outstanding issues will be emailed to the GC. <u>No additional follow-up will be generated by DCR or PW Staff</u>.

3.5. CONTRACT CLOSEOUT PROCEDURE

A. The Contract Closeout Procedure will not begin until the Construction Closeout Procedure has been completed.

B. When the GC feels he/she has successfully met all of the Contract Closeout Requirements associated with Section 3.3 above the GC may submit to the request for Final Payment to the CPM.

C. The CPM shall sign and submit the Final Payment request for processing.

D. DCR and PW staff shall do a complete review of all documentation associated with item 3.3.A above.

E. The GC shall be notified directly by DCR or PW Staff of any documentation that may still be missing, have incomplete information, or other outstanding issues. It shall be the responsibility of the GC to continue follow-up with DCR and PW staff until all documentation has been successfully submitted and accepted.

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

END OF SECTION

SECTION 01 78 13
COMPLETION AND CORRECTION LIST

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
PART 2 – PRODUCTS – THIS SECTION NOT USED 1
PART 3 – EXECUTION – THIS SECTION NOT USED 1

PART 1 – GENERAL

1.1. SUMMARY

A. The City of Madison has developed a multi-faceted Quality Management Program that begins with contract signing and runs through contract closeout to ensure the best quality materials, workmanship, and product are delivered for the contracted Work.

1. The Progress Management Web Site is a Construction Management tool that provides contractors, consultants, and staff a single on-line location for the daily operations and progression of the Work.
2. The Quality Management Observation (QMO) is an ongoing observation of the construction process as it progresses. The City of Madison does not use a "Punch List" or "Corrections List" as it is typically known throughout the construction industry. The QMO process acts as an "in progress punch list". Work identified as not in compliance with the contract documents by the Owner, Owner Representatives, Owner Consultants, etc. shall be resolved immediately at the Contractor's expense. Unresolved issues will be subject to withholding of progress payment(s) until completed.
3. Very stringent expectations are tied to Construction Closeout and Contract Closeout procedures. Specific milestones throughout the project need to be met and the milestones are tied to the Progress Payment Schedule.

B. All contractors shall be required to review the specifications identified in Section 1.2 below, and other related specifications identified therein to become familiar with the terminology and expectations of this City of Madison Public Works contract.

1.2. RELATED SPECIFICATIONS

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

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 – EXECUTION – THIS SECTION NOT USED

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. QUALITY ASSURANCE 1
1.4. O&M DATA REQUIREMENTS 1
1.5. O&M DATA SUBMITTALS 2
PART 2 – PRODUCTS – THIS SECTION NOT USED 2
PART 3 - EXECUTION 2
3.1. O&M DATA PREPARATION - GENERAL 2
3.2. O&M DATA DRAFT SUBMITTAL 3
3.3. O&M DATA FINAL SUBMITTAL 3
3.4. CONSTRUCTION CLOSEOUT 3

PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to provide clear responsibilities and guide lines related to providing well documented and complete Operation and Maintenance (O&M) Data related to general facility use, equipment, systems, finishes, and materials to City of Madison Staff (Owner, Owner Representatives, Maintenance, and Custodial Personnel) as needed.

B. Operation and Maintenance Data shall apply to both of the following categories except where specific requirements are noted under their separate titles as follows:

1. Operation and Maintenance Data: Generally shall mean the owner manual that provides information on start-up, shut-down, operation, troubleshooting, maintenance, parts, and other such documentation as it pertains to all equipment and systems installed under the Work.
2. Use and Care instructions: Where applicable use and care instructions shall also be considered O&M for such things as flooring, tile, partitions, and other such finishes and trim related items, installed under the Work.

1.2. RELATED SPECIFICATIONS

A. Section 01 29 76 Progress Payment Procedures
B. Section 01 31 23 Project Management Web Site
C. Section 01 77 00 Closeout Procedures
D. Section 01 78 13 Completion and Correction List
E. Section 01 78 19 Maintenance Contracts
F. Section 01 78 36 Warranties
G. Section 01 79 00 Demonstration and Training
H. Other Divisions and Specifications that may address more specifically the requirements for O&M Data.

1.3. QUALITY ASSURANCE

A. All O&M Data shall meet the requirements identified in Section 1.4 below.

B. All contractors shall provide O&M Data for each piece of equipment, system, or finish installed during the installation of the Work. O&M Data shall be provided to the General Contractor (GC) for verification and submittal.

C. The GC shall be responsible for receiving all required O&M Data files from all contractors for verifying that all files submitted meet the requirements in Section 1.4 below.

1.4. O&M DATA REQUIREMENTS

A. O&M Data shall be provided in digital PDF format as follows:

1. PDF files shall be complete first generation consumer useable editions of PDF documents as provided by any of the following:
   a. Product manufacturer
   b. Supplier of product
   c. Product manufacturer internet site
2. Acceptable PDF files shall have the following functionality:

a. Word searchable
b. Key areas are bookmarked
c. Table of Contents and/or Index linked to content is preferred whenever possible.

3. Scanned printed material, with word searchable capabilities, saved as a PDF, is not acceptable and will be rejected without further review.

B. O&M Data shall include but not be limited to the following manufacturers' published information as appropriate for the equipment, system, material, or finish:

1. Installation instructions
2. Parts lists, assembly diagrams, explosion diagrams
3. Wiring diagrams
4. Start-up, shut-down, troubleshooting and other related operation procedures
5. Lubrication, testing, parts replacement, and other such maintenance procedures
6. General use, care, and cleaning instructions
7. Special precautions and safety requirements
8. A list of certified equipment vendors, service companies, parts suppliers including company name, address, and phone number
9. A list of the recommended spare parts to have on hand at all times
10. A list by type of all recommended lubes, oils, packing material, and other maintenance supplies
11. Copies of final test reports, balance reports, and other related documentation
12. Warranty information for equipment and systems

1.5. O&M DATA SUBMITTALS

A. O&M Data shall be prepared as identified in this specification and shall be submitted for review as per the schedule identified in Specification Section 01 29 76, Progress Payment Procedures.

B. O&M Data Draft submittals will be reviewed for content, procedure, and compliance only. A general critique with recommendations for improvement will be made but re-submittals will not be required.

C. O&M Data Final submittals will be reviewed for content, procedure, and compliance. Re-submittals will be required until such time as each submittal is accepted.

NOTE: Acceptance of O&M Data Final submittals is required to be complete prior to scheduling and conducting owner related training and construction closeout.

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. O&M DATA PREPARATION - GENERAL

A. All contractors shall prepare O&M Data for draft and final submission as follows:

1. Obtain digital PDF files for each piece of equipment, system, material or finish as described in Sections 1.4.A.1 and 1.4.A.2 above.
2. Verify that all information as described in Section 1.4.B above is included with the PDF file. Obtain missing information as necessary for a complete submittal.

B. Rename each individual PDF file as follows.

1. Do not use special characters such as #, %, &, /, etc. These characters are reserved by the Project Management Web Site software the City of Madison uses; however the under-score (or under-bar) '_' is an allowed character.
2. Use the following format and examples for renaming your file:
   a. Format: ***Equipment name_What_Project name_Contract number_Year***
      i. *Equipment Name* represents the name of any equipment, system, material or finish as designated in the Contract Documents.
      ii. *What* represents what the file is about
      iii. *Project Name* represents the title of the project or contract. A shortened version of the title may be identified by the City Project Manager to be used by all contractors.
      iv. *Contract number* is the specific identification number the Work was bid under and appears on the plan set title sheet and in each sheet title block
      v. *Year* represents the year the contract will be closed out
   b. Examples of file names
      i. AHU 2_Operation Manual_Fire Admin_1234_2015

ii. CPT 2_Use and Care_MPD West_9876_2011

C. All contractors shall submit the completed digital PDF files to the GC in sufficient time for the GC to meet the O&M Data submission deadlines as described in Specification Section 01 29 76, Progress Payment Procedures.

D. O&M Data shall be submitted and reviewed as described in sections 3.2 and 3.3 below.

3.2. O&M DATA DRAFT SUBMITTAL

A. All contractors shall prepare and submit the following for an O&M Data Draft review submittal:
1. Prepare three (3) complete O&M Data file samples as described in section 3.1 above.
2. Review all specifications within his/her Division of Work and prepare a complete O&M Data checklist listing all equipment, systems, materials, or finishes. Checklist shall be in tabular form similar to the example below and shall indicate the title (and plan identifier when applicable) of the O&M Data, the associated specification, and a column to verify the item has been turned in and completed.

B. The GC shall be required to review all contractors' samples and checklists for compliance with this specification and shall return any to the originating contractor that are insufficient for re-submittal.
1. When acceptable to the GC, he/she shall upload each O&M Data draft submittal file to the O&M Draft library on the Project Management Web Site.

C. The Project Architect, City Project Manager, Consulting Staffs and Owner Representatives shall review the O&M Data draft submittals and checklist within fifteen 15 working days as follows:
1. Provide general critique comments by Division on O&M Data samples submitted. Critique is intended to provide all contractors with information on strengths and weaknesses of their submittals.
a. Re-submittal of the O&M Data samples will not be required.
2. Review in detail the O&M Data Checklist for completeness. Provide comments as needed.
a. Re-submittal of the O&M Checklist will be required until accepted.

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

3.3. O&M DATA FINAL SUBMITTAL

A. All contractors shall prepare and submit the following for an O&M Data Final review submittal:
1. Prepare complete O&M Data files as described in Section 3.1 above according to their approved checklist as described in Section 3.2 above.
2. Submit completed checklist and all final O&M Data files to the GC for final submittal review.

B. The GC shall be required to spot check all contractors' submittals for completeness against their checklists and for compliance with this specification and shall return any to the originating contractor that are insufficient for re-submittal.
1. When acceptable to the GC, he/she shall upload each O&M Data final submittal file to the O&M Final library on the Project Management Web Site.

C. The Project Architect, City Project Manager, Consulting Staffs and Owner Representatives shall review the O&M Data final submittals and checklist within fifteen (15) working days as follows:
1. Review the files submitted against the checklist and request any missing files through the GC.
2. Review in detail all of the O&M Data files for completeness.
a. Submittals shall be accepted or rejected as individual PDF files.
b. Contractors shall re-submit entire O&M submittal if any portion is rejected or incomplete.

3.4. CONSTRUCTION CLOSEOUT

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

END OF SECTION

SECTION 01 78 36
WARRANTIES

PART 1 – GENERAL 1
1.1. SUMMARY 1
1.2. RELATED SPECIFICATIONS 1
1.3. DEFINITIONS 1
1.4. GENERAL CONTRACTORS RESPONSIBILITIES 2
PART 2 – PRODUCTS - THIS SECTION NOT USED 3
PART 3 - EXECUTION 3
3.1. WARRANTY CHECKLIST 3
3.2. LETTERS OF WARRANTY 3
3.3. STANDARD PRODUCT WARRANTY 4
3.4. FINAL WARRANTY SUBMITTAL 4
3.5. WARRANTY NOTIFICATION, RESPONSE, EXECUTION AND FOLLOW-UP 4

PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to provide clear responsibilities and guide lines related to providing all Warranties and Guarantees related to the Work, workmanship, materials, equipment, and other such items required by the Construction Documents.

B. Manufacturers' disclaimers and limitations on product warranties do not relieve any contractor of the warranty on the Work that includes the product.

C. Manufacturers' disclaimers and limitations on product warranties do not relieve suppliers, manufacturers and any contractor required to provide special warranties under the contract documents.

1.2. RELATED SPECIFICATIONS

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

1.3. DEFINITIONS

A. See specification 01 77 00 for the definitions of the following terms that may also be used in this specification:
1. Substantial Compliance
2. Certificate of Occupancy
3. Certificate of Substantial Completion
4. Construction Closeout
5. Contract Closeout

B. Emergency Repair: The Owner or Owner Representative reserves the right to make emergency repairs as required to keep equipment or materials in operation or to prevent damage to property and injury to persons without voiding the contractors warranty or bond or relieving the contractor of his/her responsibilities during the warranty period.

C. Installer: The company or contractor hired to install a finished product that was manufactured and supplied specifically for the Work within this contract. The Installer may or may not be the same company that supplied the product. See the definition for supplier.

D. Supplier: Any company that makes a specific finished product for the Work from information within the Contract Documents. Examples of suppliers would include custom cabinets, steel stairs and railings, etc. A supplier would not be a company that distributes items manufactured by others such as an electrical or plumbing supplier.

E. Warranty: A written guarantee from the manufacturer to the owner on the integrity of a product and its installation, and the manufacturers' responsibility to repair or replace the defective product or components within a specified time from the date of ownership. Warranty may also be used interchangeably with Guarantee. The following warranty types may be part of any specification within the Work associated with the Construction Documents:

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 the date the Certificate of Substantial Completion was signed by the City Engineer.

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

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 of the Certificate of Substantial Completion signed by the City Engineer as noted in Section 1.3.F 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.

Title	Specification	Terms	Completed
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 Section1.3.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,

or replace defective materials and workmanship associated with the installation of the product within one (1) year of the warranty date.

5. Special Letters of Warranty shall be required from any contractor, supplier, installer or manufacturer who agrees to provide warranty services required by any Division Specification in excess of their Standard Product Warranty.

3.3. STANDARD PRODUCT WARRANTY

A. All contractors shall be responsible for collecting and providing copies of all standard product warranties for commercially available products purchased and installed under this contract.

B. Only one copy of the manufacturers' standard warranty needs to be submitted as representative for all quantities of the same model number used throughout the Work.

C. Provide the manufacturers certificate, letter, or other standard documentation for each Standard Product Warranty submitted as follows:

1. Whenever possible a PDF version of the document shall be used.
    a. If a PDF version is used all additional information shall be completed using simple PDF editing tools such as text boxes, highlight, etc.
    b. If a PDF version is not available and an original document is furnished the additional information shall be neatly hand written and highlighted on the document in such a fashion so that it does not obscure any part of the written warranty.
2. Provide the following additional information on each warranty document:
    a. Contract warranty date.
    b. Provide the manufacturer name and model number of the product if not specified within the warranty.
        i. Where the manufacturer name and model number is specified within the warranty it shall be highlighted for visibility.
    c. Provide the plan identifier (LAV-1, WC-2, etc) when applicable.

D. Each completed warranty shall be saved as a digital PDF. The file shall be named using the specification number and item description. I.E. 22 42 00 Toilet (WC-1).pdf
    a. Where an original certificate was furnished provide a high quality colored scan of the completed document with the additional information. Save the scanned image in PDF format and use the same naming convention as indicated above.

E. Provide all PDF files and any original documents to the GC for final consolidation to be provided to the Owner.

3.4. FINAL WARRANTY SUBMITTAL

A. The GC shall receive all required warranties (digital PDF and any original documents) from all contractors, suppliers, installers and manufacturers.

B. The GC shall inventory all received warranties with the Warranty Submittal List to ensure all required warranties have been received and all warranty periods are correct according to the specifications.

C. Provide with each Operation and Maintenance Manual a complete copy of any associated warranty.

D. Scan all warranties into a single organized electronic PDF file as follows:
1. Organize the PDF file into an orderly sequence based on the table of contents of the Specifications.
2. Provide a typed Table of Contents for the entire file at the front of the document.
3. Provide bookmarks and links to each individual PDF to enable quick navigation through the PDF document.

E. Upload the warranty submittal to the appropriate document library on the Project Management Web Site for review by the PA and CPM.

F. Correct any deficiencies or omissions and resubmit as necessary.

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

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

i. The GC shall open each warranty issue form, review the issue description and any attached documentation or photos.
ii. The GC shall also notify any other sub-contractor, supplier, or installer that may be required to review the warranty issue.

B. Warranty Response:
1. The GC shall upon notification by the City of Madison provide warranty response as follows:
a. Critical Systems or equipment: Where damage to equipment and other building components, or injury to personnel is probable provide immediate emergency shut-down information and an on-site response team as soon as possible but in no case shall on-site response exceed 24 hours.
b. For non-critical responses where damage or injury is unlikely provide on-site response no later than the next business day.
c. Where Technical Assistance support is part of the written warranty provide all assistance necessary via phone, text, or internet systems as indicated by the warranty. If issues cannot be resolved provide on-site response no later than the next business day.
d. If the request cannot be supported in sufficient time as outlined above the Owner (or Owner Representative) reserves the right to contact other contractors or service companies having similar capability to expedite the repair or replacement and shall invoice all associated costs to the Owner back to the GC.

C. Warranty Execution:
1. The GC shall provide all repairs or replacements as necessary to restore broken or damaged Work to the original level of acceptance as intended by the Contract Documents.
a. Provide all materials, equipment, products, and labor necessary to complete the repair or replacement associated with the Warranty Issue.
b. Provide all cleaning services as may be required before, during, and after the repair or replacement as per Specification 01 74 13 Progress Cleaning.
c. Provide any protection necessary for existing construction as per Specification 01 76 00 Protecting Installed Construction
d. Provide new letters of warranty when required.

D. Warranty Follow-up:
1. Logged Warranty Issues:
a. The GC shall provide complete documented responses of all logged Warranty Issues. Responses shall provide a description of work completed, by who, inclusive dates, and photos of completed or repaired work.
i. Provide call back response if work is not acceptable.
b. The City Project Manager shall review the submitted response documentation and do a field inspection if necessary.
i. If work is not acceptable, contact GC to review details and expectations of the repair as needed.
ii. If work is acceptable close the Warranty Issue.
2. Quarterly Warranty Reviews:
a. The GC shall be responsible for scheduling quarterly on-site review with all of the following:
i. City Project Manager, and other City staff as needed
ii. Owner and Owner Tenant Representative
iii. Plumbing, Heating, Electrical Sub-contractors
iv. Other Sub-contractors that may be responsible for open Warranty issues
b. Quarterly reviews shall be scheduled at 3 months, 6 months, and 11 months after the effective date of the warranty. The review meetings shall:
i. Review the status of all open Warranty Issues, determine course of action and estimated date of completion.
ii. In the appropriate quarter, provide shut-down, start-up, testing, and training of off-season equipment as required by the contract documents.
iii. The 11th month review shall review all open Warranty Issues, final plan for resolution, and all Warranty Issues where a new letter of warranty may have been issued.

END OF SECTION

SECTION 01 78 39
AS-BUILT DRAWINGS

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PART 1 – GENERAL

1.1. SUMMARY

A. This specification is intended to provide clear guidelines and identify the responsibilities of all contractors as they pertain to City of Madison contract procedures regarding the accurate recording of the Work associated with the execution of this contract. This shall include but not be limited to work that will be hidden, concealed, or buried.

B. Each contractor shall be responsible for maintaining an accurate record of all installations, locations, and changes to the contract documents during the execution of this contract as it may relate to their specific division or trade.

C. The General Contractor (GC) shall be responsible for ensuring all contractors provide as-built record information to the Master As-Built Document Set as described in this specification.

1.2. RELATED SPECIFICAITONS

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

1.3. RELATED DOCUMENTS

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

1.4. PERFORMANCE REQUIREMENTS

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

B. The GC shall designate one person of the GC staff to be responsible for maintaining the Master As-Built Document Set at the job trailer. This shall include, posting updates, revisions, deletions and the monitoring of all contractors posting as-built information as described in this specification.

C. All contractors shall use this specification as a general guideline regarding the requirements for documenting their completed Work. Contractors shall explicitly follow additional specification requirements within their own Division of Trade as it may apply to this specification.

1.5. QUALITY ASSURANCE

A. The GC shall be responsible for all of the following:
   a. Spot checking all sub-contractors field documents to insure daily information is being recorded as work progresses.
   b. Discuss as-built recording to the plan set at weekly job meetings with all sub-contractors on site.
   c. Schedule time with sub-contractors in the job trailer for recording as-built information to the plan set.
   d. Insure that all sub-contractors are providing clear and accurate information to the plan set in a neat and organized manner.
   e. Insure sub-contractors who have completed work have finalized recording all as-built information to the plan set before releasing them from the project site.

B. The Project Architect, the City Project Manager, and other design team staff will perform random checks of the Master As-Built Document Set during the execution of this contract to ensure as-built information is being recorded in a timely fashion as the Work progresses. An updated and current Master As-Built Document Set is a stipulation for approval of the progress payment.

PART 2 – PRODUCTS

2.1. OFFICE SUPPLIES

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

PART 3 - EXECUTION

3.1. FIELD DOCUMENT AS-BUILTS

A. The GC and all Sub-contractors shall be responsible for keeping their own field set of as-built documents including plans, specifications and published changes.

B. Field sets shall be kept dry and in good condition at all times.

C. No Work shall be buried, covered, or hidden, by any additional Work, regardless of Contractor or Trade, until locations of all materials and equipment has been properly documented as described below.

D. All contractors shall be required to record the following as-built information:
   a. Notes on the daily installation of materials and equipment.
   b. Sketches, corrections, and markups indicating final location, positioning, and arrangement of materials and equipment such as pipes, conduits, valves, cleanouts, pull boxes and other such items. Note all final locations on plan sheets, indicate dimension off identifiable building features. Riser diagrams need only be corrected for significant changes in locations, routing or configuration.
      i. The use of photographs in lieu of hand drawn sketches is acceptable.
      ii. Photos shall be taken according to Specification 01 32 33 Photographic Documentation
      iii. Print photo and markup with dimensions or notes as necessary.
   c. Identify by the use of existing plan symbology and notes the size, type, quantity, and use as applicable of materials such as pipes, valves, conduits, etc.

d. Note whether horizontal runs are below slab or above ceiling, include dimensions above or below finished floor elevation.

E. All contractors shall be responsible for transferring the information from their field set of documents to the Master As-Built Plan Set kept in the GC job trailer. See Section 3.3.D. below for the proper procedure.

F. All contractors shall update the GC Master Plan Set as often as necessary, but not less than once per work week.

3.2. SITE SURVEY AS-BUILT

A. The Land Surveyor Sub-Contractor shall provide digital as-built information including but not be limited to the following:

a. For underground buried utility laterals and services of all types locate all of the following that may apply:

i. Connection points at all mains
ii. Storm discharge points to open air
iii. All corners and bends regardless of angle, large radius sweeps shall have multiple point locations sufficient to define the sweep.
iv. All vertical drops
v. All wells
vi. Private buried utilities such as buried electrical cables, irrigation systems, etc.
v. Other information that may need to be located in the future by the owner prior to digging

b. Record all surface features including but not limited to the following:

i. Building corners, pavement edges, and other permanent structural features.
ii. All surface covers for inlets, catch basins, cleanouts, access structures, curb stops and other such devices.
iii. Other permanent surface features such as hydrants, lamp posts, and other permanent site amenities.

c. The following data shall be recorded while locating items in sub-sections 3.2.a and 3.2.b above:

i. Flow lines at both ends of pipes
ii. Pipe sizes and material types
iii. Rim elevations for all covers
iv. Sump elevations and invert elevations of all structures
v. Spot elevations for all pads, driveways, walks, stoops, and floors

B. The Surveyor shall provide the final digital as-built on a media and in a format specified in Specification 00 31 21 Survey Information to the GC for turn in to the Project Architect and the Civil Engineer.

C. The Surveyor shall provide two printed as-built site plans to the GC for inclusion in the Master As-Built Plan Set as follows:

1. One sheet to show all features (but not contour information) with text neatly organized for each item identified.
2. One sheet showing contours, contour labels, and features from item 1 above, but with no additional text.

3.3. MASTER AS-BUILT DOCUMENT SET

A. The GC shall be responsible for maintaining the Master As-Built Document Set in the job trailer at all times.

1. The Master As-Built Plan Set (Plan Set) shall begin with one complete bid set of drawings and any additional sheets that were supplied by published addenda during the bidding process. The cover sheet shall be titled as the “Master As-Built Plan Set” in large bold red letters approximately 2” in height and shall not be used for any other purpose.

a. The Plan Set shall be kept dry, legible, and in good condition at all times.

b. The Plan Set shall be kept up to date with new revisions within two (2) working days of supplemental drawings being issued. Revisions shall be posted as follows:

i. Insert new, revised sheets into the plan set. Void old sheets but do not remove them from the plan set. Indicate date received and what document (RFI, CB, CO, etc) caused the change.
ii. Insert new, revised individual details into the plan set. Void old details, tape new details over the old details with a “tape hinge” to allow them to be viewed. Indicate date received and what document (RFI, CB, CO, etc) caused the change.
iii. Add new details in appropriate white space on relevant sheets. If no space is available use the back side of the previous sheet or insert a new sheet. Indicate date received and what document (RFI, CB, CO, etc) caused the change.

c. The Plan Set shall be available at anytime for easy reference during progress meetings and for emergency location information of new work already completed.

2. The Master As-Built Specification Set (Spec Set) shall begin with one complete bid set of specifications and any additional specifications that were supplied by published addenda during the bidding process. The Spec Set shall be provided in three "D" ring type binders of sufficient thickness to accommodate the specification set. Multiple binders are allowed as necessary. Label the front cover and binding edge with "Master As-Built Specifications" in bold red letters. Provide other information as necessary to distinguish the contents of multi-volume sets.
   a. The Spec Set shall be kept dry, legible, and in good condition at all times.
   b. The Spec Set shall be kept up to date with new revisions within two (2) working days of supplemental drawings being issued.
   c. The Spec Set shall be available at anytime for easy reference during progress meetings.
3. Other Document Sets may be kept at the GCs option in three "D" ring type binders of sufficient thickness to accommodate the documentation. Other documentation sets may include but not be limited to RFIs, CBs, COs, etc.

C. The Land Surveyor Sub-Contractor shall be required to use digital surveying for all exterior site surveying, and provide deliverable digital as-builts as specified in Specification 00 31 21 Survey Information. As soon as practical the surveyor shall provide the GC with a preliminary copy of installed buried utilities for inclusion with the plan set in the job trailer. The surveyor shall provide final digital as builts as per section 3.2 above.

D. All contractors shall be responsible for updating the Plan Set from their field sets at least once per work week. Updates shall include but not be limited to the following procedures:
   a. All updates shall be done only in red ink. Place a "cloud" around small areas of correction to call attention to the change.
   b. Whenever possible place general work notes, field sketches, supplemental details, photos, and other such information on the reverse side of the preceding sheet. Installation notes including dates shall be kept neatly organized in chronological order as necessary.
   c. Accurately locate items on the plan set as follows:
      i. For items that are located as dimensioned provide a check mark or circle indicating the dimension was verified.
      ii. For items that are within 5 feet of the location indicated on the plans leave as shown and:
         - Provide correct dimensions to existing dimension strings or,
         - Accurately locate with new dimension strings
      iii. For items that are more than 5 feet from the location indicated on the plans
         - Accurately draw the items in the new location as installed and,
         - Accurately locate with new dimension strings and,
         - Note that the existing location is void.
   d. Include dimensioned locations for items that will be buried, concealed, or hidden in the ground, under floors, in walls or above ceilings.
      i. Dimensions shall be pulled from identifiable building features, not from centers of columns or other buried features.
      ii. When necessary pull more dimensions as needed from opposing directions to properly locate single items.

3.4. AS-BUILT REVIEW AND ACCEPTANCE

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

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

SECTION 01 78 43
SPARE PARTS AND EXTRA MATERIALS

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PART 1 – GENERAL

1.1. SUMMARY

A. This specification is intended to provide clear guidelines and identify the responsibilities of all contractors as they pertain to City of Madison contract procedures regarding spare parts, special tools, special materials, and extra materials.

B. Each contractor shall be responsible for knowing the specific requirements of their Division Specifications as they may relate to the general information provided in this specification.

C. The General Contractor (GC) shall be responsible for ensuring all contractors provide spare parts and extra materials as described in this specification.

1.2. RELATED SPECIFICAITONS

A. 01 29 76 Progress Payment Procedures

B. 01 31 23 Project Management Web Site

C. 01 77 00 Closeout Procedures

D. Other Divisions and Specifications that may address more specifically how to proceed with spare parts, special tools, special materials, and extra materials.

1.3. DEFINITIONS

A. Spare Parts: Any component of a product or assembly that comes pre-packaged or was specially ordered for the explicit use of the product or assembly. This shall include but not be limited to fastening devices, mounting brackets, replacement parts, wheels, pulleys, wiring, alternate assembly pieces, etc.

B. Special Tools: Any tool of any kind that was pre-packaged or specially ordered, and is required to be used for the installation or maintenance of an installed product or assembly as part of this contract.

C. Special Materials: Any oil, lubricant, glue, touch-up paint, or other such material that comes pre-packaged or was specially ordered and is required to be used for the installation or maintenance of an installed product or assembly as part of this contract.

D. Extra Materials (Attic Stock): Any surplus materials in new and useable condition that was installed a part of this contract. Attic Stock shall include but not be limited to the following: ceiling tiles, paint, stain, floor coverings, ceramic tiles, light bulbs/lamps, filters, strainers, etc. Attic Stock shall include partially opened bulk items and additional unopened quantities as directed by other specifications.

1.4. PERFORMANCE REQUIREMENTS

A. All contractors shall be responsible for consolidating spare parts, special tools, special materials, and attic stock as it pertains to the specific Work within their Division or Trade.

B. All contractors shall use this specification as a general guideline regarding the requirements for turning spare parts, special tools, special materials, and attic stock over to the owner. Contractors shall explicitly follow specification requirements within their own Division of Trade.

1.5. QUALITY ASSURANCE

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.

3.4. STORAGE

A. Prior to the 80% Progress Payment milestone the GC shall coordinate with the City Project Manager and Maintenance Personnel where spare parts, special tools, special materials, and attic stock shall be stored.

B. The GC shall instruct all contractors as to the location and proper storage procedures.

C. The GC shall be responsible for ensuring the storage area is kept neat and orderly as follows:

1. Like items are stored together by material, product, or trade as necessary.
2. Liquids are stored in sealable containers and the lids have been properly installed to prevent drying out, spillage, etc.
3. All labels are clearly visible and provide the required information.

D. Large items shall be stored so as not to damage other items. Do not stack heavy items or items with distinct shapes/outlines on softer items that may get crushed or imprinted.

3.5. CLOSEOUT PROCEDURE

A. Prior to the 90% Progress Payment milestone the GC shall review all attic stock already stored by the contractors to ensure the following:

1. Materials are stored in the proper location(s).
2. All boxes, containers and items are properly labeled according to the submitted/approved inventory.
3. Quantities are correct according to the submitted/approved inventory.

B. The GC shall ensure that all deficiencies are corrected prior to conducting Demonstration and Training Sessions.

C. The GC shall review with Maintenance Staff all inventories and labeling during the scheduled Demonstration and Training Sessions.

D. Any discrepancies associated with Attic Stock shall be resolved and verified prior to the CPM releasing the 90% CT progress payment.

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

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PART 1 – GENERAL

1.1. SUMMARY

A. The purpose of this specification is to provide clear responsibilities and guidelines related to providing Demonstration and Training (D&T) Sessions related to general facility use, equipment, systems, finishes, and materials to City of Madison Staff (Owner, Owner Representatives, Maintenance, and Custodial Personnel) as needed.

B. All D&T shall be coordinated through the General Contractor (GC), Project Architect (PA) and City Project Manager (CPM), and will be based on or customized to the needs of City of Madison Staff being trained. New equipment and systems may have complete D&T sessions as described in this specification while equipment or systems staff is familiar with may have sessions more focused on maintenance only.

1.2. RELATED SPECIFICATIONS

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

1.3. QUALITY ASSURANCE

A. All contractors shall have the responsibility of preparing for and conducting D&T sessions as determined by this and other Division or Trade related specifications, Owner Operation and Maintenance Manuals, and other such documentation related to the Work.

B. The GC shall have responsibility for:

1. Ensuring that all contractors required to conduct a D&T session have successfully completed all of the following:
    a. Turned in all required documentation for review and documentation has been approved/accepted prior to scheduling D&T sessions.
    b. Other required documentation as needed is available and ready for use during the D&T session.
    c. All systems have been started, tested, and running as per appropriate specification and/or manufacturers recommendations prior to scheduling D&T sessions.
    d. All contractors are sufficiently prepared for their D&T session
    e. Documents the D&T session including date, time, contractor and company name, attendees and other information regarding the session
2. Organizing the coordination and scheduling of all D&T sessions between all contractors and the appropriate representatives of the Owner. These representatives may include any of the following depending on the Work of the Contract:
    a. Owner – end users

b. Facility Maintenance personnel
   i. Facility general operation procedures including custodial services
   ii. Electrical
   iii. Mechanical
   iv. Plumbing
   v. Site
c. Information Technology (IT) Department
d. Traffic Engineering – Radio Shop
e. Architects, Engineers and Facility Management staff as project completion overview

PART 2 – PRODUCTS – THIS SECTION NOT USED

PART 3 - EXECUTION

3.1. GENERAL REQUIREMENTS

A. The GC shall develop a specific D&T plan to be scheduled and conducted as described below but no sooner than the meeting discussed in 3.2.A.2 below.

C. The GC shall not schedule D&T sessions to preclude required personnel from attending multiple sessions.

3.2. COORDINATING AND SCHEDULING THE TRAINING

A. The GC, PA, and CPM, shall review all Training and Demonstration requirements during two (2) special meetings.
   1. The first meeting shall be held at the 50% Contract Total Payment. During this meeting the following shall be discussed:
      a. Preliminary schedule of training dates to be completed prior to beginning construction closeout.
      b. List of documentation and items that need to be completed and available before and during the training session.
      c. Who (Owner, Maintenance, etc) will be attending what training session(s).
   2. The second meeting shall be held at the 80% Contract Total Payment. This meeting shall review due outs that have not yet been completed for the 90% Contract Total Payment and the requirements necessary for Construction Closeout. All Demonstration and Training sessions shall be completed prior to receiving the 90% progress payment and beginning Construction Closeout Procedures (see Specification 01 77 00).
      a. This does not include any requirement associated with off season equipment preparation and/or demonstration and Training Sessions.

B. All of the Construction Work shall be operationally ready prior to conducting training as follows:
   1. All contractors shall have their As-Built Drawing Records available for reviewing locations of system components during training.
   2. All final and approved Operations and Maintenance Data shall be completed no less than two (2) full weeks prior to the scheduled training.
   3. All systems shall have been started, functionally tested, balanced, and fully operational, and all piping and equipment labeling complete at least two (2) days prior to the scheduled training.
      a. Seasonal equipment shall not be trained out of season. Contractors having seasonal equipment shall work with the GC and CPM for coordinating additional training sessions as appropriate for seasonal equipment.

C. Correction list items that prevent a piece of equipment or system from being fully operational for training shall be corrected prior to conducting the training.

3.3. TRAINING OBJECTIVES

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

b. Warranties
c. Valve charts, tags, and pipe identification markers

B. For each piece of specialty equipment train on the following objectives/topics as applicable:
1. Manufacturers operations instructions
2. Manufacturers use and care instructions
3. Manufacturers maintenance and troubleshooting instructions
4. System operation and programming including weekly, monthly, annual test procedures
5. Identification of any correction list items still outstanding
6. Review of system documentation including the following:
a. Operation and maintenance data
b. Warranties

C. End User Orientation
1. Facility walkthrough
2. Security and emergency features
3. General facility operation procedures

D. Facility General Use and Custodial Services – if requested
1. Facility walkthrough
2. Security and emergency features
3. General facility operation procedures
4. Care and maintenance of specialty items, finishes, etc as requested
5. Attic stock inventory and material designations

3.4. DEMONSTRATION AND TRAINING PROGRAM PREPARATION

A. Each contractor having a responsibility for providing D&T sessions shall meet with the GC, CPM, and other City Staff as needed to review the extent of the Training Objectives in section 3.3 above needed for each piece of equipment, system, finish, etc. This meeting shall occur no less than four (4) weeks prior to the anticipated training session.

B. The contractor shall use the information from item 3.4.A above to prepare a formal training program for each piece of equipment or system based on the Training Objectives in 3.3 above.
1. The formal training program shall include the following information:
a. Session title
b. List of systems, equipment, use, care, etc to be covered during the session
c. Provide the following for each systems, equipment, use, care, etc to be covered during the session
i. Name and affiliation of each instructor to be used. As needed and discretion of the Owner the GC to require attendance by the installing technician, installing Contractor and the appropriate trade or manufacturer's representative.
ii. Qualifications of each instructor to be used. Practical building operation expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment as installed in this project is required by the training personnel. If Owner determines training was not adequate, the training shall be repeated until acceptable to Owner.
iii. A checklist of all documentation and system/equipment requirements necessary to complete a successful training session and the current status of each
iv. Any additional documents, training aids, video or other items to be used to complete the training
v. Any special requirements or needs associated with item iv above to complete the training
d. The intended audience for the training
e. The approximate duration of each objective or topic to be covered
2. Submit the completed training program to the GC for review and approval by the PA and CPM.

C. The PA and CPM shall work with staff as necessary to ensure all points of anticipated training needs have been met. The PA and CPM will approve the program as submitted or recommend changes for re-submittal as necessary.

3.5. CONDUCTING A DEMONSTRATION AND TRAINING SESSION

A. All contractors shall conduct their required D&T Sessions as follows:
1. Begin with a classroom session
a. Provide a sign in sheet indicating all training to be conducted, instructors, etc.
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 02 41 13 - DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

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

1.2 SECTION REQUIREMENTS

A. Coordinate with City items indicated to be removed and salvaged remain Owner's property. Carefully remove from existing construction, in a manner to prevent damage, and deliver to City. Comply with EPA regulations and hauling and disposal regulations of authorities having jurisdiction. Comply with ANSI A10.6 and NFPA 241.

B. Unless otherwise noted Contractor shall be responsible for obtaining and paying for all permits necessary to complete demolition work.

C. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces. Submit before Work begins.

D. It is not expected that hazardous materials will be encountered in the Work. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Prior to starting removal and/or demolition operations be responsible and coordinate disconnection of all existing utilities, communication systems, alarm systems and other service. Coordinate with local utility company requirements for disconnection of services.

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

PART 2 - PRODUCTS

2.1 EQUIPMENT

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

PART 3 - EXECUTION

3.1 DEMOLITION

A. Demolish and remove all buildings, structures and pavements scheduled for demolition as shown on the plans.

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

C. Locate, identify, shut off, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent site plantings to remain.

E. Explosives shall not be used for demolition activities.

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

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

H. Demolish foundation walls and other below grade features in accordance with the plans. Unless otherwise noted, remove all below grade features to a point 4' below adjoining existing grade, or proposed grade, whichever is lower. Basement and/or lowest level floors more than 4' below existing grade need not be removed, but must be broken up to permit drainage.

I. Backfill and compact below grade areas and voids resulting from demolition of structures and other abandonment and demolition.

J. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, trash and debris.

K. Promptly remove demolition waste materials from Project site and legally dispose of them. Do not burn demolished materials. Transport and dispose all demolition waste in accordance with local, state, and federal guidelines.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, concrete mix designs and submittals required by ACI 301.

B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.

C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Plain Steel Wire: ASTM A 82, as drawn.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, as drawn, flat sheet.

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

E. Portland Cement: ASTM C 150, Type I or II.

F. Fly Ash: ASTM C 618, Type C or F.

G. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

H. Silica Fume: ASTM C 1240, amorphous silica.

I. Aggregates: ASTM C 33, uniformly graded.

J. Air-Entraining Admixture: ASTM C 260.

K. Chemical Admixtures: ASTM C 494, Do not use calcium chloride or admixtures containing calcium chloride.

L. Vapor Retarder: Reinforced sheet, ASTM E 1745, Class A.

M. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

N. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

O. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

P. Coordinate curing method compatibility with resinous floor finish areas.

2.2 MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 5 inches (125 mm) plus or minus 1 inch (25 mm).
4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.
5. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 25 percent.
6. For concrete exposed to deicing chemicals, limit use of fly ash to 25 percent replacement of portland cement by weight and granulated blast-furnace slag to 40 percent of portland cement by weight; silica fume to 10 percent of portland cement by weight.

C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M.

1. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 CONCRETING

A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch (3.2 mm) for concrete exposed to view and Class C, 1/2 inch (13 mm) for other concrete surfaces.

B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches (150 mm) and sealed.

C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.

E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.

F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.

G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.

H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:

1. Scratch finish for surfaces to receive mortar setting beds.
2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.

I. Cure formed surfaces by moist curing for at least seven days.

J. Begin curing concrete slabs after finishing. Keep concrete continuously moist for at least seven days.

K. Owner will engage a testing agency to perform field tests and to submit test reports.

L. Protect concrete from damage. Repair surface defects in formed concrete and slabs.

END OF SECTION 03 30 00

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SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:
   1. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.

B. Comply with ACI 530.1/ASCE 6/TMS 602.

C. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections required by authorities having jurisdiction.

   1. Inspections: Level 1 special inspections according to the IBC.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

A. Concrete Masonry Units: ASTM C 90; Density Classification, Normal Weight.

   1. Integral Water Repellent: Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
   2. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
   3. Square-edged units for outside corners unless otherwise indicated.

   4. Colored CMU as called out on Drawings

2.2 MORTAR AND GROUT

A. Mortar: ASTM C 270, proportion specification.

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

7. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.

B. Grout: ASTM C 476 with a slump of 8 to 11 inches (200 to 280 mm).

C. Refractory Mortar: Ground fireclay mortar or other refractory mortar that passes ASTM C 199 test and is acceptable to authorities having jurisdiction.

2.3 REINFORCEMENT, TIES, AND ANCHORS

A. Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Joint Reinforcement: ASTM A 951.

1. Coating: Hot-dip galvanized at both interior and exterior walls.
2. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
3. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.

C. Corrugated-Metal Veneer Anchors: 7/8 inch (22 mm) wide and made from 0.030-inch-(0.76-mm-) thick steel sheet, galvanized after fabrication.

2.4 EMBEDDED FLASHING MATERIALS

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

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.

B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.

C. Cavity Drainage Material: Free-draining polymer mesh, full depth of cavity with dovetail shaped notches that prevent mortar clogging.

2.6 Anti-Graffiti Coating

A. Basis of Design: Sherwin Williams Clear Anti-Graffiti Coating #B97C150 at all exposed CMU conditions.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.

B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

C. Stopping and Resuming Work: Rack back units; do not tooth.

D. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

E. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.

F. Tool exposed joints slightly concave when thumbprint hard unless otherwise indicated.

G. Keep cavities clean of mortar droppings and other materials during construction.

3.2 LINTELS

A. Install lintels where indicated.

B. Minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.3 FLASHING AND WEEP HOLES

A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.

1. Extend flashing 4 inches (100 mm) into masonry at each end and turn up 2 inches (50 mm) to form a pan.

C. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

3.4 CLEANING

A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly cured, clean exposed masonry.

1. Wet wall surfaces with water before applying acidic cleaner, then remove cleaner promptly by rinsing thoroughly with clear water.
2. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04 20 00

SECTION 04 43 00 - STONE MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Samples for stone and colored mortar.

B. Submit qualification data for masonry contractor, including a list of completed projects.

C. Construct a sample wall panel approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high to demonstrate aesthetic effects and set quality standards for materials and execution.

D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

E. Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTUERS

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

2.2 VENEER STONE

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

2.3 MORTAR

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

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144
   1. Color: Provide natural sand of color necessary to produce required mortar color.
   2. For pointing mortar, provide sand with rounded edges.
   3. Match size, texture, and gradation of existing

D. Water: Potable

2.4 EMBEDDED FLASHING MATERIALS

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

2.5 MISCELLANEOUS MATERIALS

A. Dampproofing for Limestone: Cementitious dampproofing recommended by ILI.

B. Weep Holes: Round polyethylene tubing, 3/8-inch.

2.6 STONE FABRICATION

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

2.7 Anti-Graffiti Coating

A. Basis of Design: Sherwin Williams Clear Anti-Graffiti Coating #B97C150 at all exposed CMU conditions.

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

PART 3 - EXECUTION

3.1 SETTING STONE MASONRY, GENERAL

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

B. Maintain uniform joint widths except for variations due to different stone sizes and minor variations required to maintain bond alignment. Lay walls with joints not less than 1/4 inch at narrowest points or more than 1/2 inch at widest points.

C. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

1. Extend flashing 4 inches into masonry at each end and turn up 2 inches to form a pan.

3.2 INSTALLING ADHERED STONE MASONRY VENEER

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

B. Rake out joints for pointing 3/8 inch deep.

3.3 POINTING

A. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

B. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile indicated.

3.4 CLEANING

A. In-Progress Cleaning: Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly cured, remove large mortar particles, scrub, and rinse stone masonry veneer.

1. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

END OF SECTION 04 43 00

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SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Shop Drawings.

B. Comply with applicable provisions of the following:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

A. W-Shapes: ASTM A 992/A 992M Grade 50 (345).

B. Channels, Angles ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B structural tubing.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

2.2 ACCESSORIES

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

B. Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Straight.
2. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.

C. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

D. Grout: ASTM C 1107, nonmetallic, shrinkage resistant, factory packaged.

2.3 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

C. Shop Priming: Prepare surfaces according to SSPC-SP 2, "Hand Tool Cleaning"; or SSPC-SP 3, "Power Tool Cleaning." Shop prime steel to a dry film thickness of at least 1.5 mils (0.038 mm). Do not prime surfaces to be embedded in concrete or mortar or to be field welded.

PART 3 - EXECUTION

3.1 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.

C. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

D. Do not use thermal cutting during erection..

E. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened

F. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

END OF SECTION 05 12 00

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 METALS

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

B. Steel Pipe: ASTM A 53, standard weight (Schedule 40), black finish.

2.2 GROUT

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

2.3 FABRICATION

A. General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work.

B. Welding: Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth with contour of welded surface matching those adjacent.

C. Fabricate pipe bollards with hot dipped galvanized coating. Ease exposed top outside edge prior to galvanizing.

2.4 STEEL AND IRON FINISHES

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack.

B. Fit exposed connections accurately together to form hairline joints.

C. Anchor bollards in concrete and fill solidly with concrete, mounding top surface.

D. Galvanized steel bollards are to receive High Performance Coating.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.

B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

2.2 TREATED MATERIALS

A. Preservative-Treated Materials: AWPA C2**,** except that lumber not in ground contact and not exposed to the weather may be treated according to AWPA C31 with inorganic boron (SBX).

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

B. Provide preservative-treated materials for items indicated on Drawings, and the following:

1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Concealed members in contact with masonry or concrete.
3. Wood framing members that are less than 18 inches (460 mm) above the ground.
4. Wood floor plates that are installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.

1. Use Exterior type for exterior locations and where indicated.

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

2.3 LUMBER

A. Dimension Lumber:

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

    a. Species: As specified for framing other than non-load-bearing interior partitions.
    b. Grade: No. 2.

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

2.4 ENGINEERED WOOD PRODUCTS

A. Engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.

B. Laminated-Veneer Lumber: Manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.

1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi (17.9 MPa) for 12-inch nominal- (286-mm actual-) depth members.
2. Modulus of Elasticity, Edgewise: 1,800,000 psi (12 400 MPa.
3. Provide units complying with APA PRI-400, factory marked with nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

2.5 MISCELLANEOUS PRODUCTS

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

1. Power-Driven Fasteners: CABO NER-272.
2. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

B. Metal Framing Anchors: Structural capacity, type, and size indicated.

1. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 (Z180) coating designation for interior locations where stainless steel is not indicated.
2. Use anchors made from stainless steel complying with ASTM A 666, Type 304 for exterior locations and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Securely attach rough carpentry to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 2304.9.1, "Fastening Schedule," in the IBC.

END OF SECTION 06 10 00

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SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

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

2.2 WALL SHEATHING

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

2.3 ROOF SHEATHING

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

2.4 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated.

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Securely attach to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in the IBC Table R602.3(1)

B. Fastening Methods:

1. Wall and Roof Sheathing:

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

END OF SECTION 06 16 00

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS

A. Surface-Burning Characteristics: ASTM E 84, and as follows:

1. Flame-Spread Index: 25 or less where exposed; otherwise, as indicated in Part 2 "Insulation Products" Article.
2. Smoked-Developed Index: 450 or less.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, with flame-spread index of 75 or less. (Below Slab)

C. Molded-Polystyrene Board Insulation: ASTM C 578, Type I, with flame-spread index of 75 or less. (Ceiling)

2.2 ACCESSORIES

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation.

B. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage. Locate seams at framing members, overlap, and seal with tape.

END OF SECTION 07 21 00

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SECTION 07 22 16 - ROOF BOARD INSULATION

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SUBMITTALS

A. Product Data: Submit data on product characteristics, performance criteria, and limitations, including installation instructions.

B. Sustainable Design: Submit manufacturer's sustainable design certifications as specified.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: The installation work of this Section shall be performed by an experienced roofing contractor approved and certified by the roofing system manufacturer.

B. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third party inspection agency used for building code qualification.

C. Each tapered panel shall be labeled with a code letter to identify its slope and to identify its proper position on the roof. Each panel shall also be marked with an arrow to identify direction of slope.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original packaging.

B. Store and protect products in accordance with manufacturer's instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources. Do not install insulation that has been damaged or wet.

C. In the event the board insulation becomes wet, wipe dry prior to installation.

1.5 PROJECT CONDITIONS

A. Roof deck shall be free of ponded water, ice or snow. This precaution is to discourage potential future condensation on the underside of the membrane.

B. Do not expose tapered insulation to surfaces such as vent stacks, pipes or other rooftop appurtenances whose constant temperature is in excess of 165°F. If temperature cycling conditions are anticipated near the maximum recommended use temperature, consult an representative for recommendations regarding system components.

C. When insulation is to be exposed to sunlight for prolonged periods due to job site delays, protect the insulation with a light colored opaque covering. Provisions should be made to prevent wind loss of insulation materials at the job site when partially open units of Tapered are on hand.

D. Dark membrane ballasted systems must have ballast installed immediately after installation of membrane. This precaution is required to prevent potential damage to the insulation from excessive heat due to prolonged exposure to sunlight.

E. Roofs exposed to chemical discharge, or to reflective vertical surfaces adjacent to the roof, require special consideration. Consult this specification for recommendations regarding system components.

F. Any deteriorated decking shall be repaired or replaced. Roof drains must be verified to be open and adequate to promote proper roof drainage.

1.6 WARRANTY

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

PART 2 - PRODUCTS

2.1 MANUFACTURER

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

2.2 MATERIALS

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

g. Surface Burning Characteristics (ASTM E 84): Flame spread less than 25, smoke developed less than 450, certified by independent third party such as Underwriters Laboratories (UL).
h. Indoor Air Quality: Compliance certified by independent third party such as GreenGuard Indoor Air Quality Certified® and/or GreenGuard Children and Schools Certified℠.
i. Recycle Content: Minimum 20%, certified by independent third party such as Scientific Certification Systems.
j. Warranty: Limited lifetime warranty covering all ASTM C578 physical properties.

3. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to:
   a. DiversiFoam Products.
   b. Dow Chemical Company.
   c. Owens Corning.
   d. Pactiv Corporation.

B. [Overlayment]: For dark mechanically attached, or any color fully adhered, or chemically incompatible membranes, provide the following:
1. [Glass mat faced gypsum roof board.]
2. [Flexible glass fiber, nonwoven, non-flammable, corrosion and mildew resistant or other suitable separator (overlayment) sheets shall be used under PVC membranes and other such membranes which contain plasticizing agents. Separator sheet shall have been evaluated and approved by the membrane manufacturer for adequacy as a separator.]

C. Adhesion System: Per membrane manufacturer's specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation.
1. Verify that the roof deck drains completely free of water within 48 hours following rainfall.
2. Verify that the dead load carrying capability of the deck is sufficient to support code mandated live loads and dead loads incident on the roof, including the entire roof covering/insulation system.
3. Verify that the roof deck provides adequate support for the insulation.

B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 ROOF DECK PREPARATION

A. [Any deteriorated roof decking shall be repaired or replaced.]

B. A thorough inspection should be required in the case of total tear off.

C. The surface must be clean, smooth, free of fins, sharp edges, loose and foreign materials, oil, grease, and fresh roofing cement. Repair any deck joints or cracks, any deck to wall junctions, and any other deck to penetration gaps, which are greater than 1/4".

D. Install deck and secure in accordance with construction drawings. The deck must be well secured with all mechanical fasteners flush with the surface of the deck. The deck must be of sufficient thickness to develop adequate fastener holding power. Verify requirements with the membrane manufacturer.

3.3 VAPOR RETARDER

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

3.4 INSULATION

A. Install tapered roof insulation in accordance with the manufacturer's approved shop drawings.

B. Install thicknesses of fill in accordance with shop drawings prepared by manufacture and approved by the roofing contractor. Install tapered over the required base layers, following the directional arrow printed on each panel which indicates direction of slope. Note that Tapered panels also have a letter code printed on their surface which corresponds with panel layout shown on the approved shop drawings.

C. Insulation joints shall not exceed 1/4" in width. Joints wider than 1/4" shall be filled with the same insulation.

D. Insulation shall be field trimmed to fit tightly around roof protrusions and terminations.

E. Apply only as much tapered and fill roof insulation as can be covered by the roofing membrane on the same day. Apply roof insulation in parallel rows with end joints staggered. Install side and end joints closely but do not force together. In a two layer application, apply second layer panels parallel to the first layer but with side and end joints staggered in relation to the first layer.

F. In areas where black/dark membranes are used and where "reflected solar energy" is expected to be present, insulation need protection in addition to normally specified cover boards. For example, roof areas adjacent to higher walls, particularly walls with reflective surfaces, or near large rooftop HVAC units, or near or in between clusters of mechanical

equipment, or near other structures with reflective cladding (metal or glass); or near higher reflective parapets, all such areas should be considered for additional heat protection. Such roof areas must be covered with pavers or ballast. Black/dark (non-white) membranes must be coated with white reflective topping, and maintained white, to avoid damage due to the intensified heat exposure from reflected sun in such areas.

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

3.5 OVERLAYMENT

A. Only dry overlayment materials shall be used. If overlayment materials become wet, allow them to fully dry before proceeding with roofing application. Requirements for overlayment materials and thickness may vary. Contact membrane manufacturer for their individual requirements.

B. Rigid overlayment shall be adhered with a suitable adhesive per manufacturer's recommendations. Loose lay flexible sheet overlayment over Tapered and cover with a membrane attached per the manufacturer's recommendations. Edges and ends of rolls shall be lapped a minimum of 6".

C. When cleaning agents and seam adhesives used are solvent based and capable of causing cavitation of the underlying insulation, use care when preparing membrane edges for in-field seam splicing.

D. In areas where black/dark membranes are used and where "reflected solar energy" is expected to be present, need protection in addition to normally specified cover boards. For example, roof areas adjacent to higher walls, particularly walls with reflective surfaces, or near large rooftop HVAC units, or near or in between clusters of mechanical equipment, or near other structures with reflective cladding (metal or glass); or near higher reflective parapets, all such areas should be considered for additional heat protection. Such roof areas must be covered with pavers or ballast. Black/dark (non-white) membranes must be coated with white reflective topping, and maintained white, to avoid damage due to the intensified heat exposure from reflected sun in such areas.

END OF SECTION

SECTION 074600 – FIBER CEMENT SOFFIT PANELS

PART 1 - GENERAL

1.1 SCOPE

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

1.2 SUMMARY

A. This Section includes the following:

1. Commercial grade fiber-cement soffit board (vented and unvented).

1.3 SUBMITTALS

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

B. Warranty: Special warranty specified in this Section.

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

1.4 QUALITY ASSURANCE

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

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

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

1.5 DELIVERY, STORAGE, AND HANDLING

A. The GC or contractor of his choice will receive the products when delivered at the job site. A dry locked storage space complete with shelving, will be provided for the purpose of unpacking, sorting out, checking and storage.

B. Direct factory shipments to the job site not acceptable. Promptly replace items damaged in shipment with proper material without additional cost.

C. Handle product in a manner to minimize damage.

1.6 OWNERS INSTRUCTIONS

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

1.7 WARRANTY

A. Warranty: Allura Fiber Cement siding offers a 50 year limited transferable product warranty. Additionally, Allura offers for ColorMax® prefinished products a 15-year limited coating warranty.

Allura warrants that the product will be free from manufacturing defects and will not crack, rot or delaminate and will not suffer damage from termites when stored, installed and maintained according to Allura printed instructions. See warranties for details and limitations.

PART 2 - PRODUCTS

2.1 FIBER CEMENT SOFFIT PANELS

A. General: Allura Fiber Cement soffit is available in products providing both traditional and contemporary aesthetics. It is suitable for residential and light commercial applications. These products offer a high degree of dimensional stability and impact resistance. Soffit is available in ventilated and non-ventilated designs.

2.2 MANUFACTURER;

A. Allura Fiber Cement Products by Plycem.
   1. FINISHES: Allura uses an exclusive Primer / Sealer to protect against moisture on all products. Our ColorMax® finishing system offers additional protection against the elements while enhancing the exterior finish with a spectrum of 16 attractive solid colors for all Soffit and Porch Ceiling Panels. The Cedar Soffit is also available 6 natural wood stains.
   2. SURFACE PATTERNS: Cedar-textured grain and Smooth
   3. SIZES: 12” (305mm), 16” (610mm) x 12’ (3657mm) length.
   4. THICKNESS: ¼” (6mm)
   5. COMPOSITION: The products are manufactured using a multi-step high-pressure process combining Portland cement, recycled content, wood fiber and specialty additives. Wood grains and other architectural features are pressed into the surface.
   6. TECHNICAL DATA: Allura Fiber Cement soffit was tested in accordance with the American Society for Testing & Materials (ASTM) standards of the following specifications:
      a. ASTM C1186-02: Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
      b. ASTM C1185-96: Sampling and Testing Non-asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
      c. ASTM E84: Non-combustible
      d. ASTM G26-95: Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Metals.

2.3 **APPROVALS:** ICC ESR-1668

2.4 **WEATHER AND OTHER CONSIDERATIONS**: Product offers resistance to freeze/thaw cycles and is highly dimensionally stable. It is resistant to damaging ultraviolet (UV) rays and salt spray. It is immune to woo-boring insects. Product can resist high wind forces when installed in accordance with Allura application instructions.

2.5 **FIRE RESISTANCE CHARACTERISTICS**: Allura Fiber Cement soffit products have a Class-A (1) Flame Spread Rating – 0, Smoke developed – 5, per ASTM E84, and is considered Non-Combustible in accordance with ASTM E136.

3.1 **INSTALLATION**:

A. Preparatory Work: Allura Fiber Cement soffit produces are cut and installed like conventional wood soffit. Handle and store product according to Allura recommendations. Fiber Cement soffit should be applied to perpendicular to the framing. NOTE: Allura Fiber Cement soffit may be installed with either the textured or smooth finished surface facing out.

B. Methods: Complete installation manual is available from the manufacturer. Use non-corrosive double hot-dipped galvanized or stainless steel fasteners. Do not use staples. Fasten the soffit 3/4" from the side edge, 3/8" from the butt end, and 2" from the corner. Space fasteners every 12" along both the front and back edge. Fasten from one end of the panel to the other. The butt ends should be in contact, fastened at corresponding ends, and supported by framing.

C. Precautions: Avoid breathing dust created by drilling, cutting, or sawing. Use with adequate ventilation and a dust collection system; see MSDS for additional dust precautions. All Allura soffit is sealed with primer/sealer. A finish coat should be applied within 6 months of installation.

D. Building Codes: Current data on building code requirements and product compliance may be obtained from Allura. Installations must comply with the requirements of all applicable local, state and national code jurisdictions.

4.0 **TECHNICAL SERVICES**: Allura maintains a technical services staff to assist building professionals with questions regarding Allura siding products. Call (844) 4-ALLURA for samples and answers to technical or installation questions.

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

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered EPDM membrane roofing system.

1.2 ACTION SUBMITTALS

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

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

B. Source Limitations: Obtain components including for membrane roofing system from same manufacturer.

C. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

D. Preinstallation Roofing Conference: Conduct conference at Project site. Manufacturer's representative shall be present.

1.5 PROJECT CONDITIONS

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

1.6 WARRANTY

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

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

A. EPDM: ASTM D 4637, Type I, non-reinforced**,** uniform, flexible EPDM sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. GAF Materials Corporation.

2. Thickness: 60 mils (1.5 mm) nominal.
3. Exposed Face Color: Black.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

   a. Plastic Foam Adhesives: 50 g/L.
   b. Gypsum Board and Panel Adhesives: 50 g/L.
   c. Multipurpose Construction Adhesives: 70 g/L.
   d. Fiberglass Adhesives: 80 g/L.
   e. Single-Ply Roof Membrane Adhesives: 250 g/L.
   f. Single-Ply Roof Membrane Sealants: 450 g/L.
   g. Nonmembrane Roof Sealants: 300 g/L.
   h. Sealant Primers for Nonporous Substrates: 250 g/L.
   i. Sealant Primers for Porous Substrates: 775 g/L.
   j. Other Adhesives and Sealants: 250 g/L.

B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard**,** water based.

D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.

F. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 SUBSTRATE BOARDS

A. Substrate Board: ½ inch manufacturer's standard material as required for roof warranty.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

PART 3 - EXECUTION

3.1 SUBSTRATE BOARD

A. Install manufacturers approved substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of wood deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.2 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.

E. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.

F. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

3.3 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform inspections.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

END OF SECTION 07 53 23

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METAL

A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, not less than 22 ga. thick; and finished as follows:

1. Finish: Manufacturer's standard two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight
2. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish.

2.2 ACCESSORIES

A. Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.

B. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

C. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners.
1. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

D. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.

E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION

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

B. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.

B. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

C. Fabricate nonmoving seams in sheet metal with flat-lock seams. For aluminum, form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

D. Aluminum Flashing and Trim: Coat back side of aluminum flashing and trim with bituminous coating where it will contact wood, ferrous metal, or cementitious construction.

E. Separate dissimilar metals with a bituminous coating or polymer-modified, bituminous sheet underlayment.

END OF SECTION 07 62 00

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required.

B. Aluminum Extrusions: ASTM B 221, alloy and temper as recommended by manufacturer for use and finish indicated.

C. Aluminum Finish: Two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight

D. Self-Adhering Sheet Underlayment, High Temperature: Butyl or SBS-modified asphalt; slip-resisting-polyethylene surfaced; with release paper backing; cold applied. Stable after testing at 240 deg F (116 deg C) and passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.

E. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements.

1. Exposed Penetrating Fasteners: Gasketed screws with heads matching color of metal.
2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

F. Butyl Sealant: ASTM C 1311, solvent-release butyl rubber sealant.

G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 ROOF SPECIALTIES

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

1. Formed Aluminum: 0.040 inch thick.

B. Gutters and Downspouts:

1. Gutters: Manufactured in uniform section lengths, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish expansion joints, and expansion-joint covers.

a. Gutter Style: Rectangular
b. Aluminum: 0.040 inch (1.02 mm) thick.
c. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.

2. Downspouts: Open-face rectangular with mitered elbows. Furnish wall brackets of same material and finish as downspouts, with anchors.

a. Formed Aluminum: 0.050 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement.

B. Coat back side of aluminum roof specialties with bituminous coating where they will contact wood, ferrous metal, or cementitious construction.

C. Separate dissimilar metals with a bituminous coating or polymer-modified, bituminous sheet underlayment.

D. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

E. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless indicated.

1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet (15.2 m) apart. Install expansion joint caps.

F. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

G. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 12 inches (305 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.

H. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25

mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. Extend downspout into PVC drain underground. (6 inch minimum)

END OF SECTION 07 71 00

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color Samples.

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

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.

B. Sealant for General Exterior Use Where Another Type Is Not Specified
   1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT.

C. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:

   1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use T.

D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:

   1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; for Use T.

E. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:

   1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.

2.2 MISCELLANEOUS MATERIALS

A. Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Closed Cell Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

D. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 1193.

B. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

END OF SECTION 07 92 00

SECTION 08221 FIBERGLASS REINFORCED DOOR AND FRAME SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiberglass Reinforced Plastic (FRP) Doors.

1.2 RELATED SECTIONS

A. Section 07 92 00 - Joint Sealers: Perimeter sealant and backup materials.

B. Section 08 71 00 - Door Hardware.

1.3 REFERENCES

A. ASTM D 523 - Standard Test Method for Specular Gloss.

B. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E 152 - Standard Methods of Fire Tests of Door Assemblies.

E. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

F. SDI 100 - Recommended Specifications for Steel Doors and Frames.

G. UL 10B - Standard for Fire Tests of Door Assemblies.

H. UL 305 - Standard for Panic Hardware.

1.4 PERFORMANCE REQUIREMENTS

A. Door opening assemblies:

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

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 23.

B. Submit Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Plans: Indicate location of each door opening assembly in project.
   2. Elevations: Dimensioned elevation of each type door opening assembly in project; indicate sizes and locations of door hardware, and lites and louvers, if specified.
   3. Details: Installation details of each type installation condition in project; indicate installation details of glazing, if specified.
   4. Schedule: Indicate each door opening assembly in project; cross-reference to plans, elevations, and details.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

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

1.6 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in installation of fiberglass doors and frames with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's unopened, undamaged packaging, with manufacturer's labels intact.

B. Inspect and report damage to doors at time of delivery.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. Store door assemblies in on end, to prevent damage to face corners and edges.

1.8 WARRANTY

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Fib-R-Dor, a Div. of Chase Doors, Inc.; 1721 East 5th Street, North Little Rock, AR 72114. Ph. Toll Free: (800) 342-7367, Fax: 501-7589496. Web Site: www.fibrdor.com E-mail: fibrdor@fibrdor.com. or equal.

2.2 MATERIALS

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

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

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

D. Fasteners: Stainless steel.

2.3 COMPONENTS

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

1. Thickness: 1-3/4 inches (45 mm).
2. Thermal Insulating Value: 'R' factor 11 at Foam Core.
3. Construction:
    a. Core: Resin impregnated End Grain Balsa Wood, Polypropylene Honeycomb, or polyurethane foam.
    b. Door Plates: Molded in one continuous piece, resin reinforced with hand-laid glass fiber mat, nominal 1/8 inch (3 mm) thick, minimum 25 mil gel-coated surface.
    c. Door Edges: Fiberglass mat reinforced, nominal 3/8 inch (9.5 mm) thick, machine tooled resin rich FRP matrix.
4. Sizes: Indicated on drawings.

B. Non-rated Fiberglass Frames:

1. Construction: One-piece pultruded fiberglass reinforced plastic, minimum 1/4 inch wall thickness, jamb-to-head joints mitered and reinforced with FRP clips and stainless steel fasteners; conforming to SDI requirements for performance equivalent to 16 gage steel frames.
2. Frame profile: 5-3/4 inches (146 mm) deep, 2 inches (51 mm) wide face; double rabbeted with 5/8 inch (16 mm) high stop.
3. Sizes: Indicated on drawings.

C. Louvers in Non-rated Doors:

1. Construction: Molded solid vanes; pultruded fiberglass reinforced plastic construction.
2. Sizes: Indicated on drawings.

D. Door Hardware: Specified Section 08 71 00.

2.4 FABRICATION

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

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

PART 3 EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

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

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

3.3 INSTALLATION

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

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

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

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

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

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

3.4 ADJUSTING

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

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions.

3.5 CLEANING

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

B. Remove labels and visible markings.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, suitable for exposed applications.

B. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, free of scale, pitting, or surface defects.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, G60 (Z180) or A60 (ZF180).

D. Frame Anchors: Hot Dip-galvanized.

2.2 HOLLOW METAL DOORS

A. Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated, 1-3/4 inches (44 mm) thick unless otherwise indicated.
   1. Exterior Doors: Level 3 and Physical Performance Level A (Extra Heavy Duty) Model 2 (Seamless), metallic-coated steel sheet faces. Provide Top cap closure. Coordinate door panel size to provide a ¼ inch maximum gap between door bottom and the threshold.

   2. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets.

   3. Thermal-Rated (Insulated) Doors: Where indicated, provide doors with thermal resistance value (R Value) of not less than R-7 when tested according to ASTM C 1363.

B. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.
   1. Steel Sheet Thickness for Exterior Doors: 16 gauge.
   2. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
   3. Frame Anchors: Not less than 0.042 inch thick.

C. Prepare doors receive mortised and concealed hardware according to ANSI A250.6 and ANSI A115 Series standards.

D. Reinforce doors to receive surface-applied hardware.

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hollow metal frame to comply with ANSI/SDI A250.11

B. Coordinate with aluminum frame supplier and install doors to provide clearances between doors and frames as indicated in ANSI/SDI A250.11.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying rust-inhibitive primer. Use galvanizing repair paint for metallic coated surfaces.

D. Note: Hollow Metal door will receive high performance coating.

END OF SECTION 08 11 13

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

A. Basis of Design for Window frame: Lawneer 225 TL IsoLock, at fixed window condition.

B. Accessible Entrances: Comply with ICC/ANSI A117.1.

C. Performance Requirements:

1. Limit deflection of framing members normal to wall plane to 1/175 of clear span[for spans up to 13 feet 6 inches
2. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or 1/8 inch, whichever is smaller.
3. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.
4. Air Infiltration: Limited to 0.06 cfm/sq. ft. of system surface area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
5. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

D. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated; ASTM B 209 sheet; ASTM B 221 (ASTM B 221M) extrusions.

E. Glazing: As specified in Division 08 Section "Glazing."

F. Doors: See Section 08 11 13 Hollow Metal Doors

G. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.

H. Fabrication: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as

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

1. Door Framing: Reinforce to support imposed loads. Factory assemble door and frame units and factory install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.

I. Aluminum Finish: Fluoropolymer two-coat coating system complying with AAMA 2604.

J. Weather-strip: Provide standard weather-strip compatible with aluminum framing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer, or by applying sealant or tape recommended by manufacturer.

B. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

C. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

D. Install framing components true in alignment with established lines and grades to the following tolerances:

1. Variation from Plane: Limit to 1/8 inch in 12 feet (3 mm in 3.7 m); 1/4 inch (6 mm) over total length.
2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch (1.5 mm). For surfaces meeting at corners, limit offset to 1/32 inch (0.8 mm).
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch (3 mm).

E. Coordinate frame preparation with hollow metal door supplier and hardware requirements.

END OF SECTION 08 41 13

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Hardware schedule and keying schedule.

B. Deliver keys to Owner.

PART 2 - PRODUCTS

2.1 HARDWARE

A. Hinges:
   1. Basis of Design: Hager Co. BB1168 Heavy Weight Ball Bearing full mortise 630 stainless steel.
   2. Stainless-steel hinges with stainless-steel pins.
   3. Nonremovable hinge pins for exterior and public interior exposure.
   4. Ball-bearing hinges for doors with closers and entry doors.
   5. 3 hinges for 1-3/4-inch- (45-mm-) thick doors 90 inches (2300 mm) or less in height; 4 hinges for doors more than 90 inches (2300 mm) in height.

B. Locksets and Latchsets:
   1. L-1 Schlage L Series Mortise
      1 Lock Grade 1
      2 Function: Store Room, outside lever is always locked, latchbolt retracted by key on exterior and always openable from interior by turning lever.
      3 Lever Style 03 with Neuschtcheon.
      4 Finish 630 – Satin Stainless Steel.
   2. L-2 Same as L-1
      1 Function: Classroom lath bolt retracted by lever either side. Locked by key on exterior. Inside always free for egress. Door cannot be locked from inside.
   3. L-3 Schlage L400 Series Auxillary Lock
      1 Function: L9462 Classroom lock deadbolt thrown or retracted by key on exterior, interior – thumb turn retracts dead bolt but cannot project it.
      2 Finish 630 Satin Stainless Steel
      3 Inside Trim Thumbturn: E2 Turn L583-363 Disability.

C. Key locks to Owner's master-key system.

   1. Cylinders with six-pin tumblers.

D. Closers:

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

E. Provide wall stops for doors without closers.

F. Push-Pull plates:
    1 Basis of Design: Ives
        a) 8200 Push Plate 8x16; Finish: 630 Stainless Steel
        b) 8302 Pull Plate 4x16 wth 8102 Pull 10” centers; Finish: 630 Stainless Steel

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

H. Weather Strip:
1. Thresholds: Basis of Design:: Reese #212555 Mill Stainless Steel. ½”x5” profile.
2. Sweep: Basis of Design: Reese #701 C Clear anodized aluminum with polyurethane.
3. Weather Strip: Aluminum Frame condition I supplied by aluminum frame supplier Hollow Metal frame: Basis of Design: Reese 775 C Clear anodized aluminum with polyurethane insert.

PART 3 - EXECUTION

3.1 INSTALLATION

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

3.2 HARDWARE SCHEDULE

A. Hardware Set No. HS-1 (toilets 102. 103):

1. Hinges.
2. Push Pull Plates
3. Lock L-3
4. Kick Plate (Push Side)
5. Closer

6. Threshold
7. Door Sweep
8. Weather-strip (By Aluminum Frame Supplier)

B. Hardware Set No. HS-2 (Exterior Door to Mechanical 101):

1. Hinges.
2. Lock Set L-2
3. Closer
4. Kick Plate (Push Side)
5. Threshold
6. Door Sweep
7. Weather-strip (By Aluminum Frame Supplier)

C. Hardware Set No. HS-3 (Interior Door to Mechanical 101):

1. Hinges.
2. Lock L-1
3. Threshold
4. Door Sweep
5. Weather-strip – for Hollow Metal Frame

END OF SECTION 08 71 00

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SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and 12-inch- square Samples.

B. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
   1. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
   2. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
   3. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

D. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3.

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

2.2 INSULATED-GLASS TYPES

A. Glass Type [GL-1]: Low-E coated tempered insulated glass unit. Basis of Design: PPG solarban 60

   1. Overall Unit Thickness: 1" with each glass lite: ¼"
   2. Outboard glass: Fully tempered with frosted finish on #2 surface.
   3. Interspace Content: Argon
   4. Inboard Glass: Fully tempered wth low-E coating on #3 surface.
   5. Winter night time U-Factor, 29 Max

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

2.3 GLAZING SEALANTS

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."

B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 08 80 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 PANEL PRODUCTS

A. Provide in maximum lengths available to minimize end-to-end butt joints.

B. Water-Resistant Gypsum Ceiling Board (toilet Rooms 102 &103): ASTM C 630/C 630M or ASTM C 1396/C 1396M, in thickness indicated. Regular type unless otherwise indicated.

C. Cementitious Backer Units: ANSI A118.9. (Mechanical 101 Ceililng)

2.2 ACCESSORIES

A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.

1. Provide cornerbead at outside corners unless otherwise indicated.
2. Provide LC-bead (J-bead) at exposed panel edges.
3. Provide control joints where indicated.

B. Joint-Treatment Materials: ASTM C 475/C 475M.

1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
2. Joint Compounds: Use setting-type compounds at exterior soffits.
3. Cementitious Backer Unit Joint-Treatment Materials: Products recommended by cementitious backer unit manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

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

1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.

B. Install cementitious backer units to comply with ANSI A108.11.

C. Finishing Gypsum Board: ASTM C 840.

1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
2. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.

D. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

END OF SECTION 09 29 00

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Single Source Responsibility-Obtain primary resinous floor materials including hardening agents, finish or sealing coats from a single manufacturer with not less than 5 years of successful experience in manufacturing and installing the principal materials described in this section. Provide secondary materials only of type and from a source recommended by the manufacturer of the primary material.

B. Manufacturer Supervision: A representative of the materials manufacturer shall be present on site periodically for all phases of the installation of the specified coating materials. A minimum of one (1) visit for every 1000 square feet of application is required.

C. Application Bond Testing: The manufacturer shall conduct bond testing of the materials a minimum one (1) of every 1000 square of application and document acceptability to manufacturer.

D. Flooring supplier is to conduct moisture testing of the concrete floor slab – 1 per 1000 sf of floor or at least 1 per room whichever is more. Test as per flooring manufactures recommendation. Provide owner and architect written results and test process. Provide flooring manufacturers acceptable moisture limits to compare with test results.

E. Core Sampling: At the discretion, direction and expense of the Division of State Facilities, core sampling may be required by the contractor and/or manufacturer.

1.2 SUBSTITUTIONS

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

1.3 SUBMITTALS

Submittals required prior to contract award:

Letter of training certification from the manufacturer/distributor stating that contractor is an approved installer of the products specified in this Section.

Submit written description of experience illustrating conformance with the Letter of Solicitation – Contractor Qualifications, include project Owners, contact names, and phone numbers.

Submit resumes on key personnel who will be performing the actual work.

Submittals shall be delivered to Project Manager prior to or at Pre-Construction Conference and shall include at a minimum:

Submit three (3) copies and (1) digital copy of manufacturer's product literature indicating technical data including accessory materials.

Submit three (3) copies of manufacturer's installation and application guide.

Submit three (3) copies of manufacturer's color palatte for agency color selection.

Submit three (3) samples of finished product on 12 inch by 12 inch (12" x 12")

Submit three (3) copies of manufacturer's Material Safety Data Sheets.

Construction Submittals: One (1) digital of application bond test or core test results to Architect within seventy two hours of test.

1.4 REFERENCES

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

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

Delivery of materials: Deliver materials to project site with labels legible and intact.

Include and maintain labels on containers displaying the following information: Manufacturer's name, Product name, Product number, Color, Instructions for reducing (where applicable) and Component description

Storage of materials: Bulk, prolonged storage of materials at application location will not be allowed. See General Requirement, Special Site Conditions for further requirements.

1.6 JOB CONDITIONS

Environmental requirements

Comply with manufacturer's recommendations as to environmental conditions under which floor-coating systems can be applied.

Do not apply flooring system at temperatures beyond those limits stated in the manufacturer's technical data sheet unless given written permission by the manufacturer.

Do not apply flooring system in areas where dust or other airborne particulate matter is being generated.

Protection: Cover or otherwise protect finished work of other trades and surfaces not being coated concurrently or not to be coated.

1.7 WARRANTY

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

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

PART 2 – PRODUCTS

2.1 FLOORING SYSTEM

Description: Medium to heavy duty, minimum 1/8" base overall thickness with integral cove base, slip resistant, aggregate filled, 100% solids epoxy flooring system, including, antimicrobial treatment, and urethane coat finish as follows:

System Materials:

Broadcast Coats: 100% Solids, two (2) epoxy resin coats, 1/16" including color pigments and minimum 1/8" thickness

Aggregate: Color Granules. Color: As selected by Architect from Full Unicolors Pa1ette

Topcoat: 95% solids minimum, urethane resin top coat complying with the American with Disabilities Act coefficient of friction with necessary anti-slip resistance additives and a minimum thickness of 15 mils.

Approved Manufactures:

Prime Coat Coating Systems

Tnemic Inc.
Dur-A-Flex, Inc

Colors: Colors shall be selected by the Architect from manufacturer's full palette of colors.

Mixing: Comply in strict accordance with manufacturer's requirements for mixing and handling of all materials.

Do not apply any material that has exceeded shelf and pot life as determined by manufacturer.

2.2 MISCELLANEOUS MATERIALS

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

Sealants: Epoxy sealants as approved for use by this manufacturer.

Metal low profile transition strips: 304 stainless steel transition strip.

PART 3 - EXECUTION

3.1 INSPECTION

General: The Contractor and Manufacturer shall take sole responsibility for review and determination of the job conditions prior to application of any products.

Selected resinous floor system shall be applied over concrete slab, ground to profile as recommended by the selected manufacturer. Prior to system application, the concrete surface shall be free of laitance, form release agents, curing agents, oil, grease and other contaminants. Surface shall be free of fins, projections, and loosely adhering concrete, dirt and dust particles.

Examine surfaces scheduled to receive coating for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included herein.

Notify Architect immediately upon determination that surfaces to receive coating are unacceptable for proper adhesion or subsequent performance.

Do not proceed with surface preparation or coating application until conditions are suitable.

3.2 PREPARATION OF SURFACES

General: Concrete surfaces shall be free of visible moisture, oil, grease, curing

compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products, or any other contaminants that will affect long term adhesion of the flooring system.

Moisture Content: Strictly comply with the manufacturer's requirements for evaluation / testing of moisture content. Under any circumstances, do not apply high performance floor coatings to floor slabs that exceed 5 percent moisture content or 3 pounds per 1,000 square feet per 24 hours per ASTM F 1869 Moisture Vapor Emission Rate.

Other Contamination: Conduct Litmus Test for pH to determine the presence of chloride or acid is within the limits of the manufacturer's requirements.

Miscellaneous Repair Work:

Complete all concrete crack, spalling, deterioration, or damage as required by manufacturer to achieve approved surface for application.

Install new, floor to wall cants and prep wall base to receive coved resinous base up 6", provide straight even top edge.

3.2 APPLICATION

General Requirements: Comply in strict accordance with manufacturer's requirements application of all materials including but not limited to moisture content, pH balance, environmental requirements, means and methods.

Install low profile transition strip at each point of resinous floor finish termination.

3.3 INSPECTIONS

Architect and/or Department of State Facilities shall review work of this section for visual and textural acceptability only. Said review of finished surfaces will be made at the discretion of the Architect and/or Department of State Facilities Development prior to occupancy of Agency.

The Contractor and Manufacturer are solely responsible for quality assurance, application compliance, means and methods.

3.4 FINISHED WORK

Damage to finished surfaces caused by other than coating contractor shall be repaired to acceptable condition by coating contractor under cost reimbursement by owner.

The Contractor shall refinish, repair, or replace areas where any portion of finish has been damaged or is not acceptable. If refinish, repair, or replacement of any area does not produce uniformity of overall function, performance, appearance or texture of the system, it is at the discretion of the Department of State Facilities to

require rework.

3.5 CLEANING

Remove debris promptly from work area and dispose of properly. Cleaning is to be done daily.

Remove spilled, splashed or splattered coating materials from all surfaces.

Do not mar surface finish of items being cleaned.

Clean existing building components within the limits of the work area including but not limited to walls, ceilings, fixtures, and floors resulting release of dust or debris from floor preparation activities.

See General Requirements, Cleaning and Disposal for further requirements.

END OF SECTION 09 67 23

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals:

1. Product Data. Include printout of MPI's "MPI Approved Products List" with product highlighted.
2. Samples.

B. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.

C. Extra Materials: Deliver to Owner 1 gal. (3.8 L) of each color and type of finish coat used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS

A. Products:

1. Tnemec: Company Incorporated

B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."

C. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a system, provide products recommended in writing by manufacturers of topcoat for use in system and on substrate indicated.

D. Colors: As selected by Architect from manufacturers full line.

PART 3 - EXECUTION

3.1 PREPARATION

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

B. Remove hardware, lighting fixtures, and similar items that are not to be coated. Mask items that cannot be removed. Reinstall items in each area after coating work is complete.

C. Clean and prepare surfaces in an area before beginning coating work in that area. Schedule work so cleaning operations will not damage newly coated surfaces.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

3.2 APPLICATION

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

B. Coat exposed surfaces, new unless otherwise indicated.

1. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces.
2. Coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Coat the back side of access panels.
4. Do not coat prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

C. Apply high-performance coatings according to manufacturer's written instructions.

1. Use brushes only where the use of other applicators is not practical.

D. Apply high-performance coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform finish, color, and appearance.

3.3 EXTERIOR COATING APPLICATION SCHEDULE

A. Steel:
1. Gloss Epoxy Coating System: Two coat(s) over epoxy primer: MPI EXT 5.1F.

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

3.4 INTERIOR COATING APPLICATION SCHEDULE

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

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

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

END OF SECTION 09 96 00

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SECTION 099601 – MASONRY WEATHER SEAL AND GRAFFITTI BLOCK

PART 1 - GENERAL

1.1 SCOPE

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

1.2 SUMMARY

A. This Section includes the following:

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

B. Related Sections include the following:
1. Section 99700: Coatings for Masonry

1.3 SUBMITTALS

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

B. Warranty: Special warranty specified in this Section.

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

1.4 QUALITY ASSURANCE

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

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

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

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

1.5 DELIVERY, STORAGE, AND HANDLING

A. The GC or contractor of his choice will receive the products when delivered at the job site. A dry locked storage space complete with shelving, will be provided for the purpose of unpacking, sorting out, checking and storage.

B. Direct factory shipments to the job site not acceptable. Promptly replace items damaged in shipment with proper material without additional cost.

C. Handle product in a manner to minimize damage.

1.6 OWNERS INSTRUCTIONS

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

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of coated masonry that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including excessive cracking, fading, peeling, etc.
   b. Deterioration of finish from UV exposure or Graffiti removal process.

2. Warranty Period: Three years from date of Substantial Completion, or extent of applicator's and manufacturer's warrantees, whichever is longer.

PART 2 - PRODUCTS

2.1 MASONRY SEALANT AND GRAFITTI CONTROL COATING

A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.

2.2 MANUFACTURER;

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

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

A. TYPICAL TECHNICAL DATA:

1. FORM: Milky white liquid
2. SPECIFIC GRAVITY: 1.00
3. pH: n/a
4. WEIGHT / GALLON: 3.82 LBS
5. ACTIVE CONTENT: 6 %
6. TOTAL SOLIDS: 6% ASTM D 5095
7. FLASH POINT: greater than 212 degrees F (>100 degrees C)
8. FREEZE POINT: 32 degrees F (0 degrees C)
9. SHELF LIFE: 1-year in tightly sealed, unopened container
10. VOC CONTENT: less than 20g/L, Low Solids Coating. Complies with all known federal, state and district AIM VOC Standards.

B. LIMITATIONS:

1. Not suitable for extremely dense or polished surfaces.
2. Not appropriate for application to asphaltic or painted surfaces.
3. Not suitable for application to synthetic resin paints, gypsum, plaster or other non-masonry surfaces.
4. Not recommended for below-grade applications.
5. Will not prevent water preparation through structural cracks, defects, or open joints.
6. May darken or enhance the natural color of some surfaces. Always protect.
7. Not recommended for horizontal surface.

PART 3 - EXECUTION

3.1 **APPLICATION**: Before applying, read "Preparation" and "Safety Information" sections in the Manufacturer's Product Data Sheet for *Weather Seal Blok-Guard® & Graffiti Control II*. Refer to the Product Data Sheet for additional information about application of *Blok-Guard®& Graffiti Control II*. Do not dilute or alter.

For Best results, apply *Blok-Guard® &Graffiti Control II* "wet-on-wet" to a visibly dry and absorbent surface.

A. SPRAY:

1. Using low-pressure (<50 psi) spray equipment, saturate, "wet-on-wet" spraying from the bottom up. Avoid excessive overlapping. *For textured and porous surfaces*, apply enough material to create 6 to 8 inch rundown below the contact point.
2. Let first application penetrate masonry surface for 2 to 3 minutes. *For textured and porous surfaces*, reapply in same saturating manner to ensure complete coverage of recessed surfaces.
3. Immediately brush out runs and drips to prevent build-up.

B. BRUSH or ROLLER APPLICATION: Saturate uniformly. Let product penetrate for 2-3 minutes. Re-saturate. Brush out heavy runs and drips that don't penetrate.

C. DENSE, SMOOTH SURFACE APPLICATION: Apply a single coat. Use enough to completely wet the surface without creating drips, puddles or rundown. Do not over apply. Test for application rate.

D. SECOND COAT / POROUS SURFACES APPLICAION: Some surfaces will need an additional coat of Blok-Guard&Graffiti Control II for maximum protection. Apply the second wet-on-wet coat

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

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

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

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

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

3.5 BEST PRACTICES:

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

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

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

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

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

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

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

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

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

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

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

2. Eye Contact: Rinse thoroughly for 15 minutes. Get immediate medical assistance.

3. Skin Contact: Remove contaminated clothing and rinse thoroughly for 15 minutes. Seek medical assistance in persistent irritation develops. Launder contaminated clothing before reuse.

4. Inhalation: Seek medical attention if irritation develops. If you experience dizziness or nausea, get to fresh air. Seek medical assistance if symptoms persist.

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

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

PART 2 - PRODUCTS

A. Exterior signage for restrooms.
   1. Acrylic panels matte-finished. Provide solid general contrasting color to the white letters and graphic symbols.

   2. Provide sign for:
      a. MEN (include both a male graphic and accessible symbol above letters and braille under letters)
      b. WOMEN (include both a female graphic and accessible symbol above letters and braille under letters)
      c. Letters to be 3/4" Arial font.
      d. Male and Female Graphic to be +- 5" tall
      e. Accessible symbol +- 4" tall
      f. Braille to comply with ADA regulations.

   3. Finishes and Colors: As selected from manufacturer's full range

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs where indicated or directed by Architect. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

B. Wall-Mounted Signs:
   1. Mechanical Fasteners: Use non-removable stainless steel mechanical fasteners placed through predrilled holes.
   2. Locate signs to comply with ADA regulations.

END OF SECTION 10 14 00

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SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

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

B. Regulatory Requirements: Comply with ICC/ANSI A117.1 for toilet compartments designated as accessible.

PART 2 - PRODUCTS

2.1 TOILET COMPARTMENTS AND SCREENS

A. Products:

1. Basis of Design: Bradley Phenolic-Series 700

2.2 MATERIALS

A. Solid-Plastic, Phenolic Core: Solid phenolic core with melamine facing on both sides, without visible glue line or seam, with eased edges and with minimum 3/4-inch- (19-mm-) thick doors and pilasters and minimum 1/2-inch- (13-mm-) thick panels and screens.
1. Color: As selected by Architects from manufactures line.

B. Pilaster Shoes and Sleeves (Caps): Stainless steel not less than 3 inches high.

C. Brackets: Continuous.

1. Material: Stainless steel

2.3 FABRICATION

A. Toilet Compartments: Floor and ceiling anchored.

B. Urinal Screens: Wall hung.

C. Doors: Unless otherwise indicated, 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.

D. Door Hardware: Stainless steel. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units rigid, straight, level, and plumb, with not more than 1/2 inch (13 mm) between pilasters and panels and not more than 1 inch (25 mm) between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sleeve nuts for through-bolt applications.

1. Stirrup Brackets: Align brackets at pilasters with brackets at walls. Locate full length continuous wall brackets level and square so holes for wall anchors occur in masonry or tile joints.
2. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

END OF SECTION 10 21 13

SECTION 22 00 00 - PLUMBING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Domestic Hot and Cold Water Piping.
2. Drain, Waste, and Vent Systems.
3. Plumbing Fixtures and Trim.
4. Water Heater and Softener.
5. Storm Piping with Heat Tape.
6. Irrigation Backflow Prevention.

B. *Related Work*:

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

C. *Work of Other Sections:*

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

1.02 GENERAL PROVISIONS

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

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

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

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

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

D. Sanitary Napkin Disposal Unit:

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

E. Mirror Unit:

1. Basis-of-Design Product: Royce Rolls Ringer Co. Stainless Mirrors size as indicated on drawings.

F. Warm-Air Dryer:

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 10 28 00

SECTION 22 00 00 - PLUMBING

PART 1 - GENERAL

1.01 DESCRIPTION

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

1. Domestic Hot and Cold Water Piping.
2. Drain, Waste, and Vent Systems.
3. Plumbing Fixtures and Trim.

B. *Related Work*:

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

C. *Work of Other Sections:*

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

1.02 GENERAL PROVISIONS

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

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

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

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

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

1.03 QUALITY ASSURANCE

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

B. Without additional cost to the Owner, provide such other labor and materials as required to be complete the work of the Section in accordance, with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in the Contract Documents.

C. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.

D. For the actual field fabrication, installation and testing of the Plumbing work, use only thoroughly trained and experienced workmen complete familiar with the items required and manufacturer's current recommended methods of installation.

E. *Reference Standards:*

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

1.04 CODES AND PERMITS

A. This contractor must comply with building codes and other ordinances in force where the building is located as far as same apply to his work.

B. Plumbing work shall meet all Federal, State, Local Codes, ordinances and utility regulations.

1. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern when so directed by the Engineer.

C. Plumbing Contractor must secure permits from proper offices and pay all legal fees as may be necessary for fulfilling the requirements of these specifications.

D. Submit one (1) copy of all permits to the Owner.

1.05 COORDINATION

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

B. Arrange plumbing work in neat, well organized manner with piping and similar services running with primary lines of building construction, and with minimum of 8 foot overhead clearance, where possible.

C. Locate equipment properly to provide easy access, and arrange entire plumbing work with adequate access for operation and maintenance.

D. Give right-of-way to piping, which must slope for drainage.

E. Where Plumbing work is to connect to existing, the Contractor must field verify all connection points before beginning any rough-in work. Verify gravity flow lines and proper invert elevations required prior to starting piping installation.

1.06 ELECTRICAL PROVISIONS OF PLUMBING WORK

A. *Line Voltage Wiring:* The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.

B. *Low Voltage Control Wiring*: Exposed low voltage (less than 100 volts) temperature control wiring in connection with the Plumbing systems shall be in EMT conduit by the Plumbing Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed low-voltage control* wiring may be routed to equipment without conduit, unless subject to physical damage.

C. The Plumbing Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. Plumbing Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to the Electrical Contractor.

D. *Motors:* Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.

1. *Phases and Current:* 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide 2 separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
2. *High Efficiency Motors:* All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
3. *Temperature Rating:* Class B insulation for 70 degree C temperature rise.
4. *Service Factor:* 1.15 for three-phase; 1.35 for single-phase.
5. *Construction:* General purpose, continuous duty.
6. *Frames:* NEMA Standard for horsepower specified.
7. *Overload Protection:* Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.
8. *Bearings:* Permanently lubricated and sealed ball bearings.

E. *Motor Starter &Disconnect Switches:* Where motor starters and disconnect switches are indicated to be an integral part of equipment furnished by Plumbing Contractor, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.

1. Field assembled motor starters and disconnect switches are to be the responsibility of the Electrical Contractor, unless indicated otherwise.

F. *Wiring Connections:* Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.

G. *General Wiring:* Comply with applicable provisions of Division 16 Section.

H. *Drip Pans:* Furnish drain pans below piping which passes directly above electrical work. Install drain piping and drain valve.

1.07 PAINTING PLUMBING WORK

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

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

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

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

1.08 PLUMBING SYSTEM IDENTIFICATION

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

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

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

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

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

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

1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

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

1. *Pipe Sleeves:* Schedule 40 black steel pipe, 1” larger than carrier pipe.

B. The Plumbing Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.

C. Pack annular space between sleeves and pipe with fiberglass insulation and seal with approved caulking materials. Where penetrations occur through fire-rated walls or floors, fill space with fire-resistive insulation similar to high-temperature mineral wool, US Gypsum Thermafiber batts or Cera-blanket FS insulation by Tremco. Seal openings with UL approved fire-resistive fire stop caulk/sealant or assembly.

1. Fireproof plastic piping through fire-rated construction per approved UL listed assembly.

D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.

E. If the Plumbing Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the Plumbing Contractor shall pay the General Contractor for providing such openings.

F. Make arrangements with various other contractors for all special framing, spacing and chases. Mason will leave chases in mason work, but Plumbing Contractor is responsible for correct size and location.

1.10 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Plumbing work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1. All patching work in existing areas shall match existing work and restore the finish to its original condition in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

1.11 TESTS AND INSPECTIONS:

A. All plumbing tests shall be conducted in the presence of and to the satisfaction of the Governing Authorities, Architect/ Engineer, and Owner or his authorized representative.

B. The Plumbing Contractor shall be responsible for applying tests and ordering inspections as required by Federal, State and local Code and Inspection authorities.

1. All work shall remain exposed until it has been tested, inspected and approved.

1.12 TEMPORARY SERVICES

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

1.13 TRENCHING AND BACKFILLING

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

1. Cut bottom of trench to grade, make trench 12” wider than the widest dimension of the pipe.
2. All pipes shall be laid on a compacted bed of sand 6” deep. Do not lay piping on large stones, rocks or bricks.

B. Backfill in layers and compact sufficiently to prevent settlement. Backfill with damp sand and fine gravel mixture.

1. Exterior locations shall be backfilled to 12” of grade with sand and fine gravel mixture and the remainder with native compacted topsoil.
2. Do not start backfill operations until plumbing work has been properly inspected and approved.

1.14 CONCRETE FOR PLUMBING WORK

A. *General:* Comply with pertinent provisions of Division 1 and Division 3.

B. All concrete work for equipment pads by the Plumbing Contractor.

C. *Concrete Equipment Pads*: For each piece of floor or ground mounted HVAC equipment as indicated on the Drawings, provide a 4” concrete housekeeping pad at a minimum of 4 inches wider than the full size of the respective equipment’s base. Equipment pads are required for the following equipment:

1. Water Heater.
2. Water Softener.

1.15 EQUIPMENT ACCESS

A. *General:* All valves, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.

B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.

C. *Construction:* Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and furred-in spaces. Milcor or approved equal, 14-gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

1.16 EQUIPMENT SUPPORTS

A. *General:* Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.

1. Prime coat paint all metal supports.

1.17 EQUIPMENT GUARDS

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

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

1.18 GUARANTEE

A. All material and workmanship must be new and first class in every respect; the plumbing equipment must be turned over to the owner in complete working order and free from mechanical or performance defects.

B. The Plumbing Contractor must guarantee all labor and materials for one (1) year from the completion of the plumbing system. Maintain and repair plumbing equipment for the above period, unless such defects are clearly the result of bad management after plumbing system is turned over to the Owner.

C. Before final acceptance of the plumbing work, the Plumbing Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by Owner.

D. The Plumbing Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the Drawings and Specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

1.19 SUBMITTALS

A. Refer to Division 1 for additional submittal requirements.

B. The Plumbing Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Architect/Engineers final approval.

C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.

1. Incomplete drawings will be disapproved.

D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.

E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Valves.
2. Pipe and piping specialties.
3. Insulation systems.
4. Plumbing fixtures.
5. Heat Trace cable.
6. Instructions and O&M manuals(2 copies).
7. As-built Drawings(1 copy).

1.20 HOUSEKEEPING AND CLEANUP

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

1.21 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

1. The Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.

B. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

1.22 INSTRUCTIONS AND MANUALS

A. Upon completion of the installation, but before final acceptance of the system, the Plumbing Contractor shall instruct the Owner on the care and operation of all parts of the Plumbing system.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to Architect for disbursement.

1.23 AS-BUILT DRAWINGS

A. During construction maintain a set of prints showing installed as-built work for the project.

B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

PART 2 - PRODUCTS

2.01 DOMESTIC WATER PIPE SCHEDULE

A. *Above Ground Piping:*

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

B. *Below Ground*: 2-1/2” and Smaller:

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

2.02 DRAIN, WASTE AND VENT PIPE SCHEDULE

A. *Interior Above Ground:*

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

2. Hubless cast iron soil pipe and fittings, CISPI 301; with no-hub couplings, CISPI 310.
3. PVC plastic pipe, Schedule 40, Class 12454-B(PVC 112), ASTM D1785; PVC plastic drain, waste and vent pipe and fittings, ASTM D2665; socket fitting patterns, ASTM D3311; primer, ASTM F656; solvent cement, ASTM D2564.
4. Galvanized steel vent pipe, Schedule 40, zinc-coated, ASTM 120 or 53 Grade B; malleable iron threaded fittings, zinc-coated.
5. Type “DWV” copper water tube, H(hard drawn) temper, ASTM B88; with cast copper drainage fittings(DWV), ANSI B16.23; wrought copper drainage fittings(DWV) , ANSI B16.29; lead-free(less than 0.2%) solder, ASTM B32; flux, ASTM B813.

B. *Interior Below Ground:*

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

2.03 VALVES

A. *Approved Manufacturers:*

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

B. *Check valves:*

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

C. *Ball valves:*

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

2.04 VENT FLASHING

A. Where pipes of this Section pass through the roof, flash the opening with seamless 3 lb./sq.ft. lead flashing with 15” x 17” minimum base size, steel reinforced boot and cast iron counterflashing sleeve.

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

2.05 PIPE HANGERS

A. *Piping:*

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

B. *Multiple or Trapeze Hangers:*

1. Steel channels with welded spacers and hanger rods.

C. *Floor Support:*

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

D. *Copper Pipe Supports:*

1. All supports, fasteners, clamps, etc. directly connected to copper piping shall be copper-plated or polyvinylchloride(PVC)-coated.
2. Where steel strut supports are used, provide isolation collar between supports/clamp and copper piping.

E. *Approved Manufacturers*: Fee and Mason, B-line, Grinnell or approved equal.

2.06 CLEANOUTS

A. *Exterior:* Smith #4253 with XH cast iron top in concrete areas.

B. *Interior Floors:* Smith 4930-PB square nickel-bronze top.

C. *Finished walls:* Smith #4532 stainless steel with access plate and screw.

D. Provide cleanout plugs of extra heavy bronze

E. *Approved Manufacturers:* Josam, Smith, Wade, Zurn or approved equal.

2.07 ACCESS

A. *General:* All piping, conduit and accessories shall be installed to permit access to equipment for maintenance. Any relocation of piping, equipment or accessories required to provide maintenance access shall be accomplished by the Contractor at no additional cost.

B. *Removable Access Plates:* Where only hand access is sufficient for valve access, provide removable plate-type access unit of minimum size which will facilitate required access.

1. Provide units of type, style, design, material and finish appropriate for location and exposure in each instance.
2. In exposed surfaces of occupied spaces provide round plate units, flush floor units and frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome or stainless steel finish in other surfaces.

C. *Walls:*

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

D. *Ceilings:*

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

E. *Floors:*

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

2.08 WATER HAMMER ARRESTORS

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

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

2.09 HANDICAPPED INSULATION

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

2.10 PIPE INSULATION

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

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

1. Interior cold and hot domestic water piping.

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

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

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

D. *Insulation Installation Schedule:*

	Service	*Pipe Size*	*Insulation Thickness*
1.	Hot Water Piping	Less than 1"	1"
		1-1/4 thru 4"	1"
2.	Cold Water Piping	Less than 1"	½"
		1-1/4"thru 4"	1"
3.	Storm Water Piping	All sizes	1"

2.11 HEAT TRACE CABLE - STORM PIPING

A. *General:* Provide oomplete heat trace cable on exterior of storm water piping below pipe insulatioin from roof drains to 36" below grade. Heat trace cable shall be self-regulating type equal to Raychem WinterGard Plus H611 rated for120 volt and 6 watts/ft. UL listed 718K pipe heating cable.

B. Accessories:

1. H900 Power Connection(hardwire).
2. H910 Splice and Tee Kit.
3, H912 Gel-filled End Seal Kit.

2.12 FIXTURES AND EQUIPMENT

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

1. Engineer will evaluate and make final decision on whether submitted fixture is equal to specified fixture.
2. Other fixture manufacturers who consider their products equal to those specified are required to request pre-approval for bidding as base bid in accord with Instructions to Bidders section.

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

1. All wastes and supplies for fixtures, except as otherwise specified or required, shall turn back into walls.

C. All trim, except as otherwise specified, shall be constructed of brass. Finish shall be polished chrome, except where concealed(inside cabinets, etc.).

D. Faucets shall have replaceable control assemblies or replaceable washers and seats.

E. Exposed waste fittings shall be constructed of 17 gauge tubular brass. Slip joints are permitted only on the fixture side of the trap.

F. All fixtures with non-accessible traps such as bathtubs, showers, floor drains, shall have a completely removable stopper or grate in order to be accessible for cleanout.

G. Quarter-turn(1/4) ball valve type fixture stops shall be installed at each fixture. It is the Contractor's option to install straight or angle type. All stops are to have a minimum of ½" inlets with flexible riser and loose key handles where exposed to the public.

1. All shower/bath valves are to have integral stops.
2. All loose stops shall be from the same manufacturer.

2.12 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

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

3.02 SITE UTILITIES

A. Verify all flow lines to the septic system sewer prior to installing any underground sewer piping. Advise the General Contractor of site conditions or inverts inconsistent with the plumbing layout and proposed flow line prior to proceeding.

3.03 PLUMBING SYSTEM LAYOUT

A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only the minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.

C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other that as shown on the Drawings.

D. Where work is to connect to existing, Plumbing contractor must field verify all connection points before beginning any rough-in work. Verify all connecting invert elevations and flow lines of new work connected to existing gravity drainage.

3.04 TRENCHING AND BACKFILLING

A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of these Specifications and consistent with the national, state and local plumbing codes.

B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the pipe.

C. Bedding and backfilling:

1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
2. Under the building, install pipes on a 6" bed of damp sand. Backfill to bottom of slab with damp sand.
3. Outside the building, install underground piping on a 6" bed of damp sand. Backfill to within 12" of finish grade with damp sand. Backfill remainder with native topsoil.
4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

3.05 INSTALLATION OF PIPING AND EQUIPMENT, GENERAL

A. General:

1. Proceed as rapidly as the building construction will permit.
2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
3. Cut pipe accurately, and work into place without springing or forcing properly clearing window, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
5. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of the pipe.
6. Run horizontal sanitary piping at a uniform grade of 1/4" per ft., unless otherwise noted. Run horizontal water piping with an adequate pitch upwards in direction of flow to allow complete drainage.
7. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
8. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment.
9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain and unthreaded pipe 6" above the drain.
10. Securely bolt all equipment, isolators, hangers, and similar items in place.
11. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.
12. Provide complete dielectric isolation between ferrous and non-ferrous metals.

13. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus.

B. Equipment access:

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

3.06 PIPE JOINTS

A. Copper tubing:

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

B. Screwed piping:

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

C. PEX Tube Joints

1. Installed per ASTM F-1807 with insert-type fittings with cold memory flaring as manufactured by Uponor are approved.
2. Brass compression type fittings with threaded nut, compression ring and insert will not be acceptable.
3. Provide copper type L manifolds, where manifold distribution is used with labeled quarter turn ball valve stops for each service line.
4. Install piping and fittings per manufacturers recommendations.

D. Leaky joints:

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

3.07 PIPE SUPPORTS

A. Support suspended piping with clevis or trapeze hangers and rods.

B. Space hangers and support for horizontal steel pipes according to the following schedule:

Pipe size:	Maximum spacing on centers:
1-1/4" and smaller:	8'-0"
1-1/2" to 3":	10'-0"
4" to 5":	14'-0"

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

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

D. Provide sway bracing on hangers longer than 18".

E. Support vertical piping with riser clamps secured to the piping and resting on the building structure. Provide at each floor unless otherwise noted.

F. Provide insulation continuous through hangers and rollers. Protect insulation by galvanized steel shields.

G. Arrange pipe supports to prevent excessive deflection, and to avoid excessive bending stress.

H. Hubless piping:

1. Provide hangers on the piping at each side of, and within 6" of, hubless pipe coupling so the coupling will bear no weight.
2. Do not provide hangers on couplings.
3. Provide hangers adequate to maintain alignment and to prevent sagging of the pipe.
4. Make adequate provision to prevent shearing and twisting of the pipe and the joint.

3.08 SLEEVES AND OPENINGS

A. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, and ceilings.

1. Set pipe sleeves in place before concrete is placed.
2. For uninsulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2" clearance between inside and outside of the pipe.
3. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.

B. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with noncombustible asbestos cotton, or fiberglass to within 1/2" of both wall faces, and provide the waterproof compound described above.

C. Finish and escutcheons:

1. Smooth up rough edges around sleeves with plaster or spackling compound.
2. Provide 1" wide chrome or nickel plated escutcheons on all pipes exposed to view where passing through walls, floors, partitions, ceilings, and similar locations.
   a. Size the escutcheons to fit pipe and covering.
   b. Hold escutcheons in place with set screw.

3.09 CLEANOUTS

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

B. Provide cleanouts of same nominal size as the pipes they serve; except where cleanouts are required in pipes 4" and larger provide 4" cleanouts.

C. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite the cleanout threads.

3.10 VALVES

A. Provide valves in water and gas systems. Locate and arrange so as to give complete regulation of apparatus, equipment, and fixtures.

B. Provide valves in at least the following locations:

1. In branches and/or headers of water piping serving a group of fixtures.
2. On both sides of apparatus and equipment.
3. For shutoff of risers and branch mains.
4. For flushing and sterilizing the system.
5. Where shown on the Drawings.

C. Locate valves for easy accessibility and maintenance.

3.11 WATER HAMMER ARRESTORS

A. Provide water hammer arrestors on hot water lines and cold water lines.

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

3.12 BACKFLOW PREVENTION

A. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back siphonage.

B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.13 PLUMBING FIXTURE INSTALLATION

A. Installation:

1. Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.
2. Provide supplies in proper alignment with fixtures and with each other.

B. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.

C. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

3.14 DISINFECTION OF WATER SYSTEMS

A. Disinfect hot and cold water systems.

1. Perform disinfection under the Architect's observation. Notify the Architect at least 48 hours prior to start of the disinfection process.
2. Upon completion of disinfecting, secure and submit the Certificate of Performance, stating system capacity, disinfectant used, time and rate of disinfectant applied, and resultant residuals in ppm at completion.

3. Use disinfectant method approved by the Architect.

B. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory approved by the Architect, based on water samples from the system, showing test negative for coli-aerogene organisms. Provide a total plate count of less than 100 bacteria per cc, or equal to the control sample.

C. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

3.15 OTHER TESTING AND ADJUSTING

A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction.

B. Where test show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

C. Adjust the system to optimum standards of operation.

END OF SECTION

SECTION 23 00 00 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide heating, ventilating, and air conditioning systems where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Exhaust systems including, inline fans, motors, dampers, controls and related items;
2. Air Inlets and Outlets;
3. Electric heat;
4. Acoustical and thermal insulation of ductwork and related equipment.
5. Test, adjust, and balance air systems;
6. O&M manuals, warranty work and Owner instructions.

B. *Related Work*:

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

C. *Work of Other Sections*:

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

1.02 GENERAL PROVISIONS

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

B. The plans show various details indicating the general arrangement of the heating and ventilating work, sizes and locations of pipe work, ducts, units, etc., the said plans with figures, lettering, etc., shall be considered a part of these Specifications and no charge or alternation shall be made in either case unless ordered by the Engineer.

C. In addition to the heating and ventilating plans, see General Plans of the building, as all heating and ventilating work appearing on the latter plans will be part of this Contract unless especially specified to be done by other contractors, as well as, the said work detailed on the heating and ventilating plans.

1.03 QUALITY ASSURANCE

A. *Qualifications of Installers*:

1. For the actual fabrication, installation and testing of heating and ventilating work, use only thoroughly trained and experienced workmen completely familiar with the items required and manufacturer's current recommended methods of installation.
2. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.

B. *Reference Standards*: The following standards are imposed, as applicable to work in each instances:

AABC	Associated Air Balance Council
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
MCA	Mechanical Contractors Association
MSS	Manufacturers Standardized Society
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association

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

Inside:	70 deg. F	74 deg. F 50% RH
Outside:	-15 deg. F	91 deg. dbF/ 74 deg. wbF

1.04 CODES AND PERMITS

A. This Contractor must comply with building laws and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009.
2. IMC 2009; SPS 364.

B. He must secure permits from proper offices and pay legal fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

1.05 COORDINATION

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

B. Arrange heating and ventilating work in neat, well organized manner with piping and similar services running parallel with primary lines of building construction, and with minimum of 8 foot overhead clearance where possible.

C. Locate operating and control equipment properly to provide easy access, and arrange entire heating and ventilating work with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF HVAC WORK

A. *Line Voltage Wiring*: The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.

B. *Control Wiring*: Exposed low voltage (less than 100 volts) temperature control wiring in connection with heating and ventilating system shall be in EMT conduit by the Heating Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed control wiring* may be routed to equipment without conduit, unless subject to physical damage.

C. This Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. HVAC Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Electrical Contractor.

D. *Motors*: Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.

1. *Phases and Current*: 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide two (2) separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
2. *High Efficiency Motors*: All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
3. *Service Factor*: 1.15 for three-phase; 1.35 for single-phase.
4. *Construction*: General purpose, continuous duty.
5. *Frames*: NEMA Standard for horsepower specified.
6. *Overload Protection*: Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.

E. *Starter and Switches*: Where motor starters and switches are indicated to be an integral part of equipment furnished by Heating installer, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.

F. *Wiring Connections*: Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.

G. *General Wiring*: Comply with applicable provisions of Division 16 Section.

1.07 PAINTING HVAC WORK

A. *General:* All field painting of mechanical equipment will be done by the General Contractor unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.

B. All equipment shall be provided with factory-applied prime finish, unless otherwise specified.

C. If the factory shop paint finish on any equipment furnished by the Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Contractor to the satisfaction of the Architect/Engineer.

D. Prime paint all field-fabricated metal work under HVAC work, comply with applicable provisions of Division 9.

1.08 IDENTIFICATION

A. *General*: Provide adequate marking of the HVAC system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals. Tag and label HVAC equipment located in exposed or accessible areas to conform to ANSI A13.1-1981.

After painting and/or covering is complete, identify all equipment, piping and ductwork by its abbreviated generic name as shown/scheduled/specified.

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

C. *Piping and Ductwork*: Identify all *exposed and accessible* piping and ductwork once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping or duct identification. Provide appropriate sized letters to convey information on wrap-around signage, adhesive-backed or paint stenciled labels.

1. *Exposed* includes all piping and ductwork above suspended ceiling systems.

D. *Valves*: Identify all valves with 1-1/2" diameter minimum polished brass stamp-engraved or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, service and tag description, incorporate in Instruction/O&M Manual.

E. *Operational Labels*: Where needed for proper or adequate information on operation and maintenance of HVAC systems, provide labels or markers of plasticized or laminated card stock, typewritten of appropriate size to convey the information.

F. Submit schedule of Identification labels for Architect/Engineer approval.

1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

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

B. The HVAC Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.

1. *Pipe sleeves*: Schedule 40 black steel pipe, 1” larger than the pipe;
2. *Duct sleeves*: 24 gauge galvanized sheetmetal, ½” larger than the duct on all sides.

C. Pack annular space between sleeves and pipe or ducts with fiberglass insulation and seal. Where penetrations through fire rated walls or floors, fill space with fire-resistive insulation similar to US Gypsum Thermafiber batts or other approved fire-resistive insulation material and seal annular openings with a UL approved , fire-stopping sealant/caulk.

D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.

E. If the HVAC Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the HVAC Contractor shall pay the General Contractor for providing these openings.

F. Make arrangements with various other contractors for all special framing, spacing and chases. Mason will leave chases in mason work, but HVAC Contractor is responsible for correct size and location.

1.10 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1.11 CONCRETE FOR HVAC WORK

A. *General:* Comply with pertinent provisions of Division 1 and Division 3.

B. None anticipated for project.

1.12 EQUIPMENT ACCESS

A. *General:* All valves, volume dampers, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, ducts or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.

B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.

C. *Construction:* Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and or furred-in spaces. Milcor or approved equal; 14 gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

1.13 EQUIPMENT SUPPORTS

A. *General*: Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.

1. Prime coat paint all supports.
2. Turn over equipment curbs to the General Contractor for installation; structural steel supports under equipment curbs by the General Contractor.

1.14 EQUIPMENT GUARDS

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

1. Prime coat paint all supports.

1.15 GUARANTEE

A. All material and workmanship must be new and first class in every respect; the heating, ventilating and air conditioning equipment must be turned over to the owner in complete working order and free from mechanical defects.

B. The HVAC Contractor must guarantee all labor and materials for one (1) year from the substantial completion and acceptance of the HVAC system and keep or place same in repair for

said period, unless such defects are clearly the result of bad management after HVAC system was turned over to the Owner.

C. The system must be guaranteed to operate noiselessly and to the satisfaction of the Owner and to supply and exhaust quantities of air shown on the Drawings.

D. Before final acceptance of this work, the Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by the Owner.

E. The HVAC Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the plans and specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

1.16 SUBMITTALS

A. Refer to Division 1 for additional submittal requirements.

B. The HVAC Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Engineer's final approval.

C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.

D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.

E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Exhaust fans and accessories;
2. Diffusers, grilles, registers and louvers;
3. Insulation systems;
4. TAB air balance report;
5. Instructions and O&M manuals (2 copies);
6. As-built drawings.

F. Marked-up drawings indicated record installation as-built HVAC work.

1.17 HOUSEKEEPING AND CLEANUP

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

1.18 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

1.19 INSTRUCTIONS AND MANUALS

A. Upon completion of the installation, but before final acceptance of the system, this Contractor shall instruct the Owner on the care and operation of all parts of the system.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all HVAC equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to the Architect for distribution.

1.20 AS-BUILT DRAWINGS

A. During construction maintain a set of prints showing installed as-built work for the project.

B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

PART 2 - PRODUCTS

2.01 DUCTWORK

A. *Sheet Metal*: Furnish, install, fit and secure in place all supply, return, exhaust and vent air ducts, risers, branches, etc., as shown and detailed on plans, built of galvanized iron as hereinafter specified.

1. Above ground, general ductwork: Galvanized steel, lock-forming quality, ASTM A527; 1.25 oz. zinc coating each side, mill phosphatized, ASTM A525.
2. Steel Ducts: Galvanized steel, lock-forming quality, ASTM A527; 1.25 oz. zinc coating each side, mill phosphatized, ASTM A525.

B. Ductwork Construction:

1. Sheet metal work shall be constructed according to practices recommended in the HVAC Duct Construction Standards - Metal and Flexible 1st ED. 1985, as published by SMACNA, and hereinafter specified.
2. *Ductwork Pressure-Velocity Classification*: + 2" static pressure class 2,500 FPM velocity level.
3. *Duct Sealing Requirements:* Seal Class B. Transverse and longitudinal joints.
4. All duct dimensions noted on the drawings are finished inside dimensions.
5. Install ducts, risers, etc., as indicated on plans, making necessary changes in cross section, offsets, etc., whether or not same is specifically indicated. If ducts cannot be run as shown on drawings, install ducts between required points, subject to the approval of Engineer without additional cost to the Owner.
6. At all outlets and inlets in rooms, flange ducts for attachment of grilles. Install grilles according to manufacturer's recommendations.
7. Sheet metal work throughout shall be assembled and erected in such a manner that no vibration will occur and no noise be transmitted by the moving air due to inappropriate fitting or offsets. *All corrective measures will be determined by the Engineer at the HVAC Contractor's expense.*.
8. All duct turns shall have either an inside radius equal to the duct width or be a miter turn with turning vanes. Turning vanes shall be double wall air-foil type.
9. *Branch Take-Off Fittings*: Round branch take-off fittings shall be low-loss type fittings such as bellmouth or conical type; *no scoops or 90 degree tee fittings allowed.* Square/rectangular branch take-off fittings shall have 45 degree leading edge with 4 inch minimum depth; *no air turns or scoops allowed.*

C. *Ductwork Accessories*:

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

2. *Access Panels*: Install access panels with latches and gaskets in ducts at automatic dampers, coils, fire dampers, louver plenums and other duct mounted equipment. Panels in insulated ducts must be internally insulated.
3. *Openings around Ducts*: Through walls must be filled with fiber-glass, caulked and sealed with 14 gauge galvanized sheet metal angle around duct on each side of wall.

2.02 VIBATION ISOLATION

A. *General:*

1. Isolate all motor driven mechanical, unless otherwise noted, from the building structure and from the systems which they serve, to prevent equipment vibrations from being transmitted to the structure.
2. Consider equipment weight distribution to provide uniform deflections.
3. For equipment with variable speed capability, select vibration isolation devices based on the lowest speed.

B. *Manufacturers:* Products and methods of fabrication shall be as manufactured by Mason Industries, Korfund Co., Amber/Booth Co., Vibration Mounting and Controls, or Kinetics, similar to the manufacturers model listed.

C. *Performance:*

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

Type of Equipment	*Isolation Type*	*Minimum Static Deflection - Inches*
Inline Exhaust Fans	Type 'X' Flexible Duct Connector &	¾"
	Type 'D' Hanger	¾"

D. *Type D Hangers*:

1. Mason type 30N, vibration hangers with a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing thru a 30 degrees arc before contacting the hole and short circuiting the spring.
2. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection

E. *Type X Flexible Duct Connectors:*

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

2.03 GRILLES, REGISTERS AND DIFFUSERS

A. Furnish grilles, registers and diffusers in the sizes, type and capacity as shown on the Drawings by the selected manufacturer or approved equal.

B. Grilles, Registers and Diffusers shall be suitable and compatible with ceiling construction in which they are installed. Check architectural schedules for ceiling construction. Coordinate locations with T-bar ceiling system and lighting fixtures.

2.04 LOUVERS

A. Extruded aluminum louver, 2" deep, 30 deg. J-blades mounted, 1.75" O.C. with rain hooks. Stainless steel screws.

1. Frame: Aluminum extrusions 0.081" 6063-TS
2. Blades: Z-shaped extruded aluminum 6063-TS.
3. Bird Screens: 1/2" mesh PVC crated.
4. Insect Screens where scheduled - aluminum.
5. Finish: Powder-coat baked-on enamel finish, finish color selection by Architect.

2.05 FANS

A. *General*: Furnish fans in the size and capacity as shown on the drawings. Shall be manufactured by Broan, Carnes, Greenheck, ILG, Penn or approved equal.

B. Inline Fan: Furnish duct mounted centrifugal, direct-driven or belt-driven inline fan. Fan shall be constructed of heavy gauge steel with acrylic enamel finish over iron phosphate primer. Motor or drive compartment shall be isolated from the airstream and be externally ventilated. Bearings shall be prelubricated and sealed for 200,000 hours operation. Fan wheel shall be aluminum, backward inclined, centrifugal type, dynamically and statically balanced with venturi inlet. One side of the housing shall be equipped with a hingeable service door assembly supporting the motor, drives, wheel and inlet venturi for servicing without disconnecting the fan connections. Fan shall be AMCA certified for air and sound performance.

1. Accessories (as indicated on plans and schedules).

C. *Ceiling Mounted*: Furnish ceiling-mounted exhaust fans complete with centrifugal blower, inlet grille, gravity back-draft damper, and discharge duct connection as shown on the drawings. Fan shall be AMCA certified with a sound rating of less than 4.5 sones. Housing shall be insulated with minimum 1/2" acoustic insulation.

1. *Accessories (as indicated on plans and schedules).*

D. *Motors*: 1 HP and larger shall be suitable for 240/60/1 1-phase operation and less than 1 HP shall be 115/60/1 with integral thermal overload. Horsepower rating shall be such that motor will not be overloaded at rated capacity. Motors in air stream shall be totally enclosed, other shall be open type. Motors shall have permanently lubricated ball bearings, mounted on neoprene vibration-isolator supports. All units shall have remote disconnect switch.

1. ECM motor with local speed control, where scheduled.

2.06 ELECTRIC HEAT

A. General: Furnish electric heat equipment of the type and capacities as shown on the Drawings and schedules.

B. Architectural Heavy Duty - Electric Wall Heater: Louvered front cover with aluminum frame and recessed tamperproof thermostat control. Back box for recessed mounting, semi-recessed mounting or surface mounting, as scheduled. Heating element of 80/20 nickel-chromium resistance wire enclosed in a steel sheath with brazed copper plate fins. Fan shall be provided with aluminum fan blades with protected electric motor mounted on permanently lubricated bearings with totally enclosed rotor. Electric wall heater shall be provided with disconnect switch, integral bi-metallic thermostat controller and manual reset thermal cutout.

1. 14-gauge cover security cover, as scheduled.
2. Surface mounting frame-box, as scheduled.

PART 3 - EXECUTION

3.01 JOB CONDITIONS

A. Examine and check conditions at the actual job site and determine facilities for delivery, storing and handling of materials and equipment.

B. Drawings show approximate locations of equipment, verify exact locations.

C. Cooperate as necessary with other trades in order that all systems in the work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

3.02 DUCTWORK INSTALLATION

A. Ducts shall be constructed, supported and installed in accordance with the latest low pressure duct standards of SMACNA. Install all turning vanes, access doors, extractors, and accessories as indicated or specified herein.

B. Fabricate and install all ductwork to be air tight in accordance with SMACNA Class B, seal. Evident air leaks in the ductwork shall be sealed.

C. Seal exposed outside ductwork joints water tight with mastic sealant.

D. Install all motor operated dampers per manufacturer's instructions in accordance with control sequence intended.

3.03 INSTALLATION OF EQUIPMENT

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

B. All equipment, as called for on the drawings and herein specified, shall be installed in strict accordance with manufacturer's recommendations.

C. Interferences: Avoid interference with structure, and with work of other trades, preserving adequate
headroom and clearing all doors and passageways.

D. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

3.04 TESTING, ADJUSTING, AND BALANCING

A. Provide all necessary personnel, equipment, and services and perform all tests necessary to demonstrate the integrity of the completed installation to the approval of the Owner and Architect. The air system shall be tested, adjusted and balanced in accordance with the latest edition of the Associated Air Balance Council (AABC) Procedural Standards, NEBB or equivalent by an independent TAB Contractor. TAB work performed by the HVAC Contractor shall not be accepted.

B. Submit three (3) certified copies of the final report to Architect on applicable AABC reporting forms or equivalent for approval.

1. Air volume at supply, return and exhaust inlets and outlets;
2. Air volume at each fan/air handler unit for supply air, return/exhaust air and fresh air;
3. Static pressure drops at filter assemblies, DX coils, mixing boxes, supply and return/exhaust plenum-ducts;

4. Record fan speed, RPM, motor nameplates and amperage/voltage;
5. Measure and record supply air, return/exhaust air, fresh air and mixed air temperatures. Record entering and leaving temperatures (dry bulb and wet bulb) at all coils and heating apparatus;
6. Report all equipment model #'s and related drawing identification on the TAB report;

C. Upon completion of TAB work, mark equipment settings, including damper control levers, and similar devices to indicate final settings. Plug all holes in insulation, ductwork and housings with acceptable test plugs.

D. Eliminate noise and vibration and assure proper function of all controls, maintenance of temperature, and operation with the approved design.

3.05 CLEANING

A. Ductwork: After the ductwork has been tested and proved tight, thoroughly vacuum and clean all components of the ductwork. Remove all dirt, scale, oil and other foreign substances which may have accumulated during the installation process.

B. Equipment: After the equipment has been started and proved operational, carefully clean all accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease and other foreign substances.

3.06 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

B. Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.

C. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

3.07 INSTRUCTIONS

A. Instruct owner’s representative in the operation and maintenance of all mechanical systems.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment installed under this contract. Prepare in bound copies with index tabs. Information must include parts list and wiring diagrams. Submit to Architect for presentation to the Owner.

3.08 CLOSEOUT OPERATIONS

A. Refer to Division 1 for additional project closeout requirements.

B. Closeout Equipment/System Operations: Sequence operations properly so that work of the project will not be damaged or endangered. Coordinate with seasonal requirements.

1. Operate each item of equipment and each system in a test run of appropriate duration with the Owner's operating personnel present to demonstrate sustained, satisfactory performance.
2. Adjust and correct operations as required for proper performance.
3. Clean and lubricate each system, and replace dirty filters, especially worn belts and parts and similar expandable items of the work.

C. Instruction, O&M: Instruct Owner (Owner's personnel) in the proper operation and maintenance of the HVAC systems. Train personnel in the setting and scheduling of programmable thermostats for occupied/unoccupied periods.

D. Service Organization: At time of substantial completion, Contractor shall provide Owner with a listing of qualified service organizations (including addresses and telephone numbers) for each piece of major equipment.

E. Turn-Over of Operations: At time of substantial completion, turn over the prime responsibility for operation of HVAC equipment and systems to the Owner's operating personnel. However, during the guarantee period, provide and operating engineer, who is completely familiar with work, to consult with and continue training the Owner's personnel on an as-needed basis.

END OF SECTION

SECTION 26 00 00 - ELECTRICAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide complete electrical service and distribution system with equipment and materials where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Underground Electric Service (200-amp, 1-phase, 120/240 volt), service disconnect - meter cabinet with service ground, distribution panel with main circuit breaker, SPD device and branch circuit breakers;
2. Branch circuit wiring, for lighting, receptacles, motors and equipment;
3. Lighting fixtures;
4. Wiring system for equipment and controls provided under other Sections of these Specifications including General Construction, Plumbing and HVAC trades;
5. Lighting Control System;
6. Power to new site lighting and new lighting and receptacles at existing shelter.
7. Power to door operators and electric hand dryers by others.
8. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and equipment;
9. Demolition and deactivation of electrical systems in existing facilities as noted on Site Drawings.
10. Other items and services required to complete the electrical systems.

B. *Related Work:*

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications;
2. Equipment structural supports, etc.;
3. All line voltage control wiring and starter interlocks, where specified;
4. Final equipment electrical connections.

C. *Work of Other Sections:*

1. Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC trades.

1.02 GENERAL PROVISIONS

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

B. In addition to the electrical plans, see General Plans of the building, as all electrical work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, the said work detailed on the electrical plans.

1.03 QUALITY ASSURANCE

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

B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. *Reference Standard:* The following standards are imposed, as applicable to the work:

ASTM	American Society of Testing and Materials
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriters Laboratories

1.04 CODES AND PERMITS

A. The Contractor must comply with national, state of Wisconsin and city of Kenosha building and electrical codes and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009;
2. IEEC 2009;
3. NEC 2008;
4. Wisconsin Electrical Code SPS sections.

B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

D. Electric Service Fee: Electrical Contractor shall secure and pay all fees for new electrical service from electric utility, including temporary power services.

1.05 COORDINATION

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

B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel with primary lines of building construction.

C. Locate operating and control equipment properly to provide easy access, and install entire electrical systems with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK

A. Line Voltage Wiring: The Electrical Contractor shall make all line voltage (100 volts and greater) electrical wiring, final connections and motor wiring for Mechanical equipment.

B. Control Wiring: Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical work shall be by the Mechanical Contractor in strict accordance with the applicable sections of the Electrical Specifications.

C. Motors, Starters, and Disconnects: All motors starter and disconnects shall be provided by the Electrical Contractor, unless provided with the equipment or indicated otherwise.

1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and requirements for electrical connections, along with wiring diagrams.

1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS

A. The General Contractor will be required to leave openings in new construction ceiling, floors, walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the Drawings. The Electrical Contractor is responsible for correct size and location of openings.

B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings and partitions are to be made in advance of construction of such parts of the building.

C The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the Drawings.

1.08 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the Electrical systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

1.09 TRENCHING AND BACKFILLING

A. Comply with pertinent provisions of Division 1.

B. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of the Specifications.

1.10 SUBMITTALS

A. Comply with pertinent provisions of Division 1.

B. *Shop Drawing Submittals*: Submit six (6) copies of shop drawings to the Architect for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Electric Service Equipment;
2. Distribution Panelboards;
3. Starters and Disconnects;
4. Light Fixtures;
5. Electrical Devices.
6. Lighting Controls;

C. *Shop Drawings*:

1. The Electrical Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the electrical work without approved shop drawings that have the Architect/Engineers final approval.
2. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities. Incomplete drawings will be disapproved.
3. This Contractor will be responsible for all figures, quantities and dimensions shown on the shop drawings.
4. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from responsibility of resubmitting equipment that will meet the space requirements.

D. *O & M Manual*: Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Division 1 of these Specifications. Include the following within the bound O&M manual:

1. Copy of the approved Record Documents for this portion of the Work;
2. Copies of all warranties and guaranties.
3. As-built drawings.

E. *As-built Drawings:* Record installation as-built on a set of blueline prints during construction. Plan shall represent actual locations, materials and circuiting of equipment installed.

1.11 PRODUCT HANDLING

A. Comply with pertinent provisions of Division 1.

1.12 WARRANTY

A. In addition to standard one year warranty on all labor and materials, provide an additional warranty on ballasts for all new fluorescent and HID lighting fixtures as specified.

1.13 HOUSEKEEPING AND CLEAN-UP

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

1.14 TEMPORARY SERVICES

A. This Contractor shall provide temporary lighting and power as required throughout the construction period.

B. Arrange for temporary electrical utility with local electrical utility. Electrical Contractor shall pay all temporary electrical service and usage fees.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. has established standards for such materials, provide only materials bearing the UL label.

2.02 SERVICE ENTRANCES AND METERING

A. New Service: Provide new underground 200A, 120/240 volt, 1-phase, 3-wire electric service from pad-mounted transformer as required by the local electrical utility(MG&E) and as shown on Drawings.

B. Metering: Provide combination service disconnect with ground and metering socket cabinet for exterior mounting and related metering equipment per local electrical utility requirements(MG&E).

1. Utility approved metering equipment: Milbank U5784-O-200-5T-CB

C. Main Switches: Provide a 200-amp main circuit breakers in the service metering cabinet with current limiting capabilities to meet utility AIC requirements.

D. Service Distribution Panel (Panel 'A'):

1. Provide 200-amp, 1-phase main distribution panel as indicated on plans complete with 200-amp main circuit breaker, 10,000 AIC branch circuit breakers, NEMA 1 enclosure, main service ground and solid neutral buss lugs and other components required for a complete installation.
2. SPD service device as specified herein and scheduled on Drawings.

2.03 SURGE PROTECTIVE DEVICES

A. The surge protective device (SPD) shall be designated a location Type 2 device intended for installation on the load side of the service equipment overcurrent device, including SPDs located at the branch panel. The SPD shall be Listed in accordance with UL 1449.

B. The SPD shall be made up of metal oxide varistors (MOV's), or a combination of MOV's with selenium cells or silicon avalanche diodes, ensuring that all of the performance requirements are met. Gas tubes shall not be used.

C. The SPD shall have a maximum continuous operating voltage (MCOV) rating not less than 115% of nominal voltage of the system it is protecting.

1. MCOV = 150 volt.

D. Protection Modes: The SPD shall have line to neutral (L-N), line to ground (L-G), line to line (L-L) and neutral to ground (N-G) protection modes for grounded wye configured systems. For a delta configured system, the device shall have line to line (L-L) and line to ground (L-G) protection modes.

E. Voltage Protection Rating (VPR):
The UL 1449 Voltage Protection Rating (VPR) for the device shall not exceed the following:

1. Surge current per phase rating: 80kA
2.. 240/120 volt applications: 900V L-N, 1200V L-G, 700V N-G, 1500 L-L

F. Nominal Discharge Current (In): The SPD shall have a UL 1449 Nominal Discharge Current Rating (In) of not less than 20kA.

G. Short Circuit Current Rating (SCCR):
The SPD shall have a UL 1449 Short Circuit Current Rating (SCCR) of not less than 200kA.

2.04 GROUNDING SYSTEM

A. Ground all equipment, including switches, transformers, conduit systems, motors, and other apparatus, by conduit or conductor to cold water main and to independent electrode, using ground clamps manufactured by Burndy or T&B, and approved by the Engineer.

B. Provide new service grounding electrode system. Add ground rods, foundation rebar ground and water service grounding electrodes as required per NEC 250.50 for a common grounding electrode system.

C. Provide grounding conductor from service ground to solid ground buss bar at all distribution panelboards.

D. Provide grounding jumper from electrical devices to the metallic device boxes.

E. GFI receptacles shall be provided with separate insulated ground wire conductor to the main service ground bar.

F. Ground all motor and equipment connections with dedicated ground conductor.

2.05 IDENTIFICATION

A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following junction and pull boxes shall be identified using a coded system. Coding shall be submitted to Engineer for approval.

1. Light and Power - 120/240V;

B. Label circuit numbers for all accessible line voltage power distribution raceways and junction boxes.

C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.

1. Panelboards.
2. Lighting Control Panel.

D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel frame with plastic cover contained on the inside of panel door. These directories shall indicate load served and rooms served by each protective device in the respective panel.

E. Identify all conductors per NEC:

120/240V - Phase A - Black
- Phase B - Red
- Neutral - White
- Ground - Green

2.06 POWER DISTRIBUTION SYSTEM

A. See plans for panelboard capacity, voltage ratings, and branch circuit breaker units.

B. All panelboards to be of the circuit breaker type with bolt-on circuit breakers. AIC rating as scheduled on drawings.

C. Branch circuit breakers shall be thermal magnetic; quick-make and quick break. Multi-pole breakers to have common trip. Handle ties of any sort not allowed.

D. Panelboards shall be Square "D" type NQOD with bolt-on branch circuit breakers rated for 10,000 AIC.

1. Square 'D' is the only approved manufacturer for this project.

F. Each panel shall be provided with a typewritten directory mounted on inside of panel door and covered with clear plastic. This directory shall indicate the load supplied by each branch circuit breaker in panel. Room numbers shall be actual room numbers.

G. Each panelboard shall be securely attached to the building structure on 3/4" AC plywood backer board with non-metallic painted surface.

H. All panelboards shall be equipped with an equipment grounding bar that is separate from the solid neutral bar.

2.07 WIRING DEVICES

A. *General*:

1. Devices shall be provided at each location shown on the plans or called for in the Specifications.
2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour, Hubbell or General Electric.
3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.
4. Device finish color to be selected by Architect.

B. *Receptacles*:

1. Duplex Receptacles: Industrial-specification grade, nylon face and base, NEMA 5-15R, 15A, tamperproof, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Use of self-grounding option not permitted.
   a. 15-amp: Leviton 5262;
   b. 20-amp: Leviton 5362;
2. GFCI Receptacle: Industrial-specification grade, NEMA 5-15R or 20R with indicator light and feed through. Provide tamper resistant devices in public areas.
   a. 15-amp: Leviton 7599; tamper resistant: Leviton T7599
   b. 20-amp: Leviton 7899; tamper resistant: Leviton T7899

C. *Switches:*

1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade.
2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
3. Switches to be back and side wired, silent or quiet type.
4. The following catalog numbers refer to Leviton, Inc.:
   a. single pole – 1221-2;
   b. three way – 1223-2;
   c. four way – 1224-2;
   d. Single pole with pilot light – 1221-PLR;

D. *Plates*:

1. Provide as required for each outlet, single or multiple gang.
2. Provide blank covers on all empty boxes or outlets.
3. Plates shall be 204 stainless steel construction in all finished areas.
4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.

5. Provide single gang die-cast weather resistant in-use covers equal to Leviton M5979 on receptacles in damp areas and exterior locations.

2.08 RACEWAY SYSTEM

A. *Steel Conduit*: Galvanized or sheradized steel intermediate or rigid metal conduit, or electrical metallic tubing (EMT) with steel set screw or compression ring type fittings.

1. Provide steel conduits as all exposed in the work areas.
2. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel conduit, or PVC coated steel conduit is acceptable.

B. *Rigid Non-Metallic Conduit*: Schedule 40 PVC with solvent welded fittings.

1. Below grade installation only.
2. Encase in concrete below drives and roadways.

C. *Electrical Non-Metallic Tubing(ENT):*

1. Above grade indoor concealed installation only, for branch circuit wiring after the first metallic junction box from the panelboard.
2. Not allowed for service conduit and panelboard feeders.
3. Provide and install per NEC Article 331 with grounding conductor.

D. *Outlets, Junction Boxes and Switch Boxes*:

1. Provide standard one-piece units, galvanized or sheradized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires without crowding.
2. Provide deep boxes(2-1/8”) with 1" and larger conduit.
3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.
4. For switches and receptacles, provide boxes 4" square by 1-1/2" deep minimum with rings and covers as required.

E. *Low Voltage Cabling Raceways:*

1. Provide 4" square boxes with single device ring and 3/4" raceway stubbed to accessible area at ceiling with insulating bushing.
2. In areas with no ceiling, extend raceway to adjacent accessible ceiling space or to telephone backboard or as directed by Owner.
3. Provide pull string for all low-voltage raceways.

F. *Pull Boxes:*

1. Provide galvanized code-gauge sheet units with screw-on covers, of size and shape required to accommodate wires per NEC wire bending requirements, without crowding access and to suit the location.

G. Provide sleeves and chases where conduits pass through floors and walls.

2.09 CONDUCTORS

A. *Wire and Cable (600 Volt):* Provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by governmental agencies having jurisdiction. Use only copper wires and cables.

1. With conductors No. 4 and larger, provide insulating bushings.
2. Wire and cable shall be THHN or THWN.
3. Branch circuit wiring installed in wiring channels of continuous row-mounted fixtures shall be provided. UL listed type RHH or other approved 90 degree C wires, rated at 600 V.
4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be stranded wire.
5. Wire in conduits subjected to direct sunlight shall be THWN or RHWN.
6. Provide XHHW/CU wiring in underground exterior conduit.
7. Identify feeder neutrals with white tape or white paint.
8. All low-voltage wiring located in accessible areas shall be installed in metallic conduit.
9. Provide separate identified neutral conductor for emergency and exit lighting circuits.
10. All branch circuit conductors shall be connected by means of a screw terminal.

B. *Armored Cable (AC) or Metal-Clad Cable (MC):*

1. Limit AC and MC usage to concealed only locations, branch-circuit wiring after the first junction box from the panelboards; where approved by NEC, state and local electrical inspecting authorities.
2. Not allowed for Panelboard feeders or service conduit.
3. Provide and install per NEC Articles 333 and 334 with grounding conductor.

2.10 MOTOR WIRING

A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with the contractor that is furnishing the motor driven equipment.

B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes. Verify all these requirements with contractor concerned and install accordingly under this contract.

C. Install disconnect means where required by code for motors out of sight of controller. These shall be fusible safety switches, fusetron box cover unit, or non-fused switch as indicated on plans. All switches shall be horsepower rated.

D. All motors will be furnished and installed by others, unless noted otherwise.

E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise herein or on the plans. See Motor Schedule.

F. All final connections to motors to be made by this Contractor.

G. All motors to be connected using flexible metallic conduits extending from motor box to outlet box. Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit shall be stranded. Grounding wires shall be in all cases installed in flexible conduit and not wrapped around the outside of the conduit.

2.11 MOTOR STARTERS

A. General:

1. Indoor - NEMA Type 1.
2. Outdoors or where exposed to moisture - NEMA Type 3R, raintight.
3. Units shall open all ungrounded conductors simultaneously.
4. All starters shall be from a single manufacturer.
5. Approved Manufacturers: Allen-Bradley, Cutler Hammer, Square D and Siemens.

B. Manual Starters:

1. For single-phase starters, provide units of tumbler switch type that clearly indicate ON, OFF and TRIPPED positions.
2. For three-phase starters, provide pushbutton operated units with START, STOP-RESET button on the enclosure cover.

C. Magnetic Starters:

1. Provide units with operating coils designed to operate on line voltage or any other auxiliary voltage indicated on the Drawings.
2. For starters with line voltage operating coils, provide built-in under-voltage release.
3. Provide units with the accessories and auxiliary contacts needed for automatic or remote operation as shown on the Drawings.
4. Provide "H-O-A" control switch and "green" run light on unit cover.
5. Provide thermal overload protection in each phase which if any phase trips causes the starter to drop out.

2.12 SAFETY SWITCHES

A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.

B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:

1. Indoor: NEMA type 1.
2. Outdoor: NEMA type 3R, raintight.

C. Approved Manufacturers: Square D, Cutler Hammer or Siemans.

2.13 LIGHTING FIXTURES

A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.

B. *Light Fixtures*:

1. Provide units having a UL label.
2. Provide local label in addition if so required by governmental agencies having jurisdiction.
3. Verify all ceiling types as shown on final architectural plans and be responsible for ordering proper fixtures and accessories for the proper ceiling.

C. *LED Lighting:*

1. The manufacturer of the LED lighting fixture shall utilize high-brightness LEDs and high-efficiency electronic LED drivers, dimmed or no dimmed as required.
2. The LED fixture shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the fixture is to be installed
3. Light output of the LED system shall be the absolute photometry following IESNA LM-79 and IESNA LM-80 requirements and guidelines.
4. Minimum power factor of 0.90.
5. LED lighting fixture shall be mercury-free, lead-free and RoHS compliant.
6. The LED lighting fixture shall maintain 70% lumen output for a minimum of 50,000 hours.
7. All components of the LED lighting fixture shall be replaceable.
8. The LED lighting fixture shall carry a limited 3-year warranty minimum.

D. *Acceptable Lighting Fixture Manufacturers*:

1. Refer to **Fixture Schedule**. Engineer will evaluate and make final decision on whether submitted fixture is equal to specified light fixture.
2. Other fixture manufacturers who consider their products equal to those specified are required to request pre-approval for bidding as base bid in accord with Instructions to Bidders section.

2.14 OCCUPANCY SENSOR CONTROLS

A. Occupancy Sensors shall be equal to Sensor Switch or approved equal. Refer to Occupancy Sensor schedule on the Drawings for specific types required.

1. All sensors shall be capable of operating normally with electronic fluorescent ballasts and LED driver systems and rated motor loads.
2. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
3. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
4. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

B. Wall Sensors:

1. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
2. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
3. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
4. Wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

C. Passive Infrared Sensors:

1. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
2. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

D. Ultrasonic Sensors:

1. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
2. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005% tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

E. Dual Technology Sensors:

1. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.

2. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

2.15 PROGRAMMABLE LIGHTING CONTROLLER

A. The programmable lighting controller shall consist of intelligent lighting control panel(s) with programmable digital and analog inputs, integral astronomic time-clock scheduling with flash warn before OFF feature and provision for up to 16 relay outputs. The specified system for this project shall include the following components:

1. Sixteen(16) Relay digital programmable lighting controller.
2. Programmable digital time clock
3. Two(2) local override manual switches.
4. Photocell input.
5. Alphanumeric key pad programming and LCD display.
7. Communication via LAN internet connection with BACnet standard MSTP protocol.

B. Standard Output relays

1. UL Listed 30 Amp @ 277VAC Ballast and HID and 20 Amp Tungsten at 120 Vac. 347V Ballast and HID at 20 amps Latching Relay wit 18,000A SCCR at 277Vac.
2. Relays shall be individually replaceable. Relay terminal blocks shall be capable of accepting two (2) #8AWG wires on both the line and the load side. Relays to be rated for 250,000 operations minimum at a full 30a lighting load.
3. Standard relay shall default to closed at normal power loss, Normally Closed Latching (NCL).
4. Optional relay types available shall include: Normally Open Latching (NOL) relay rated for 250,000 operations, a 600v 2-pole NO and NC and a Single Pole, Double Throw (SPDT) relay.

C. Low Voltage Switches

1. All switches shall be digital and communicate via RS 485. The programming for a digital switch shall reside in the switch itself, via double EPROM memory. Any digital switch button function shall be able to be changed locally (at the DTC or a PC) or remotely via Internet.
2. Digital low voltage switch shall be a device that sits on the lighting control system bus. Digital switch shall connect to the system bus using the same cable and connection method required for relay panels. Each button shall be able to be enabled or disabled over the bus.
3. Keyed switches shall be similarly programmable and connect to the lighting control system bus.
4. Digital switches for high abuse areas (common areas, gymnasiums, etc.) shall be vandal resistant, contain no moving parts, and be touch sensitive and available with up to two buttons in a single gang.
5. Touch pads shall be Stainless Steel and capable of handling both high abuse and wash down locations.
6. High abuse switches shall connect to the lighting control system digital bus. Each high abuse touch button shall be able to be programmed in the same way as other digital switch buttons.

D. Programming shall be accomplished through an integral keypad and display on the unit or via PC software using a local LAN connection over internet connection. Software shall be available for download from the manufacturer's web site free of charge.

1. Local LAN interface network: BACnet protocol LAN connection.

E. Approved Manufacturer - Model: Leviton Z-MAX Plus series (sole source -no substitution).

1. Leviton Z-Max Plus R24BD-L16

G. Startup and Owner Services: Authorized lighting controller representative shall startup and program lighting controller per Owner's schedules.

1. Submit startup report and final lighting schedules for approval and inclusion in O&M manuals.
2. Provide 2 hours of Owner training in the proper operation and maintenance of the lighting control system.

2.16 ELECTRIC HEATERS

A. Electric heaters provided and installed by HVAC Contractor, line voltage wiring by Electrical Contractor.

B. Low Voltage (less than 100 volts) control wiring by HVAC Contractor.

2.17 TELEPHONE SERVICE RACEWAY

A. Provide 2" service conduit stubbed outside the building 24" below grade and capped from the mechanical room for future telephone or data services. Coordinate locations with Owner.

2.18 OTHER MATERIALS

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

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

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

3.02 PREPARATION

A. *Coordination*:

1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the work schedule.
3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.

B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.

E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.03 INSTALLATION OF ELECTRIC SERVICE

A. Coordinate installation with local utility as required for a complete electric service installation.

B. Installation shall be approved by the local utilities.

3.04 TRENCHING AND BACKFILLING

A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the providions of Division 2 of these Specifications.

B. Cut bottom of trench to grade, make trench 12” wider than the widest dimension of the pipe.

C. *Bedding and backfilling*:

1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
2. *Under the building slab*: Install all pipes on a compacted bed of damp sand 6” deep. Do not lay piping on large stones, rocks or bricks.
3. *Outside the building*: Install all underground piping on a compacted bed of damp sand 6” deep. Backfill to within 12’’ of finish grade with damp sand. Backfill the remainder with native topsoil. Backfill in layers and compact sufficiently to prevent settlement.
4. Do not start backfill operations until underground plumbing work has been properly inspected and approved by governing authorities.

3.05 INSTALLATION OF RACEWAYS AND FITTINGS

A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide rigid galvanized conduit or electrical metallic tubing with compression type fittings.

1. Seal joints to prevent entrance of water.
2. Provide ground wire of proper size per NEC 250.
3. Use nylon (rather than steel) fish tape.

B. Use flexible conduit only for short motor connections, or where subject to vibration.

C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting in connection with the Work.

D. Where conduit is exposed, run parallel to or at right angle with lines of the building.

E. Securely and rigidly support conduits throughout the work.

3.06 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.

B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.

C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.

D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the fixture is supported, either directly or indirectly, by a safe and sound structural member of the building, using adequate number and type of fastenings to assure safe installation.

1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.

3.07 INSTALLATION AND START-UP OF PROGRAMMABLE LIGHTING CONTROLS

A. System Start-up: Provide a factory authorized technician to verify the installation, test the system, and train the owner on proper operation and maintenance of the system. Before requesting start-up services, the installing contractor shall verify that:

1. The control system has been fully installed in accordance with manufacturer's installation instructions.
2. Arrange and coordinate network connections for remote communication with Owner. Owner will provide internet service to lighting control panel.
3. Low voltage wiring for overrides and sensors is completed.
4. Accurate "as-built" load schedules have been prepared for each lighting control panel.
5. Proper notification of the impending start-up has been provided to the Owner’s representative.

B. Factory Support: Factory telephone support shall be available at no cost to the owner during the warranty period. Factory assistance shall consist of assistance in solving programming or other application issues pertaining to the control equipment. The factory shall provide a toll-free number for technical support.

3.08 INSTALLATION OF POWER EQUIPMENT

A. Provide power and control wiring for motor starters and safety switches as shown on the Drawings.

3.09 INSTALLATION OF CONDUCTORS

A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100 feet, use larger wires to limit voltage drops.

B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.

1. Make splices electrically and mechanically secure with pressure-type connectors.
2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6 AWG and smaller.
3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a mechanical tool and die equipment for wire sizes 4 AWG and larger.
4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-plastic electrical tape where insulation is required.

3.10 INSTALLATION OF PANELBOARDS

A. Unless otherwise shown on the Drawings, install panels with the top of the trim 6'-3" above the finished floor.

B. Mount a typewritten directory behind plastic on the inside of each panel door and on the directory, showing the circuit number and complete description of all outlets on each circuit.

C. Provide two (2) spare 1" conduits, stubbed out of the top of each flush-mounted panel and terminated in accessible ceiling space, with each conduit tagged with panel description.

3.11 TESTING AND INSPECTION

A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.

B. Make written notice to the Architect adequately in advance of each of the following stages of construction:

1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
2. Immediately submit to the Architect a report of maximum and minimum voltages and a copy of the recording volt-meter chart.
3. Also measure voltages between phases and between phase wires and neutrals and report these voltages to the Architect.

3.12 PROJECT COMPLETION

A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.

B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under Article 1.3 of this Section of these Specifications.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

General Requirements

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

1.1 SECTION REQUIREMENTS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

C. Utility Locator Service: Notify utility locator service, Diggers Hotline for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance.

B. Protect site improvements to remain from damage. Restore damaged improvements to condition existing before start of site clearing.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect remaining trees and shrubs from damage and maintain vegetation. Employ a licensed arborist to repair tree and shrub damage. Restore damaged vegetation.

Replace damaged trees that cannot be restored to full growth, as determined by arborist.

E. Do not store materials or equipment or permit excavation within drip line of remaining trees.

F. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

G. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

3.2 SITE CLEARING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

B. Strip topsoil. Stockpile topsoil that will be reused in the Work.

1. Stockpile surplus topsoil to allow for respreading deeper topsoil.

C. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

D. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Neatly saw-cut length of existing pavement to remain before removing existing pavement.

E. In areas not to be further excavated, fill depressions resulting from site clearing. Place and compact satisfactory soil materials in 6-inch- (150-mm-) thick layers to density of surrounding original ground.

F. Dispose of waste materials, including trash, debris, and excess topsoil, off Owner's property. Burning waste materials on-site is not permitted.

1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

General Requirements

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

1.1 SECTION REQUIREMENTS

A. Unauthorized excavation consists of excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

B. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.

B. Unsatisfactory Soil: ASTM D 2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Backfill and Fill: Satisfactory soil materials.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.

E. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

F. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

G. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Protect and maintain erosion and sedimentation controls during earth moving operations.

B. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

C. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

D. Explosives: Do not use explosives

E. Excavate to subgrade elevations regardless of character of materials and obstructions encountered.

F. Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents.

G. Excavate for structures, building slabs, pavements, and walkways. Trim subgrades to required lines and grades.

H. Utility Trenches: Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain 12 inches (300 mm) of working clearance on each side of pipe or conduit.

1. Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
2. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.

I. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal to receive fill.

J. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify

soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

K. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact.

L. Place backfill and fill in layers not more than 8 inches (200 mm) in loose depth at optimum moisture content. Compact each layer under structures, building slabs, pavements, and walkways to 95 percent of maximum dry unit weight according to ASTM D 698; elsewhere to 90 percent.

M. Grade areas to a smooth surface to cross sections, lines, and elevations indicated. Grade lawns, walkways, and unpaved subgrades to tolerances of plus or minus 1 inch and pavements and areas within building lines to plus or minus 1/2 inch (13 mm).

N. Under pavements and walkways, place subbase course material on prepared subgrades and compact at optimum moisture content to required grades, lines, cross sections, and thicknesses.

O. Under slabs-on-grade, place drainage course on prepared subgrade and compact to required cross section and thickness.

P. Allow testing agency to inspect and test each subgrade and each fill or backfill layer and verify compliance with requirements.

Q. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 20 00

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

General Requirements

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

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and design mixtures for concrete.

B. Comply with ACI 301 unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Welded Wire Reinforcement: ASTM A 185, flat sheets.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

C. Portland Cement: ASTM C 150, Type I or II, gray supplement with the following:

1. Fly Ash: ASTM C 618, Type C or F.
2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100.

D. Normal-Weight Aggregates: ASTM C 33, , uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: ASTM C 494. Calcium chloride shall not be used.

G. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, 1/2 to 1-1/2 inches (13 to 38 mm) long.

H. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.2 CONCRETE MIXTURES

A. Proportion normal-weight concrete mixes to provide the following properties:

1. Compressive Strength (28 Days): 4000 psi (27.6 MPa)
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
3. Slump Limit: 4 inches, plus or minus 1 inch (25 mm).
4. Air Content: 6 percent plus or minus 1.5 percent.
5. Synthetic Fiber: 1.0 lb/cu. yd.

PART 3 - EXECUTION

3.1 PAVING

The installation of concrete pavement, including materials, equipment, foundation, construction methods, method of measurement, and basis of payment shall be in accordance with Article 415 and 416, “Concrete Pavement”, of the latest edition of the Standard Specifications for Highway and Structure Construction of the State of Wisconsin, Department of Transportation, except as modified herein The City of Madison Standard Specifications or the Special Provisions of the contract

A. Accurately position and support reinforcement, and secure against displacement.

B. Locate and install contraction, construction, isolation, and expansion joints as indicated or required.

C. Place concrete in a continuous operation within planned joints or sections. Do not add water to adjust slump.

D. Float surfaces to true planes within a tolerance of 1/4 inch in 10 feet

E. Tool edges and joints to a radius of 1/4 inch.

F. Concrete Finish: Light broom finish.

G. Begin curing after finishing concrete. Keep concrete continuously moist for at least seven days.

H. Owner will engage a qualified testing agency to perform tests and inspections.

I. Remove and replace concrete paving that is broken, damaged, or defective. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

J. Protect concrete paving from damage. Exclude traffic from paving for at least 28 days.

END OF SECTION 32 13 13

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

General Requirements:

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

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and hot-mix asphalt design mixes. Include certification, by authorities having jurisdiction, of approval of each job mix.

B. Regulatory Requirements: Comply with requirements of “Part 3 of the latest edition of the Standard Specifications for Highway and Structure Construction of the State of Wisconsin, Department of Transportation” for asphalt paving work.

C. Asphalt-Paving Publication: Comply with AI MS-22, "Construction of Hot Mix Asphalt Pavements," unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and “Part 3 of the latest edition of the Standard Specifications for Highway and Structure Construction of the State of Wisconsin, Department of Transportation”

1. Base Course:
2. Surface Course:
3. Provide mixes with a history of satisfactory performance in geographical area where Project is located and complying with ASTM D 3515 for the following nominal, maximum aggregate sizes:

    a. Base Course: 1 ½ inch
    b. Surface Course: 1 ½ inch

B. Tack Coat: ASTM D 977 emulsified asphalt, or of suitable grade and consistency for application.

PART 3 - EXECUTION

3.1 PAVING

A. Tack coat existing asphalt or concrete surfaces and allow tack coat to cure undisturbed.

B. Place hot-mix asphalt to required grade, cross section, and thickness. Promptly correct surface irregularities in paving course.

1. Spread mix at minimum temperature of 250 deg F (121 deg C).

C. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

D. Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness.

E. Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to 92 percent of reference maximum theoretical density according to ASTM D 2041.

F. Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

G. While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

H. Remove and restore paved areas that are defective or contaminated.

END OF SECTION 32 12 16

SECTION 32 33 00 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, shop drawings showing installation and color Samples.

B. Maintenance Data: Include recommended methods for repairing damage to the powder coat finish.

C. Store bicycle parking racks in original undamaged packages and containers until ready for installation.

D. Handle powder coated bicycle parking racks with sufficient care to prevent any scratches or damage to the finish.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, hot-dip galvanized.

B. Steel Pipe: ASTM A 53/A 53M or ASTM A 13, hot-dip galvanized.

C. Steel Tubing: ASTM A 500 0, hot-dip galvanized.

D. Steel Finish: Powder coat, color as selected by City Parks Staff from full line of manufacturer's standard colors.

2.2 SITE FURNISHINGS

A. Bicycle Racks:

1. Basis of Design: Madrax Spartan

2. Bicycle Rack Construction: Steel galvanized steel tubing
3. Style: Double-side parking
4. Installation Method: Surface mount on concrete slab, anchor with 1/2" stainless steel expansion anchors with 3" imbedment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Handle and install bicycle parking racks in accordance with manufacturer's recommendations and installation instructions.

B. General: Anchor bicycle rack securely, positioned at locations and elevations indicated.

END OF SECTION 32 33 00

SECTION 32 92 00 - TURF AND GRASSES

PART 1 - GENERAL

General Requirements:

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

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, certification of grass seed and product certificates.

B. All seed shall conform to the requirements of the Wisconsin Statutes regarding noxious weed seed content. No seed shall be used on the work later than one year after the germination test date which appears on the label.

Seed shall be tested when required in accordance with the methods and procedures used in making purity analyses and germination tests as adopted by the U.S. Department of Agriculture in the Administration of the Federal Seed Act.

Seed Areas that have been disturbed by construction activities. The intent is to match the grass in the adjacent undisturbed areas.

C. Planting Restrictions: Plant during one of the following periods:

1. Planting: April 15 to September 15th and October 15 to Snow Cover.

D. Maintain turf until established, but for not less than 30 days.

PART 2 - PRODUCTS

2.1 GRASSES

A. Seed Species: State-certified seed of grass species, as follows:

Seed Mixes (Sun and Shade). Seed mixes shall be clean, latest crop seed of the varieties required, labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect at the time of delivery of seed. Seed shall be properly mixed. The seed shall be delivered in sealed containers to which is affixed a statement of guaranteed analysis for each seed variety furnished. Seed shall meet the following requirements and shall be subject to test at the ex-

pense of the owner by the State Seed Laboratory of the Wisconsin State Department of Agriculture.

		% Purity	% Germination
30%	Dawson Red Fescue	95	85
30%	Puccinella Distans	99	85
30%	Geronimo Kentucky Bluegrass	95	85
10%	SR 4000 Perennial Rye Grass	98	90

The intent is to match existing grass in adjacent areas.

2.2 SOILS AND AMENDMENTS

A. Topsoil: ASTM D 5268, with pH range of 5.5 to 7, free of stones 1 inch (25 mm) or larger and other extraneous materials harmful to plant growth.

B. Lime: ASTM C 602, Class T, agricultural limestone.

C. Commercial Fertilizer: Commercial-grade complete fertilizer, consisting of 1 lb/1000 sq. ft. (0.5 kg/100 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

D. Straw Mulch: Clean, mildew- and seed-free salt hay or threshed straw of wheat, rye, oats, or barley.

2.3 PLANTING SOIL MIX

A. Mix topsoil with the following soil amendments and fertilizers in the following quantities:

1. Ratio of Loose Compost to Topsoil by Volume: 1:3.
2. Weight of Lime per 1000 Sq. Ft..
3. Weight of Commercial Fertilizer per 1000 Sq. Ft..
4. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.

PART 3 - EXECUTION

3.1 PREPARATION

A. Loosen subgrade to a minimum depth of 4 inches; remove stones, sticks, existing grass, vegetation, and other extraneous materials.

1. At newly graded subgrades, spread planting soil mix to a depth of 4 inches, but not less than required to meet finish grades.

2. At unchanged grades, apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

B. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Moisten before planting.

3.2 PLANTING

A. Seeding: Evenly distribute seed by sowing with a spreader or a seeding machine. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray. Protect seeded areas by spreading straw mulch 1-1/2 inches in loose depth.

1. Seeding Rate: 3 to 4 lb/1000 sq. ft..

B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

C. Mow seeded area as soon as top growth is tall enough to cut. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

END OF SECTION 32 92 00

SECTION 33 11 00 - WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 SCOPE

A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide water distribution system components and other work, as required in these specifications, on the drawings and as otherwise deemed necessary to complete the work.

1. All materials and methods shall meet the City of Madison public works standards Articles 701 thru 704.

1.02 REFERENCE

A. Applicable provisions of Division 1 shall govern all work under this Section.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

B88	Standard Specifications for Seamlesss Copper Water Tube
C504-00	Rubber-Seated Butterfly Valves
C509-01	Resilient-Seated Gate Valves for Water Supply Service
C515-01	Reduced Wall, Resilient Seated Gate Valves for Water Supply Service
C800-01	Underground Service Line Valves and Fittings

1.03 SUBMITTALS

A. Provide manufacturers product information (cut sheets) and O&M information for watermain materials including:

1. Pipe
2. Fittings
3. Valves

B. Provide reports that document pressure and continuity testing procedures and results.

C. Provide copies of record drawings.

1.04 QUALITY ASSURANCE

A. Maintain and submit record drawings.

B. Conduct pressure testing, continuity testing and safe sampling as required in Part 3 – Execution.

1.05 PERMITS/FEES

A. Contractor shall be solely responsible for obtaining all permits necessary to complete the work. Contractor shall pay all fees associated with obtaining permits. These include, but are not limited to permits for work within public right-of-way, street opening permits, utility connection permits, and plumbing permits.

1.06 SURVEY AND STAKING

A. Contractor shall be responsible for transferring benchmarks, control points, lines and grades necessary to complete his work.

1.07 RECORD DOCUMENTS

A. Maintain record drawings that show the actual locations, sizes and types of utilities and other features encountered.

1. Note any modifications to proposed watermain size, alignment, or grades.
2. Record any other deviations from the original design.

PART 2 - PRODUCTS

2.01 Ductile Iron Pipe:

A. Ductile iron pipe and accessories shall conform to the requirements of American National Standard for Ductile Iron Pipe, Centrifugally Cast, for Water (ANSI/AWWA C151/A21.51 - latest revision).

B. Pipe requirements:

1. Class 52 ductile iron.
2. Cement lined.
3. Push-on joint.
4. Furnished with all necessary accessories.
5. Bonding straps to provide electrical conductivity.

2.02 Gaskets:

A. Gaskets shall conform to the requirements of American National Standard for Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings (ANSI/AWWA C111/A21.11 - latest revision).

B. Gasket Requirements:

1. Plain rubber gaskets.
2. Restrained-joint locking gaskets.
   a. Use restrained joint locking gaskets when electing to or are otherwise required to meet thrust-restraint requirements by means of restrained-joint pipe.
   b. Restrained-joint locking gaskets must be certified as compliant for use with the furnished pipe material by the pipe manufacturer.
   c. Nitrile or Fluorocarbon gaskets may be required if water mains are near contaminated soils.

2.03 Polyethylene Encasement:

A. Polyethylene encasement materials shall conform to the requirements of the American National Standard for Polyethylene Encasement for Ductile Iron Pipe Systems (ANSI/AWWA C105/A21.5 - latest revision).

B. Polyethylene Encasement Requirements:

1. 8-mil thickness (minimum).
2. Furnish in either tube or sheet form.

2.04 Mechanical Joint Fittings:

A. Mechanical joint fittings are to conform to the requirements of American National Standard for Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch, for Water (ANSI/AWWA C110/A21.10 - latest revision).

B. Mechanical Joint Fitting Requirements:

1. Class 250 mechanical joint pipe fittings.
2. Cement lined.
3. All bells.
4. Entire fitting tarred.
5. Conductive mechanical joint (no lead)
6. Furnished with all necessary accessories (rubber gaskets, flanges, bolts, etc.).

2.05 Mechanical Joint Restraints:

A. EBAA Iron Inc. - MEGALUG® Series 1100, or approved equal.

2.06 Nuts and Bolts:

A. Comply with AWWA C111/A21.11. - latest revision.

B. Ensure that bolts are of sufficient length such that a minimum of ½-inch of threads are exposed beyond the end of the nut when tightened.

C. Refer to the following table for the numbers, diameters, and lengths of bolts to be used:

Pipe Dia (inches)	No Bolts	Bolt Dia (inches)	Bolt Length (inches)	Bolt Lenth for MEGALUG® (inches)
3	4	5/8	3	3-1/2
4	4	3/4	3-1/2	4
6	6	3/4	3-1/2	4

2.07 COPPER WATER SERVICE

A. Type K, soft copper tubing meeting the requirements of ASTM B88.

B. Copper watermain 1½" inch diameter and larger shall be provided in straight lengths, not roll stock.

2.08 SADDLES

A. Saddles are required at:

1. All 1-½-inch and 2-inch service lateral taps.
2. All service lateral taps on PVC, HDPE, or CIPP-lined water mains.

B. Approved saddles:

1. Ford Series 202B double strap brass saddle.
2. A.Y. McDonald - Series 3825 saddles (double strap).

2.09 COUPLINGS

A. Couplings shall be copper-to-copper fittings.

1. Compression couplings are only permitted when reconnecting existing copper tubing to new copper tubing.

B. Allowable couplings:

1. Mueller H15400.
2. Mueller Hl5405.
3. Mueller H5403.

4. Mueller P15403.
5. Ford C44-33 / 44 / 66 / 77

2.10 CORPORATION STOPS & SERVICE FITTINGS

A. 1½-inch and 2-inch diameter Service Fittings (1/8 bends):

1. Mueller H – 15470.

B. Supply all Service Fittings (1/8 bends) with a fiber gasket.

2.11 CURB STOPS

A. 1 ½-inch and 2-inch diameter Curb Stops:

1. Mueller H15201.

2.12 CURB BOXES

A. Ensure that all curb boxes are complete, with covers marked "WATER".

1. Mark cover for air blowout connection "AIR CONNECTION".

B. Curb Box Assemblies shall include the following:

1. Brass screws.
2. 2½-inch new style flush fit cover.
3. 54-inch rods and guide rings.
4. 2½-inch screw type shaft.
5. 37-inch bottom section.
6. 29-inch top section.
7. 16-inch center section.

C. 1½-inch and 2-inch diameter Curb Boxes:

1. Tyler or Bingham and Taylor (Standard Valve Box).
2. No rods or rings.

2.13 DISINFECTION CHEMICALS

A. Dry chemicals:

1. Chloride of Lime.
2. HTH.
3. Pittchlor.
4. Or equal (65 % available Chlorine), granular form only.

B. Liquid:

1. Only to be used with Engineer’s written authorization.
2. Sodium hypochloric.

2.14 BOARD INSULATION

A. Rigid, closed-cell, extruded polystyrene insulation. Insulation shall be suitable for buried installation.

B. Individual boards shall have minimum dimensions of 8’x4’x2”.\

C. Dow Styrofoam, or approved equal.

2.15 LOCATOR TAPE

A. Detectable metallic locator tape, specifically manufactured for marking utilities.

B. Tape shall be a minimum of 6” wide and designed to be detectable at a depth of 18”.

C. Tape shall be marked “WATER” and blue colored.

2.16 PIPE JOINT LUBRICANT

A. Petroleum free pipe lubricant formulated for use with potable water systems. Product shall meet the requirements of ANSI/NSF Standard #61.

PART 3 - EXECUTI0N

3.01 GENERAL

A. Complete exploratory excavations at utility crossings as shown on the plans and as necessary to complete the work.

B. Maintain clearances between watermains and existing or proposed sewer lines as follows:

1. 8’ horizontal separation (measured center to center) between watermains and existing or proposed sanitary or storm sewers.
2. 6” vertical separation (measured from outsides of pipes) where watermains cross over sanitary or storm sewers.
3. 18’ vertical separation (measured from outsides of pipes) where watermains cross under sanitary or storm sewers.

C. Store and handle pipe in accordance with manufacturers recommendations. Keep pipes clean of soil, debris and animals.

3.02 EXCAVATION

A. Construct water mains and appurtenances in open trenches and in a manner to protect the pipe and appurtenances from unusual stresses at all times.

B. Trench Excavation:

1. All excavation, sheeting, shoring and bracing shall be done in accordance with the latest edition OSHA regulations and any additional requirements specified in the Plans or Contract Documents.
2. Provide all sheeting, bracing and/or shoring necessary to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the trench. All costs of sheeting, bracing and/or shoring is considered incidental to any work which necessitates it.
3. When not in use, remove sheeting and bracing, unless permission to leave in-place has been given in writing by the Engineer.
4. Excavate trenches in conformity with the required alignment and grades as shown on the drawings and as laid out in the field by the Engineer.
5. Remove all vegetation and topsoil along the trench line to the width of the proposed trench before beginning excavation.
6. Deposit material excavated from the trench on the sides of the trenches and excavations, beyond the reach of slides. Transport material to spoil banks as an alternative.

C. Properly dispose of surplus material at no additional cost to the City. Surplus material includes but is not necessarily limited to:

1. Vegetation from the trench line.
2. Excavated rock or cobbles in excess of 6-inches in diameter.
3. All other material from excavation not needed or suitable for backfilling trenches.

D. For water main construction, the width of the trench shall be such as to leave a clear space of not less than 6-inches between the earth wall, or the supporting sheeting or bracing where such is used, and the sides of the pipe. The trench width established by this pipe clearance, measured at the spring line, shall be applicable to that portion of the trench from 1-foot above the top of the pipe to the bottom of the trench.

E. On streets opened to traffic, on restricted easements, and other specified locations, minimize the width of the trench at the ground surface to the extent possible to accommodate the pipe installation and any necessary sheeting or bracing.

F. The Engineer reserves the right to limit the extent of excavation depending on the nature of the soil and other conditions.

1. As ordered by the Engineer due to trees, fences, buildings, shrubs, etc., dig trenches by hand.

3.03 EXCAVATION IN POOR SOILS

A. If, in the opinion of the Engineer, an artificial foundation is necessary because of the nature of the excavated material, excavate the unsuitable material and replace with suitable specified material to produce an acceptable pipe foundation.

B. The undercut depth shall be as directed by the Engineer but shall be a minimum of 1-foot below the bottom of the pipe. Any work involved in forming a satisfactory foundation at depths of 1- foot or less below the bottom of pipe will be considered to be incidental to the work.

C. Backfill this portion of the trench with specified approved bedding material and mechanically compact the select fill prior to laying the pipe. Limit the width of the trench excavation to the outside diameter of the pipe plus 2-feet, plus the amount necessary for sheeting and/or bracing.

3.04 DEWATERING

A. In accordance with these Specifications, remove by pumping, bailing, or otherwise, any water that may accumulate or be found in the trenches and other excavations.

B. Form all dams, flumes or other works necessary to keep the trenches or excavations entirely clear of water while the water mains and their appurtenances are being installed.

1. Direct all water from excavations, so as not to flow over or damage private or public property.
2. All costs of dewatering are considered to be incidental to the associated work.

3.05 BACKFILL REQUIREMENTS

A. Backfill trenches and excavations immediately after the water main and appurtenances have been installed.

B. Close trenches at the end of every day.

C. Backfill to the original surface elevation or otherwise specified elevation. In the event of a shortage of material to perform this work, including replacement as may be required by rock excavation or removal of boulders, provide the necessary fill material at no cost to the City.

D. Except as may be necessary in compacting and backfilling, do not walk or work on installed pipe until the trench has been backfilled to an elevation at least 2-feet above the top of the pipe. Do not take backfill material from trench walls below an elevation 2-feet above the top of pipe.

E. Evenly place backfill material so that no unbalanced pressures are placed upon the water system. Backfill material may be dumped directly into the trench from trucks when the amount of material to be dumped is controlled by proper equipment.

F. Deposit, spread and level backfill material in layers not exceeding 12-inches in thickness before compacting. Compact each layer to the density specified herein before placing the succeeding layer. When the material being compacted is of a granular nature and the compacting equipment is adaptable for the purpose, the thickness of the layer may be increased to a maximum of 24-inches at the Engineer's discretion, provided the required compaction density is obtained.

G. Only use heavy equipment in the trench for compaction or other purposes if the pipe is adequately protected and the Engineer approves. Trucks, vehicles, or other equipment are not allowed within the limits of the trench prior to the completion of the backfilling operations.

H. Dump imported backfill material along the top of the trench beyond the reach of slides. Do not store imported material such that it increases the stresses on the trench section.

I. Carefully draw and remove any required sheathing and bracing such that it will not disturb the completed work. Carefully fill and compact any voids created by the removal of sheathing and bracing with approved backfill material.

J. Whenever possible, backfill trenches and other excavations with materials excavated during the course of the work.

K. Do not include vegetation, stones, or fragments of broken rock in excess of 6-inches in any dimension in the backfill.

L. Note that the Engineer may reject material due to:

1. Unacceptable moisture content.
2. Unacceptable gradation or composition
3. The presence of frozen material.
4. Remove all rejected materials from the site.

3.06 CAMPACTION REQUIREMENTS

A. Mechanically compact backfill layers in trenches and excavations to thoroughly consolidate the material to the density specified and to not damage or disturb the pipe or other structures.

B. Begin mechanical compaction of the backfill material when the depth of the backfill material is 2-feet above the top of the pipe. (In the case of structures, begin compaction of the backfill material with the placing of the first layer of backfill material).

C. The Engineer will perform compaction testing as necessary to verify uniformity of compaction.

D. Compaction Density Requirements:

E. From 2-feet over the pipe to within 3-feet of the bottom of subgrade:

1. A minimum of 90% of maximum density.

F. Within 3-feet of the bottom of subgrade:

1. A minimum of 95% of maximum density.

G. Determine maximum density in accordance with the Standard Method of Test for the Moisture-Density Relations of Soils, ASTM Designation: D 1557, Method D, latest revision. Replace the fraction of material retained on a ¾-inch sieve, with No. 4 to ¾-inch material.

H. Determine the density of compacted backfill in accordance with one of the following: Test for Density of Soil-in-Place by the Sand-Cone Method, ASTM Designation: D 1556, latest revision, or Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods, ASTM Designation: D 2922, latest revision.

I. In the event that the material in the density sample differs in percentage of aggregate retained on a No. 4 sieve from that in the sample upon which maximum density was determined, adjust the maximum density in accordance with approved procedures.

J. In the event of inadequate moisture in the backfill materials, add water as necessary to obtain the required compaction.

K. Whenever the work of installing water pipes takes place during freezing weather, follow the specifications for trench compaction above, if practicable. If the specified compaction cannot be achieved, and the Engineer determines that the work may not be suspended until more favorable weather conditions exist, proceed as follows:

1. Remove all frozen material in the trench at the beginning of the day's work.
2. Do not compact frozen materials.
3. Compact material in 6-inch maximum lifts.
4. Compact to densities specified herein.

L. If the top 3-feet of material does not meet 95% of maximum density, remove the material and place Select Fill using 6-inch maximum lifts and compact to 95% of maximum density.

M. As a guideline, no construction will be permitted when the temperatures are too cold to achieve the specified compaction of the backfill. Ensure that temperatures are at least 15ºF and rising, with winds less than 10 mph, before considering working in freezing conditions.

3.07 BEDDING AND INITIAL COVER

A. Watermain and water service piping shall be provided with 4" of bedding material and 12" of initial cover material (both measured at the bell of the pipe).

B. Bedding and cover material for various types of pipe shall consist of the following:

1. Copper Water Services: Bedding sand or crushed stone screenings.

3.08 INSTALLING FITTINGS AND VALVES

A. Install fittings and valves at locations shown on the drawings.

B. Unless otherwise shown, provide mechanical joint connections. Install materials in accordance with manufacturer's recommendations.

C. Maintain electrical continuity through all fittings, valves and hydrants. Provide and install suitable jumper cables for epoxy coated valves.

D. tall valve box so that bonnet rests on compacted initial backfill material at the same elevation as the top of the valve stuffing box. Center the valve box over the valve nut.

E. Install valve box plumb and level, backfilling evenly. Extend valve box to proposed final grade; provide valve box extensions as necessary. Valve boxes that shift during backfilling or restoration shall be excavated and re-set.

3.09 CONNECTING TO EXISTING WATER MAINS

A. There are three types of connections to existing mains:

1. A plug-removal connection is a connection that requires the removal of a slip or mechanical joint plug from an existing fitting or the end of a water main.
2. A cut-in connection is a connection that requires the installation of a new fitting or valve in an existing water main.
3. A live-tap is a connection in which the main is tapped under pressure and in-service while a tapping valve is installed by the City. Furnish the ditch as necessary for the City to make the tap and perform the associated cut-off and cap of the existing water main. Isolate and depressurize all live-tap connections on any PVC, HDPE and CIPP-lined water mains prior to providing the ditch to the City.

3.10 WATER MAIN SHUTOFFS

A. Do not interrupt water service without prior notification to all affected residents and property owners. Ensure that all street-facing and/or visible entrances and all addresses of multi-unit properties are included separately in the notification distribution.

B. With notification distributions, it is recommended to include a request to avoid using water fixtures, faucets or water-sensitive appliances during the service interruption, and then opening an outside spigot or cold water faucet on the lowest level of the property after service has been restored.

C. When requested and furnished by the Engineer, post terrace signs as part of the notification distribution. Carefully remove and return all posted terrace signs to the Engineer upon completion of the service interruption.

D. In the case of an emergency or an unplanned shut-off, notify all affected residents and property owners during or immediately after the water is turned off.

E. Minimum requirements for all planned shut-offs:

1. Provide 2 working days notice to affected water users.
2. The shut-off may not begin earlier than 8:00 AM.
3. The shut-off may not exceed 8-hours.

F. In the event a planned shut-off is anticipated to require more than 8-hours, re-notify all affected water users prior to the expiration of the time limit listed on the original notification.

G. Perform all shut-offs as proposed in the Contract Documents. The proposed shut-offs are provided for reference purposes to aide planning connection point isolation and preparing water user notification lists for planned outages.

H. Obtain prior authorization from the Engineer and be responsible for all valve turnings. Be properly equipped at all times for doing such work.

I. Any water service or plumbing problems which arise as a result of either planned or emergency water main shutoffs or any associated work, are the Contractor's responsibility to promptly resolve at no cost to the City or Madison Water Utility.

J. To reduce the likelihood of draining private water systems and/or associated private plumbing problems, it is required to close all service valves and/or curb stops on all 1.5-inch or larger laterals prior to removing the main from service.

K. Additionally, it is required to close all service valves and/or curb stops at properties without accessible hose spigots or other outside plumbing connections.

3.11 MECHANICAL JOIINT PIPE AND FITTINGS.

A. A mechanical pipe joint is made by compressing a rubber gasket between a bell, cast on the end of one pipe, and a gland that slides along the plain end of the pipe to be joined. The joints are tightened using nuts and bolts.

B. Assemble mechanical joints in accordance with AWWA C600 – latest revision.

C. Restrained joints using MEGALUG® Series 1100 or approved equal mechanical joint-restraint retainer glands shall have bolts tightened in accordance with the manufacturer's installation specifications.

D. Before slipping the gland and the gasket onto the plain end for joint assembly, lubricate both the gasket and the plain end of the pipe with an approved pipe lubricant meeting the requirements of ANSI/AWWA C111/A21.11 - latest revision.

E. Place the gland on the plain end with the lip extension toward the joint, followed by the gasket with the narrow edge toward the joint. Insert the pipe into the bell and press the gasket firmly and evenly into the gasket recess in the bell keeping the joint straight during assembly. Push the gland toward the bell and center it around the pipe, with the flange lip against the gasket. Insert bolts and hand tighten nuts. Deflect pipe after assembly, but before tightening bolts.

3.12 INSTALLATION OF COPPER WATER SERVICES AND BRASS FITTINGS

A. Connect copper water service piping to watermain, wellhouse, or other supply as shown on the drawings.

B. Watermain taps shall be made under pressure using a tapping machine specifically designed to tap and install corporation stops. Dry watermain taps are not allowed.

C. Service saddles shall installed on services where the corporation stop is 1 ½" nominal diameter or greater.

D. Provide a horizontal offset adjacent to the main for all copper services. Comply with pipe manufacturer's requirements with respect to minimum radius on bends.

E. Install curb stops as shown on the drawings. If specific curb stop location is not shown on the plans, consult with DFD Construction Representative to determine acceptable location prior to installing.

F. Place curb stop box on a 4"x8"x8" solid concrete masonry unit set on compacted ground. Orient box so that no portion of the box bears on the water service or curb stop.

G. Install curb stop box plumb and level, backfilling evenly. Extend curb stop box to proposed final grade; provide extensions as necessary. Curb stop boxes that shift during backfilling or restoration shall be excavated and re-set.

H. Mark all curb stop boxes with a steel "U" fence post to protect them from damage.

I. Install copper water service as shown on the drawings. Limit the number of water service joints, using full lengths of pipe whenever possible.

J. Prepare copper pipe joints in accordance with pipe and fitting manufacturer recommendations. Cut pipe squarely, remove burs and round ends as necessary.

K. Install fittings in accordance with manufacturers recommendations. Torque compression connections to recommended tightness; do not over-tighten compression joints.

L. Provide dead-end copper water services with compression connectors fitted with plugs. Do not tap he ends of copper water services shut. Mark the location of dead-end services with an 8' long 4x4 timber and steel "U" fence post.

3.13 COPPER SERVICE LATERALS

A. Provide and install saddles on all 1-1/2-inch and 2-inch services and at all service lateral taps on new or existing PVC, HDPE, or CIPP-lined water mains. Use a standard valve box in lieu of a curb box, with no rod or rings required, for all 1-1/2-inch and 2-inch services.

B. Use a pipe cutter to cut all copper tubing. Hacksaws or other such devices to cut copper tubing are not permitted.

C. Excavate and expose the area on the water main for new service connections, as noted on the drawings or as otherwise instructed by the Engineer. Maintain a separation distance of at least 18-inches between adjacent service taps and between a service tap and a pipe joint or fitting. Locate the tap on the upper half of the main at a 45^{o} angle from the vertical plane, perpendicular to the water main and on the side of the main to which the service extends.

D. Tap the water main and install the corporation stop using a tapping machine specifically designed to tap water main under pressure. No other method of tapping the water main will be allowed. Repair and replace any cut or removed polyethylene encasement following the tap to ensure that the water main is fully protected.

E. After the tap has been made and the corporation stop and bend have been inserted, loop the copper tubing out and then back toward the main, then back away from the main to form the shape of a vertical "S". Ensure that the "S" loop is of sufficient size so that it uses a minimum of 2-feet of copper tubing. Ensure that the highest portion of the loop is not higher than the top of the water main.

F. Lay the service flat to the property line or otherwise indicated point of termination. Provide a minimum of 6-feet of cover below finished grade.

G. Place at least 1-foot of approved bedding material around the copper service pipe. The bedding material is considered incidental to the cost of backfilling the service lateral trenches. Protect all laterals and appurtenances from damage when backfilling. Stones 3-inches in diameter or larger are not allowed within 18-inches of the copper service. Backfill containing rocks 3-inches or larger may not be placed around curb boxes.

H. Restore any disturbed terrace or turf areas associated with the lateral installation work. Any terrace or turf restoration work is considered incidental to any work associated with service laterals.

I. Coordinate with property owners to allow for flushing service laterals both prior to and immediately after any work impacting a service. Resolve any problems with property owners, including but not limited to problems regarding discolored water or low/no water flow.

3.14 FILLLING WATERMAIN

A. Fill watermain after main has been installed and completely backfilled.

B. Fill main slowly to limit entrapped air and evenly distribute calcium hypochlorite. Open all hydrants completely to allow air to escape and monitor filling.

C. Once main is full, allow a minimum of 48 hours time for disinfection to occur before flushing.

3.15 PRESSURE TESTING

A. Pressure test all watermain and copper water services.

B. Provide all valves fittings, joint restraints, hoses, compressors, and water and power supply as necessary to complete pressure testing. Utilize testing apparatus that is fabricated specifically for testing watermains. Calibrate pressure gauges as necessary.

C. Flush main as necessary to remove air prior to testing. Comply with the requirements of this section with respect to flushing.

D. For longer installations or installations consisting of watermain and copper water service, the Contractor may elect to pressure test the system in short segments.

E. All pressure testing shall be conducted in the presence of the Owner's representative. Provide minimum of 48 hours advanced notice of testing.

F. Conduct a combined pressure/leakage test for 1 hour at a pressure equal to 150% of system normal operating pressure (as measured at the lowest point in the system), or a minimum pressure of 150 psig.

G. When conducting test, pressure test equipment shall be set-up as close to the highest point in the line as possible.

H. Make-up water for the test shall be clean potable water supplemented with ½ oz of dry calcium hypochlorite per 35 gallons of water.

I. Leakage for test shall not exceed gallons per hour as allowed by the attached formula:

$$G = \frac{ND\sqrt{P}}{7400}$$

Where: G= Allowable leakage (gallons per hour of test)
N=Number of joints under test
D=Nominal diameter of main (inches)
P=Average pressure during test (psig)

J. Record and document pressure test by recording the following information:

1. Date of test
2. Section tested
3. Diameter and length of main under test
4. Number of fittings, valves hydrants, etc.
5. Results of test including test length, pressure, actual water loss
6. Calculation of allowable leakage
7. If a failed test, describe actions taken to eliminate leaks and results of re-testing

K. Submit reports documenting pressure testing.

3.16 CONTINUITY TESTING

A. At the request of the Owner's Representative, conduct continuity test on all ductile iron watermain and copper water services.

B. The continuity test shall be performed using an multi-meter to verify electrical continuity of the watermain system.

C. The Contractor shall furnish all labor and equipment necessary to conduct the continuity test.

D. Document continuity testing by recording the following information:

1. Date of test
2. Test methods and equipment
3. Section tested

4. Diameter and length of main under test
5. Number of fittings, valves hydrants, etc.
6. Results of test including resistance
7. If a failed test, describe actions taken to eliminate leaks and results of re-testing

E. Submit reports documenting continuity testing.

3.17 DISINFECTION/FLUSHING

A. After filling the main, allow a minimum of 48 hours time for disinfection to occur before flushing.

B. Flush all sections of watermain and water service. When possible, utilize hydrants or other large diameter orifices to complete flushing and achieve 2.5 fps water velocity. If needed, utilize services or temporary connections to complete flushing.

C. All watermain and services shall be flushed for a minimum of 10 minutes, or as necessary to obtain a sediment-free and bacteriologically safe sample.

D. Utilize diffusers, hoses, settling basins and other devices as necessary to limit erosion and other damage to the site and downstream areas.

E. Contractor shall be responsible for providing all necessary fitting, valves, joint restraints, hydrants and other materials necessary to conduct flushing.

F. Submit reports documenting disinfection and flushing.

3.18 BACTERIOLOGICAL SAMPLE

A. Following all pressure testing and flushing, the contractor shall collect a sample from the newly installed watermain or water service(s). Samples shall be submitted to the State Laboratory of Hygiene, or other licensed testing laboratory for bacteriological (colliform bacteria) analysis.

B. The Contractor shall be responsible for all costs associated with sample collection(s) and analysis.

C. Document bacteriological sample collection and analysis by recording the following information:

1. Date of sample collection
2. Sample collection methods and equipment
3. Person collecting the sample
4. Location(s) sample was collected
5. Results of sample analysis

D. If sample results indicate water is “Unsafe – Colliform Bacteria Present”, Contractor shall re-disinfect watemain and water services by introducing additional chlorine into the line and re-flushing the main. This process shall be repeated as necessary until a clean sample is obtained. The Contractor shall be responsible for all costs associated with all efforts necessary to obtain a “Safe – Coliform Bacteria Not Present” sample.

E. Submit reports documenting bacteriological sample collection and analysis.

END OF SECTION

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.01 SCOPE

A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the sanitary sewer work required in these specifications and on the drawings. This specification shall apply to all sanitary sewer work beginning at a point five 5' outside of the building wall, unless otherwise specified. Included are the following topics:

1. All materials and methods shall meet the City of Madison public works standards Articles 501 thru 509.

1.02 REFERENCE

A. Applicable provisions of Division 1 shall govern all work under this section.

1.03 REFERENCE STANDARDS

A. Where these specifications do not cover portions of the work to be undertaken, the Standard Specifications for Sewer and Water Construction in Wisconsin, current edition, shall govern the work.

B. American Society for Testing and Materials (ASTM):

D1784-03	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
D2564-04	Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
D2680-01	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
D3034-04a	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D3212-96a(2003)e1	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
D3350-05	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
D4673-02	Standard Classification System for Acrylonitrile-Butadiene-Styrene (ABS) Plastics and Alloys Molding and Extrusion Materials
F477-02e1	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
F679-03	Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

1.04 SUBMITTALS

A. Provide manufacturers product information (cut sheets), shop drawings and O&M information for sewer materials including:

1. Pipe
2. Fittings

B. Provide reports documenting pressure testing, mandreling, and televising.

C. Provide copies of record drawings.

1.05 RECORD DRAWINGS

A. Maintain record drawings that show the actual locations, sizes and types of utilities and other features encountered.

B. Note any modifications to proposed sewer system size, location or elevation. Record any other deviations from the drawings.

PART 2 - MATERIALS

2.01 GENERAL

A. Conform all materials to the size and type shown on the plans or as called for in the specifications and to applicable Laws, Codes, and Ordinances.

B. All products and materials are to be new, undamaged, clean, and in good condition. Existing products and materials are not to be reused unless specifically indicated.

C. Be responsible for the safe storage and handling of all materials utilized in the work. Store all materials in areas designated by the Construction Representative in cooperation with the Owner.

D. Perform all work in accordance with any applicable manufacturer's instructions.

2.02 PIPE

A. Provide the size, type and class/schedule of pipe as indicated on the drawings.

B. Use only pipe supplied from the same manufacturer, and of the same type, unless otherwise specified or approved in advance by the Engineer.

C. Only pipe, joints, material and installation approved by Wisconsin Department of Natural Resources and/or the Department of Commerce for the intended use in the State of Wisconsin shall be used.

2.03 PVC PIPE

A. Conform to ASTM D-3034 with solvent weld or elastomeric joints. Pipe shall be SDR-35, unless otherwise noted. Pipe over 15 inches in diameter shall meet the requirements of ASTM F679-03. Do not mix different manufacturer's products, or fittings.

B. PVC fitting joint type and SDR shall be same as the pipe that the fitting is connected to.

2.04 HDPE PIPE

A. Conform to ASTM D-3350 for PE material with a cell classification of 335434C or better. Pipe shall be SDR 11, unless otherwise noted. Joints shall be thermal butt fusion in accordance with the manufacturer’s recommendation.

B. HDPE pipe fittings shall be thermal fusion weld type of the same or greater SDR as the pipe that the fitting is connected to. Provide transition fittings when connecting to existing piping, or where shown on the drawings.

2.05 CONNECTIONS FOR DISSIMILAR PIPE MATERIALS

A. Where new sewer connects to and existing dissimilar pipe, the connection shall be made with a no hub type coupling meeting the requirements of CISPI 310. Couplings shall have neoprene gaskets with stainless steel shield, and multiple stainless steel clamps with worm gear tightening

device. The couplings shall be made specifically for the type and size of pipe materials being connected. Couplings shall be Fernco Husky or approved equal.

2.06 PIPE INSULATION

A. Rigid, closed-cell extruded polystyrene insulation. Insulation shall be suitable for buried insulation.

B. Individual boards shall have dimensions of 8'x4'x2".
Dow Styrofoam, or approved equal.

2.07 SANITARY LATERAL ELECTRONIC MARKERS

A. Effective Dec. 31, 2006, Act 425, Chapter 182.0175 (2r) of the Wisconsin State Statutes requires that all non-metallic building sewers (including sanitary laterals, private sanitary sewers and storm sewer laterals) installed within the City Right of Way, shall be accompanied by a means of locating the newly installed underground pipe. Sewer mains that have manhole or inlet structures on both ends within the City Right of Way are considered exempt from this legislation.

B. The City of Madison has selected a marker system that includes the installation of extended range ball markers over the sanitary sewer facilities, which after construction provide a signal that can be located by the city's utility locator after construction is complete.

C. The 3M ScotchMark Electronic Ball Marker System Extended Range Marker (model #1404-XR) shall be considered an acceptable marker device for this specification. If an alternate equivalent marker is selected, contractor shall provide specifications and data sheets of the selected device to City Engineering prior construction in order for the City to confirm that the proposed marker device is compatible with the City's marking equipment.

1. Markers shall be installed per manufacturer's written instruction. Electronic marker balls shall be installed in the trench directly above the sewer pipe.
2. The key constraint is the maximum depth of the marker. The signal range of the 3M™ Electronic Marker System (EMS) 4" EXTENDED RANGE 5' BALL MARKER - WASTEWATER (MODEL 1404-XR) is 5 feet. However, electronic marker balls shall be installed at 4 feet from finished grade.

D. The City shall provide the Contractor with the required number of electronic markers for City bid public works contracts. The Contractor shall be responsible for picking up the markers at the Engineering Service Building, 1602 Emil Street in Madison, Wisconsin.

1. Upon completion, the City will test each electronic marker to confirm that it is installed and functioning properly. If it is determined that the marker has not been installed correctly and/or is not functioning properly, the Contractor shall be responsible for all work associated with the installation of a properly functioning marker. This work shall be done with the approval of the Construction Engineer and with no additional reimbursement to the Contractor.

2.08 SEWER STRUCTURES

A. Castings General: Gray iron castings used in the work shall conform to the requirements of the Specifications for Gray Iron Castings, ASTM A 48, Class 35B except as noted.

1. The castings for sewer access structures, catchbasins, and inlets shall be in accordance with the designs, dimensions, and details shown on the Standard Detail Drawings for the installation named, unless otherwise specified.
2. Frames and lids for sewer access structures and catchbasins shall be machined and fitted so that rocking and chattering will be eliminated.
3. The lids installed on sanitary sewers shall have the self-sealing gaskets firmly glued in place at the factory. All cleanouts shall conform to the requirements in the Wisconsin Plumbing Code. The type of cleanout cap shall be approved in advance by the field engineer.

B Sewer Access Structures. The following lists of Neenah Foundry castings are acceptable for City construction and are further detailed in Standard Detail Drawing 5.7.16 & 5.7.16A, SAS Frame and Cover. Substitutions shall be approved by the Engineer prior to delivery to the job site.

1. R-1550: Heavy-duty R-1050 frame, w/logo lid 1550-0054, nine (9) inch high, non-rocking sewer access structure frame and Type “B” non-rocking self-sealing sewer access structure lids with concealed pick holes. EJ Co. 1078Z frame, w/logo lid 1078ATGS shall be considered an approved equal.
2. R-1689: Heavy-duty, w/logo lid 1550-0054, four (4) inch high, non-rocking sewer access structure frame and Type “B” non-rocking self-sealing sewer access structure lids with concealed pick holes. EJ Co. 1078Z1 frame, w/ logo lid 1078ATGS shall be considered an approved equal.
3. R-1916C: Heavy-duty, sewer access structure frame and self-sealing lid with Type “F” locks and concealed pick holes and 41” anchor holes.

2.09 SEWER STRUCTURE CONSTRUCTION METHODS

A. General: The construction of concrete sewer access structures, catchbasins, and inlets shall conform to the pertinent portions of Part 3, Concrete and Concrete Structures of these Specifications, and the applicable Standard Detail Drawings for the structure involved. Sewer access structures, cleanouts, catchbasins and inlets shall be of a size and type specified in the contract, and shall be constructed at the location and to the elevation shown on the plans, or as directed by the Engineer. Cleanouts shall be constructed in accordance to the Wisconsin Plumbing Code.

B. Unless otherwise specified, all sanitary sewer access structures shall be constructed of precast units of reinforced concrete provided they meet all the precast requirements. Sewer access structures and inlets for storm sewers may be either cast-in-place or precast concrete structures. If the plans specifically require a field poured structure, then the structure shall be cast-in-place with no exception. If the structure is not specifically required to be field poured, a precast structure may be substituted for a cast-in-place structure provided they meet all the precast requirements and approval is granted by the Engineer.

C. Cast-in-place structures shall be constructed as detailed in the Standard Detail Drawings. The bases of all structures which are cast-in-place shall be poured prior to pouring the walls of the structures, unless otherwise ordered or allowed by the Engineer.

2.10 PRECAST REQUIREMENTS

A. Precast Sewer Access Structures (SAS) and inlets, generally referred to as precast structures, shall be of reinforced concrete and shall conform to the specifications of Precast Reinforced Concrete Manhole Sections, ASTM C 478. Joints shall meet the requirements for circular reinforced concrete pipe as specified in these Specifications.

B. Precast structures for storm sewer may be furnished with steps. Precast structures for sanitary may be furnished with steps in the barrel sections only. If steps are used in the cone sections to facilitate construction, they shall be removed prior to acceptance.

C. Precast structures of reinforced concrete may be substituted for cast-in-place structures provided they can meet all of the following criteria and the conditions of the contract and approval is granted from the Engineer. No precast structures shall be brought to the job site until approval is granted from the Engineer. Any precast structure not meeting these criteria shall be replaced by a cast-in-place structure or a precast structure satisfying these criteria at the Contractor’s expense.

D. Sanitary Sewer: The following precast requirements shall be met for all precast SAS for sanitary sewers:

1. Precast SAS shop drawings for public works reconstruction projects shall be approved prior to fabrication and delivery to the site.
2. Precast SAS shop drawings for private developments are not required.
3. Spreader bars shall be used if “lift eyes” are utilized for movement and placement of the precast structure.
4 Each precast structure on the plan shall be custom manufactured with factory-made cores for sanitary sewer connections.
5 The total height of adjustment shall be a minimum of three (3) inches and a maximum of nine(9) inches.
6 The base shall be precast integral to the precast structure. The invert and bench may be either field poured concrete or precast and shall be such that the invert provides positive flow through the structure and the height of the bench shall match the top of the discharge pipe.

E. A base section with a precast bench and invert may be provided, subject to the following requirements:

1. The concrete of all inverts shall be finished with a steel trowel to produce a smooth flowline. Inverts which are brushed and/or have a rough flowline may be rejected by the Engineer in the field.
2. The Contractor shall provide for a tight joint between all pipes entering or leaving the structure and the precast invert such that there is no abrupt change in the grade of the flowline through the joint. Any grinding or grouting of the invert which is required to produce a tight joint shall be considered incidental to the installation of the precast structure.
3. The precast bench shall extend to a height of 3/4 of the diameter of the pipe, at a minimum.
4. All inlet flowlines shall be poured with gentle sweeps through the structure towards the outlet flowline such that cleaning and televising equipment can pass easily along the flowlines.

2.11 CASTINGS

A. Castings shall be installed to the grades shown on the plans or as directed by the Engineer. Sewer Access Structure (SAS) castings shall be installed 1/4 inch below the final grade. SAS castings that are 3/4 inch, or more, below the final grade shall be repaired.

1. Inlet castings shall be set to grade prior to and separate from the pouring of the concrete curb and gutter. It is expected and required that three (3) feet of concrete curb and gutter on either side of the inlet shall be poured by hand, not through the use of a curb machine.
2. The inlet casting shall be set to grade on a bed of mortar, which shall be a minimum of 2-1/4 inches thick.
3. The inlet shall be placed on the mortar bed and shall be adjusted to grade by applying direct pressure to the casting. Once the casting adjustment is complete, three (3) feet of curb and gutter on either side of the inlet casting shall be poured by hand. The inlets shall be placed in accord with the appropriate Standard Detail Drawing.

2.12 SEWER CONNECTIONS

A. The connections of new pipes at new structures are detailed in the respective sewer type Sections with the exception of sanitary sewer drop inlets which are defined in this Subsection.

B. When a structure is to be constructed at an existing pipe, the Contractor shall sawcut the existing pipe in the required location to accommodate the placement of the new structure. If the Contractor deems it more suitable to remove the existing pipe to a full joint, the additional pipe and connection required to reconnect the sewer shall be the Contractor’s responsibility.

C. The following requirements are specific for sanitary sewer and storm sewer connections.

1. Sanitary Sewer: Whenever shown on the plans, or directed by the Engineer, the Contractor shall install outside drop inlets in conjunction with the installation of sanitary sewer access

structures as detailed in the Standard Detail Drawings. The pipe and fittings to be used in the construction of the outside drop inlets shall be of the same material as the sewer main. The pipe and fittings shall be securely anchored to the sewer access structure to prevent displacement during the placement of the concrete encasement.

2. A Sanitary Sewer Tap shall include the connection of an existing lateral or main to a new structure. A coupling (SDD 5.3.3) shall be provided and used by the Contractor to connect the existing pipe to any new pipe that is required to make the connection to the structure as detailed in Standard Detail Drawing 5.7.31, Flexible Pipe to SAS connector. Any new pipe that is installed by the Contractor to reconnect the existing sewer main or lateral shall be considered incidental to this bid item.
3. The newly installed pipe shall match the existing pipe's diameter or be of the next larger diameter. If the existing lateral is to be replaced, the new pipe shall be compensated under the corresponding sanitary sewer lateral bid item. The pouring and construction of concrete benches and flowlines in new sewer access structures for the inlet or outlet pipes shall not be considered a part of this work.
4. The Contractor shall be responsible for maintaining the normal flow of wastewater during tapping of the sewer access structure.

D. New Pipe Connections

1. Where any type of new public storm pipe is being tapped into an existing concrete structure or pipe the connection shall be made in a workmanship like manner to assure the structural integrity of the tapped structure or pipe once the connection is made. It is required, and this item includes, the use and provision of a concrete collar to complete and seal the connection between the existing structure or pipe and the new pipe. The work completed shall be in accord with Standard Detail Drawing

2.13 EXTERNAL SEWER ACCESS STRUCTURE JOINT SEAL

A. Where called out by for on the plan or by the Engineer, barrel joints shall be sealed on sanitary sewer structures around the outside circumference of the Sewer Access Structure. Manhole joint seal shall be minimum of nine (9) inches wide. The seal shall consist of flexible rubberize seal conforming to ASTM C923 held in place with stainless steel compression bands or butyl adhesive tape conforming to ASTM C877 or heat shrink sleeve over visco-elastic adhesive sealant.

B. Acceptable products and manufacturers are the following:

1. Mac Wrap, Mar Mac Manufacturing Company, Inc.
2. NPC External Joint Seal, NPC, Inc.
3. EZ-Wrap, Press-Seal Gasket Corporation
4. Riser-Wrap, Pipeline Seal and Insulator
5. Alternate manufacturers and products not listed above are subject to pre-approval by the Engineer.

PART 3 - EXECUTI0N

3.01 NOTIFICATION

A. Contractor, prior to excavation work, shall notify all utilities, governmental agencies, or entities, known to, or which can reasonably be assumed to, have above or below ground pipe, conduit cables, structures or similar items within limits of project, to locate and mark location of such items. The Contractor shall expose potential pipe conflicts prior to installation of sewers to allow for any field changes to the design to be made.

3.02 GENERAL INSTALLATION OF SEWER PIPE

A. Install all pipe in accordance with ASTM specifications which pertain to the specified type of pipe material and the installation situation.

1. Do not use any pipe or fittings cracked in cutting or handling or otherwise not free from defects.
2. Clean all pipe of any dirt and/or debris both inside and out prior to placing in the trench.

B. Make joints in accordance with manufacturer's directions with due care to avoid damaging pipe and/or disturbing previously laid pipe.

C. Cut pipe only according to manufacturer's directions.

D. Lay all sewer pipes to horizontal alignment and grade shown on the plans with bell ends up hill. Establish and maintain horizontal alignment using total station, transit or theodolite. Use pipe laser or level to establish and maintain grade of pipe. Discrepancies from the required horizontal alignment or grade at any location shall not be greater than 0.10’ or 0.05’, respectively.

E. Do not exceed specified trench widths.

3.03 TRENCH EXCAVATION

A. Unless otherwise provided in the contract or permitted by the Engineer, the work of constructing sewers and allied works shall be done in open trenches and in a manner to protect the pipe lines or sewers from unusual stresses. When provided in the contract or permitted by the Engineer, the construction of sewers may be done by tunneling and/or jacking in lieu of open trenching; details of construction shall be indicated on the plan, specified in the contract, or established by the Engineer prior to beginning the work of tunneling and/or jacking. All of the work of constructing sewers shall be done in accordance with the applicable provisions of the “Wisconsin Administrative Code”.

B. The trenches shall be excavated in conformity with the required alignment and grades as shown on the plans and as laid out in the field by the Engineer. It shall be understood that the elevations for sewers, as shown on the plans, are subject to such revisions as may be necessary to fit field conditions and that the Engineer reserves the right to adjust the profile grades from those shown on the plan. No adjustment in compensation will be made for the grade adjustments not in excess of one(1) foot above or below the elevations shown on the plans.

C. The Contractor shall remove all vegetation along the trench line to the width of the proposed trench before beginning excavation. Vegetation removed shall not be used as backfill in the trench, but shall be disposed of by the Contractor at no additional cost to the City. If the trench line is finished with pavement or other structures, removal of those items shall be completed as specified in Article 203 – Removal of Miscellaneous Structures with the exception that the sawcut shall be incidental to the trench excavation.

D. The materials excavated from the trench shall be deposited on the sides of the trenches and excavations, beyond the reach of slides, or transported to spoil banks. For pipe sewers, the width of the trench shall be such as to leave a clear space of not less than six (6) inches nor more than twelve(12) inches between the earth wall, or the supporting sheeting or bracing where such is used, and the sides of the pipe. The trench width established by this pipe clearance, measured at the spring line, shall be applicable to that portion of the trench from one (1) foot above the top of the pipe to the bottom of the trench. On streets opened to traffic, on restricted easements, and in such other locations as the Engineer directs, the width of the trench at the surface of the ground shall be limited to the outside diameter of the pipe plus two (2) feet plus the amount necessary for sheeting or bracing.

E. Surplus material shall be considered to include vegetation from the trench line, excavated rock or boulders larger than six (6) inches in diameter, and all other material from excavation not needed or suitable for backfilling trenches. Unless otherwise specified, surplus material shall be the property of the Contractor, and shall be disposed of at no additional cost to the City. Unless otherwise provided, the Contractor shall provide all the sheeting or bracing needed to protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions in the trench.

Such sheeting and bracing shall be according to the Contractor's design and shall comply with the "Wisconsin Administrative Code". Removal of any sheeting or bracing from the trench shall be accomplished in such a manner as to fulfill the above requirements. Sheeting and bracing shall be removed unless specific permission is given by the Engineer to leave it in place. Costs of this work shall be at the Contractor's expense.

F. The Engineer reserves the right to limit the extent of excavation in advance of pipe laying and backfilling depending on the nature of the soil and other conditions affecting the work.

G. The Engineer reserves the right to order additional excavation where unsuitable foundation conditions exist. When this condition arises, the excavation shall be carried to such depth as directed by the Engineer. The maximum width of the extra trench excavation shall be the outside of the proposed structure plus two (2) feet plus the amount necessary for sheeting or bracing. Mechanically compacted crushed stone and/or washed gravel shall be installed to replace the excavated materials to subbase grade.

H. When directed by the Engineer, the Contractor shall uncover utility lines within the proposed construction limits in advance of the construction as specified in Article 508. Work necessary to expose existing underground facilities that are part of the Contractor's statutory obligation during the normal storm sewer, sanitary sewer, electrical conduit or water main installation shall be considered as incidental to those respective items and will not be paid for as utility line openings.

3.04 ROCK EXCAVATION

A. Rock excavation shall include all hard, solid rock in ledges, bedded deposits and unstratified masses and all conglomerate deposits or any other material so firmly cemented as to present all the characteristics of solid rock; which material is so hard or so firmly cemented that, as determined by the Engineer, it is not practical to excavate and remove same with a power shovel except after thorough and continuous drilling and blasting. Power shovels as referred to above shall be taken to apply to a modern power shovel or backhoe of not less than three-quarters cubic yard manufacturer's rated capacity, having adequate power and being in good running condition in the hands of an experienced operator. Rock excavation shall also include all rock boulders necessary to be removed having a volume of one (1) cubic yard (9 cubic feet) or more. Rock excavation shall not apply to plain or asphaltic bound bases or surface courses of macadam, gravel, or broken stone.

B. Rock excavation shall be carried to a depth of six (6) inches below the outside of the sewer, and to a width limited to the outside diameter of the pipe plus two (2) feet. Rock excavation shall be carried to a depth of eight (8) inches below the outside of the sewer for sewer access structures up to ten (10) feet deep and twelve (12) inches below the outside of the sewer for sewer access structures over ten feet deep. The horizontal limit for rock excavation shall be the outside dimensions of the sewer access structure plus two (2) feet.

3.05 DEWATERING

A. The Contractor shall provide and maintain ample means and devices with which to promptly remove all water entering excavations, trenches, and other parts of the work and shall keep said excavations dry until the structures to be built therein are completed. No masonry shall be installed in water nor shall water be allowed to rise over masonry and concrete until the mortar and concrete have attained final set. In no event shall water be allowed to rise over masonry or concrete if there is danger of flotation or of setting up unequal pressures in the concrete until the concrete has set at least twenty- four (24) hours and any danger of flotation has been removed.

3.06 BEDDING OF SEWER PIPES

A. The bedding, or foundation, for sewer pipes shall be constructed to prevent settlement of the pipes and to avert excessive pressure on the pipes in order to avoid rupture, leakage or deformation of the pipes. Unless otherwise specified in the Special Provisions of the contract, all sanitary and storm sewer pipes, including sanitary sewer laterals and storm sewer leads, shall be

constructed with the type of bedding that is specified for the type of pipe installed, as shown on the Standard Detail Drawing 5.2.1, Storm and Sanitary Sewer Beddings.

B. The width of the bedding shall be equal to the width of the trench. The depth of the bedding shall extend from an elevation at least six (6) inches below the bottom of the pipe to an elevation at least twelve (12) inches above the top of the pipe. All bedding shall be mechanically compacted, including crushed stone and washed gravel. Sand or limestone screenings used for bedding shall conform to the following gradation:

Passing 3/4" sieve	100%
Passing #200 sieve	0-10%

C. Washed gravel and crushed stone used for bedding shall conform to the following gradation:

Passing 1" sieve	100%
Passing 1/2" sieve	35-60%
Passing #200 sieve	0-10%

D. Washed gravel or crushed stone shall be used for all pipe sizes over ten (10) inches in diameter, and for smaller sizes when directed by the Engineer. With the approval of the Engineer, the maximum size of the washed gravel or crushed stone may be increased, and screened crushed stone may be substituted for washed gravel.

3.07 BACKFILLING EXCAVATIONS AND COMPACTION OF BACKFILL

A. Unless otherwise provided, all trenches and excavations shall be backfilled immediately after the sewers and appurtenances have been constructed therein. In covering the sewers and filling around structures, the backfill material shall be brought up evenly on all sides so that no unbalanced pressure is brought to bear upon the pipe and masonry.

B. The Contractor shall be required to backfill all excavations to the original ground elevation unless otherwise specified in the contract or ordered by the Engineer. In the event of a shortage of material to perform this work, including replacement as may be required by rock excavation or removal of boulders, the Contractor shall provide the necessary material at no additional cost to the City.

C. Walking or working on the completed pipe sewers, except as may be necessary in compacting and backfilling, shall be prohibited until the trench has been backfilled to an elevation at least two (2) feet above the top of the pipe. No trucks, vehicles, or other equipment shall be allowed within the limits of the trench prior to the completion of the backfilling operations, unless authorized by the Engineer for compaction or other purposes.

D. Backfill material hauled to the project shall be dumped along the top of the trench beyond the reach of slides and placed in the trench with the proper backfilling equipment. Backfill material may be dumped directly into the trench from trucks when the amount of material to be dumped is controlled by partially opening the tailgates, and only when authorized by the Engineer.

E. Trenches shall be hand backfilled to an elevation at least one (1) foot above the top of the pipe. The material for this portion of the backfill shall not contain stones, or hard or frozen lumps of earth. For plastic sewer pipes, this material shall be the same classification as the bedding. The equivalent of hand backfill may be accomplished by lowering a clam bucket or material to a point immediately above and approximately one (1) foot from the sewer and slowly releasing the fill; for reinforced concrete pipe or corrugated metal pipe, the material may be deposited on a slope, equal to the angle of repose of the material, and allowed to flow progressively forward in such a manner as to avoid impact on the pipe and to avoid uneven pressures on either side of the pipe which may disturb its grade or alignment. Backfill material shall not be taken from trench walls below an elevation of two feet above the top of the pipe. The remainder of the trench shall then be filled carefully in a manner satisfactory to the Engineer. The compaction sections are detailed in

Standard Detail Drawing 5.2.2, Typical Trench Compaction & Standard Detail Drawing 5.2.3, Typical Trench Compaction (Greenway/Park).

F. All corrugated metal culverts shall be hand backfilled and mechanically tamped to an elevation at least one (1) foot above the top of the culvert. Extreme care shall be taken so as to assure complete filling and compaction under the culvert and between the culvert and the walls of the trench. If trucks or other heavy equipment used on the project are to travel over the newly installed culvert, then the Contractor shall place a minimum cover of twelve (12) inches of fill over the culvert to protect it during this period. This protective layer of fill shall be thoroughly mechanically compacted.

G. In the event that excavations have been sheathed or braced, the Contractor shall carefully draw and remove the sheathing and bracing in a manner which will not disturb the completed work. All openings left in removing sheathing and bracing shall be carefully filled with approved backfill material and properly compacted.

H. Where the grade of the sewer is such that, in the opinion of the Engineer, the top surface of the sewer shall require protection, an embankment of earth or other material, satisfactory to the Engineer, shall be constructed over the sewer by the Contractor. The height of the embankment shall be one (1) foot above the top of the pipe unless otherwise specified or directed by the Engineer. The width at the top of the embankment shall be not less than two (2) feet wider than the external width of the sewer. The sides of the embankment shall slope from the top of the embankment to the existing ground surface in a ratio of not less than two (2) feet horizontally to one (1) foot vertically. The material used to construct the embankment shall be such surplus material excavated from trenches as shall be approved by the Engineer. Such selected material shall be furnished and placed in the embankment by the Contractor at no extra cost to the City. Should more material be needed to complete the embankment than can be obtained from surplus material excavated, such material shall be furnished by the Contractor, and will be paid for as provided herein. The material shall be compacted as provided in Subsection 202.3(b) – Standard Compaction of these Specifications.

I. All material used for backfilling trenches and other excavations shall be subject to the approval of the Engineer. Unless otherwise specified or directed by the Engineer, the Contractor shall backfill trenches and other excavations with materials excavated in the course of the work. Whenever specified in the contract or directed by the Engineer, trenches and other excavations shall be backfilled with Select Fill. Vegetation and stones or fragments of broken rock in excess of six (6) inches in any dimension shall not be included in the backfill. In the event the Engineer rejects the excavated materials for backfilling due to the character of the material, including excess moisture content, gradation, composition, frozen material, or for whatever cause, the Contractor shall backfill the trenches and other excavations in the specified manner with Select Fill. In the event of lack of moisture in the backfill materials, the Contractor shall add water in quantities deemed necessary to secure the required compaction. In the event the excavated materials contain excess moisture, the Contractor shall, as directed by the Engineer:

1. Suspend all work on the project for that period of time as may be necessary to allow the backfill materials to dry sufficiently prior to backfilling and compacting the backfill material, during which time work days shall not be charged against the Contractor, or
2. Replace the excavated materials, in whole or in part, with Select Fill.

J. Where the moisture content of the excavated materials is such that drying or adding water is necessary prior to backfilling and compaction, the Contractor may furnish acceptable materials for the backfill and dispose of the excavated materials, all at no additional cost to the City.

K. Select Fill for backfilling trenches and other excavations shall be material as defined in Subsection 202.2(b) – Select Fill of these Specifications and shall be measured and paid as defined in Subsection 502.2(g) – Select Backfill for Sewer of these Specifications. Excess excavated material resulting from the above work may be used in backfilling other trench areas, unless the material is declared unsuitable for backfill by the Engineer, in which case the material

shall be considered surplus material and shall be disposed of by the Contractor at no additional cost to the City.

L. Unless otherwise specified or directed by the Engineer, the backfill in all trenches and excavations shall be mechanically compacted in such a manner as to thoroughly consolidate the backfill material and not injure or disturb the pipe or other structure. The compaction of the backfill material shall be in accordance with the following requirements:

1. The material for the backfill shall be deposited, spread and leveled, as herein before provided, in layers generally not exceeding twelve (12) inches in thickness before compaction, except that when the material being compacted is of a granular nature and the compacting equipment is adaptable for the purpose, the thickness of the layer may be increased to a maximum of twenty-four (24) inches provided the required density is obtained. Each layer of the spread and leveled material shall be compacted, by means of suitable compaction equipment, to not less than the specified density before the succeeding layer is placed.

2. All Pipe Trenches shall be compacted in conformance of Standard Detail Drawings 5.2.2 Typical Trench Compaction and 5.2.3 Typical Trench Compaction (Greenway Park). Compaction of the backfill material shall not begin until the depth of the backfill material is two (2) feet above the top of the pipe. In the case of structures, compaction of the backfill material shall begin with the placing of the first layer of backfill material. Backfills of three feet or less in depth below the proposed or existing subgrade shall be compacted to at least ninety-five (95) percent of maximum density for their full depth.

   In city right of ways or as called for by the construction engineer, backfills over three (3) feet in depth below the proposed or existing subgrade shall have the top three (3) feet below the proposed or existing subgrade compacted to not less than ninety-five (95) percent of maximum density, and those portions more than three (3) feet below the proposed or existing subgrade shall be compacted to at least ninety (90) percent of maximum density.

   In greenways and parks, in accordance to Standard Detail Drawing 5.2.3, backfills over three(3) feet in depth below the proposed or existing subgrade shall be compacted to at least ninety (90) percent of maximum density. If the proposed pipe is located horizontally within 15’ of an existing or proposed asphalt or concrete surface, then the pipe compaction shall be completed in conformance of Standard Detail Drawing 5.2.2.

3. The maximum density shall be determined in accordance with the Standard Method of Test for the Moisture-Density Relations of Soils, ASTM Designation: D 1557, Method D, with replacement of the fraction of material retained on 3/4-inch sieve with No. 4 to 3/4-inch material. The density of compacted backfill material shall be determined in accordance with the Test for Density of Soil-in-Place by the Sand-Cone Method, ASTM Designation: D 1556, the Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods, ASTM Designation: D 2922, or by other approved methods.

4. In the event the material in the density sample differs in percentage of aggregate retained on a No. 4 sieve from that in the sample upon which maximum density was determined, the maximum density shall be adjusted in accordance with approved procedure.

5. The foregoing density requirements will not apply to portions of backfills constructed of materials which, because of numerous large stones or high percentages of material retained on the No. 4 sieve, cannot in the determination of the Engineer be accurately tested in accordance with the above procedures for determining maximum or in place dry density.

M. Whenever the work of installing sewers takes place during cold weather, the specifications for trench compaction above shall be followed if practicable. If the specified compaction cannot be

achieved, and the Engineer directs that the work may not be suspended until more favorable weather conditions exist, then the following procedures shall be followed:

1. All frozen material in the trench shall be removed before beginning the day's work. As a method to achieve this, trenches shall be closed overnight.
2. Materials shall be unfrozen when being compacted.
3. The material shall be compacted in six (6) inch lifts in a manner normally done during warm weather construction and to a minimum density of ninety (90) percent compaction below the three (3) foot depth.
4. If the top three (3) feet of material does not meet ninety-five (95) percent compaction, then pit run sand (hauled in if necessary) shall be compacted in the normal manner using six(6) inch lifts.
5. The Engineer will have tests performed as necessary to provide uniformity of compaction.
6. As a guideline, construction should cease when the temperatures are too cold to achieve the above. At least 15F and rising is a reasonable temperature if it is not extremely windy.

3.08 LAYING PIPE

A. The pipe, fittings and accessories shall be of the size, class, type, and design; and shall be laid at the locations and to the required lines and grades; all as shown on the plans, required by the contract, or directed by the Engineer. Wherever the word "pipe" appears in this Subsection, it shall be understood to include pipe, fittings, and accessories.

B. The proper installations of structures and fittings, whose locations are shown on the plans and laid out by the Engineer shall be accomplished by the use of random lengths of pipe furnished by the Contractor. All field cuts of all types of pipe, except reinforced concrete pipe, shall be made with an approved mechanical pipe cutter or with a power saw in order to make a straight, true cut without chipping and cracking the pipe. In the event the Contractor is unable to obtain a certain size pipe, as specified on the plans or in the contract, the Contractor shall promptly inform the Engineer, and with the approval of the Engineer, the Contractor will be allowed to furnish and install a larger size pipe. In such case, the additional cost resulting from such substitution shall be at the Contractor's expense and no adjustment in compensation will be allowed.

C. A flexible watertight connections shall be used for plastic sewer pipe connections to structures as detailed in Standard Detail Drawing 5.7.31, Flexible Pipe to SAS Connector. For concrete pipe connections, a mechanical vibrator shall be used during placement of the concrete collar to assure complete exterior seal of concrete pipes to the new structure.

D. The laying of pipes in finished trenches shall commence at the lowest point and shall proceed towards the upper end, and the pipe shall be laid so that the spigot or tongue ends point in the direction of flow.

E. Jointing surfaces shall be carefully cleaned before pipes are lowered into trenches. The pipes shall be lowered so as to avoid unnecessary handling in the trench. Each section shall have a firm bearing throughout its length and shall be true to the line and grade required.

F. The method of shoving or pulling the pipes together shall be such that there will be no injury to the pipes, and the joints will be properly adjusted and will not be excessively large. The pipes shall be fitted and matched so that when set firmly to line and grade they will form a sewer with a smooth and uniform invert.

G. After the pipe is installed, lift holes shall be sealed with suitable concrete or other approved plugs.

H. The pipe shall not be laid within ten (10) feet of the excavating nor within forty (40) feet of blasting operations. The pipe shall not be laid in water or on frozen trench bottoms, or when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for the proper performance of the work.

I. No length of pipe shall be laid until the previously laid length of pipe has been sufficiently backfilled to hold it securely in place during the jointing operation. If, in making a joint, any previously laid pipe is disturbed, such pipe shall be removed and relaid. Adequate backfill shall be placed on the pipe to prevent floating. Any pipe which has been floated shall be removed and relaid at the expense of the Contractor.

J. The Contractor shall furnish suitable lifting and handling devices designed to distribute the weight of the pipe over the length of the pipe and prevent high stresses over small areas.

K. All water must be kept out of the bell hole of the pipe until the joint is completed and water shall not be allowed to rise in or about the pipe until the trench is filled at least one (1) foot above the top of the pipe.

L. Before leaving the work for the night, or during a storm, or for any reason, care must be taken that the unfinished end of the sewer is securely closed with a tightly fitting iron or wooden plug. Any earth or other materials that may find entrance into the sewer shall be removed by the Contractor at no additional cost to the City.

3.09 SANITARY SEWER LATERALS

A. General.

1. Installation of sanitary sewer laterals shall comply with all the requirements set forth herein for the installation of the sewer main, including excavation, backfilling, bedding, laying and jointing pipe. Sanitary sewer laterals shall be laid with a maximum grade of one-half (1/2) inch per foot and a minimum grade of one-fourth (1/4) inch per foot. Unless otherwise specified, sanitary sewer laterals shall be of the same material as the sewer main pipe. Where laterals are to be connected to risers the Contractor shall furnish and install the required fittings.

2. The typical locations of sanitary sewer laterals to be installed in new developments are detailed in Standard Detail Drawing 5.3.2, Location of Sanitary Laterals. A separate sanitary sewer lateral shall be installed between the public sewer main and the property line to each unit of a split two-family dwelling (i.e., duplex unit).

3. For reconstruction of existing sanitary sewer, the connection of a lateral to a new structure shall be completed under Sanitary Tap and to a new main under Reconnect. For those laterals to be reconnected to a main, the first five (5) feet of the lateral and backfill from the main shall be included in the Reconnect and shall not be included in this item. The trench shall be backfilled with select backfill and shall be completed under Select Backfill for Sewers.

4. For laterals that are in close proximity to terrace trees (as determined by the Engineer), the situation shall be reviewed on a case by case basis by the Engineer and the City Forester. The Contractor shall use construction methods and equipment to minimize tree damage as directed by the Engineer and in accordance with section 107.13 Tree Protection Specification. In extreme cases the Engineer may elect to terminate lateral installation prior to conflict with the tree.

5. The estimated location of the laterals will be marked by the City of Madison on the sidewalk; however, Contractors are encouraged to start at the sanitary main. If the Contractor elects to start at the property line, it shall be at their own risk. No Utility Line Openings will be granted for the inability to locate the lateral at the property line.

6. Prior to the abandonment of any lateral, the Contractor shall definitively prove to the satisfaction of the Construction Engineer that the lateral is not currently in use and has no potential future use. The state of the lateral shall be determined by dye testing, the use of a push camera, the use of Sonde equipment, or other equipment that will determine

where the lateral terminates. Lamping the lateral will only be an acceptable method if a cap or plug is visible.

B. Size. When the lateral size is not specified, the following guidelines shall be used:

1. For the installation of new lateral in the public right-of-way, unless otherwise specified in the plans or directed by the Engineer, the size of a newly constructed sanitary sewer lateral to be installed between the public sanitary sewer main and the property line shall be four (4) inches in diameter. The Engineer may require the size of the lateral to be six (6) inches or greater depending on the lot size or proposed land use.

2. For the reconstruction, repair or replacement of sanitary sewer laterals in the public right-of- way, unless otherwise specified in the plans, when a portion of a sanitary sewer lateral in the public right-of-way is to reconstructed, repaired or replaced, the inside diameter of the new lateral to be installed shall match that of the lateral which is being replaced. For purposes of this requirement, all five (5) inch laterals shall be considered to be six (6) inches in diameter. It shall not be permissible, in any event, to decrease the diameter of a sanitary sewer lateral in the direction of flow.

C. Alignment. Where a sanitary sewer lateral is being relaid in the public right-of-way and bends are required to reconnect the new lateral to the ends of the existing lateral or sewer main, the Contractor may use standard Poly (Vinyl Chloride) (PVC) bends that provide a change in the direction of flow of 22.5 degrees or less. Bends placed in a lateral shall be separated by straight pieces of pipe such that any two bends are separated by a distance of two (2) feet or more, measured from the center of each bend. The use of 45 degree bends shall be allowed only in connecting to a 45 degree wye at the sewer main in order to orient the lateral perpendicular to the sewer main.

D. Couplings. Where a lateral is being relaid in the public right-of-way and connected to pipes of differing materials and/or sizes, couplings (SDD 5.3.3) shall be used. The couplings to be used shall provide for a tight fit around the outside diameter of each pipe and shall be securely fastened with two stainless steel clamps at each pipe end. Couplings which reduce the pipe cross sectional area in the direction of the flow shall not be allowed.

E. Reconnect. Reconnect shall include reconstructing sanitary sewer lateral connections that shall be reconnected to the sanitary sewer main. This item shall include necessary wyes or fittings and PVC pipe, 4” or larger, for the connection of the lateral and shall not exceed a length of five (5) feet. All new laterals shall be a minimum of four (4) inches in diameter. Under no circumstances shall the new lateral be smaller than the existing. Plugging the existing lateral, select backfill and bedding required for the reconnection are included in this item. Sewer laterals that are to be reconnected to new sewer access structures shall be completed as a Sanitary Tap as specified in Subsection 507.3(d) – Sewer Connections. The Contractor shall be responsible for maintaining the normal flow of wastewater during reconnection of the laterals.

3.10 SANITARY LATERAL ELECTRONIC MARKERS

A. Each sanitary lateral shall have a minimum of 2 electronic markers: one shall be located above the wye on the sewer main and one shall be located above the lateral at the property line. Additional markers shall be placed at each change in horizontal direction.

B. Sewer access structures are required on the City’s sanitary sewer main on every instance that a lateral diameter is 8” or larger or if the proposed lateral size is of equal or larger size than the City’s sanitary sewer main.

3.11 JOINTS

A. New Pipe to New Pipe.

1. Joints shall not be made until the pipe is in the trench and set to true line and grade. Lengths of pipe which are joined together outside of the trench shall be removed from the project immediately.
2. Prior to making joints, the jointing surfaces shall be inspected for chips, cracks, or other defects in the joints and jointing materials. The jointing surfaces shall be carefully cleaned and lubricated with a vegetable lubricant or a lubricating adhesive. Lubricant shall be applied to both the bell and spigot surfaces of the joint. The lubricant shall be that recommended by the gasket manufacturer for the particular type of gasket being installed.
3. Care shall be taken when shoving or pulling the pipes together in order not to damage the pipe or the joints and jointing materials. The pipes shall be in proper alignment and to the proper grade prior to applying the pressure necessary to make the joint.
4. Rubber gaskets for reinforced concrete storm sewer pipe shall be assembled as follows:
   a. When air temperature is below 32F, gaskets shall be applied one and one-half (1-1/2) hours before installation of the pipe.
   b. When air temperature is above 32F, gaskets shall be applied fifteen (15) minutes before installation of the pipe.
5. The temperature referred to pertains to the prevailing air temperature at the point of application of the gaskets. This shall be taken to mean the air temperature, either indoor or outdoor, at the time and place the gaskets and cement are being applied to the pipe. It does not refer to the temperature in the trench, or of the bonding cement, or of the pipe.
6. In making mechanical joints, the bolts shall be installed with the heads in reverse direction. The nuts shall be turned on only as far as they can be by using the wrench with one hand, with no extensions on the wrench to give greater leverage. Care shall be taken not to over-tighten the bolts. The bolts shall be tightened equally and diametrically in order to apply the proper pressure on the gasket and joint.

B. New Pipe to Existing Pipe.

1. A coupling shall be required at the junction of a new pipe to an existing pipe as specified on the plan set or as required in the field by the Engineer.
2. It is expected that the Contractor shall saw cut the existing main at the location shown to accommodate a clean joint for the installation of the compression couplings. If the Contractor for his/her convenience deems it more suitable to remove the existing pipe to a full joint, the additional pipe required to connect the new pipe is to be the Contractors responsibility and shall not be compensated.
3. The coupling shall be placed as shown on the plan or as directed by the Engineer and shall be constructed per Standard Detail Drawing 5.3.3, Coupling Details.

3.12 CONNECTIONS TO EXISTING STRUCTURES

A. Make all necessary openings into existing structures or sewers including the reconstruction of existing inverts or benches, as necessary. Patch all openings permanently watertight with concrete brick and mortar, or hydraulic cement and waterstops, or for sanitary sewers, hydraulic cement and flexible watertight boots.

3.13 PIPE INSULATION

A. Provide insulation when indicated on the drawings, or where depth of cover is less than 6'. Unless otherwise noted, install 2" thick polystyrene boards insulation.

B. Install insulation on compacted initial cover material, 6" above the top of the pipe. Stagger joints where more than one layer of insulation is required. Provide insulation with a minimum of 1' of initial cover material. Place cover and backfill material in manner that does not damage insulation; replace any damaged insulation.

3.14 DEFLECTION TESTING

A. Test all PVC sewer pipe in the presence of the DSF Construction Representative by a "go-no-go" deflection test mandrel furnished by the Contractor. Do not perform deflection testing any sooner than 30 days following the installation of the PVC pipe. Pull the mandrel by hand, or hand operated winch so as to avoid any damages to the pipe that may be caused by mechanized pulling equipment.

B. Size the to test the pipeline for a maximum allowable internal deflection of the pipe (in any direction) of not to exceed five (5) percent of the original internal diameter for the pipelines tested, regardless of how long after installation the testing takes place.

C. Deflection testing may be done concurrently with any necessary televising of the sewers. When done concurrently with sewer televising, the mandrel may be pulled by mechanized equipment, provided the mandrel is visible in the television picture during the testing and the operation of the mandrel can be quickly halted before damage to the pipe occurs.

D. Where poor trench soils conditions require the pipe excavation to be undercut and/or over excavated, the Construction Representative reserves the right to require an additional deflection test prior to the expiration of the Contractor's one year performance guarantee.
Remove and replace all pipe that fails to pass the five (5) percent vertical deflection testing until the pipe passes the deflection test.

3.15 LEAKAGE TESTING

A. All new sanitary sewer lines shall be leakage tested in accordance with Chapter 3.7.0 of Standard Specifications for Sewer and Water Construction.

3.16 MANHOLES

A. Contractor shall determine the proper location, size, elevation, and orientation of all pipes entering new manholes before ordering. Do not connect abandoned pipes to new manholes. Manholes having improper location and/or orientation of the pipe connections will be rejected. Field repairs or adjustments of connection points are not permitted.

B. Limit the excavation for manholes so as to provide only the necessary amount of space to sufficiently prepare the subgrade, set the base, set the manhole or structure, and lay pipe. Provide a minimum of 1’ of clearance between structure and trench wall for adequate backfilling and compaction.

C. Where excavation occurs below the bottom elevation of the structure's base, bring the excavation to the required elevation by the use of compacted crushed stone bedding. A minimum of 8 inches of compacted Crushed Stone Bedding shall be placed below manhole base.

D. Set manhole base in accordance with elevation and location as indicated on the plans. Install base plumb and level. Install subsequent pre-cast manhole sections in accordance with shop drawing layout. Provide watertight gaskets between each manhole section.

E. Pour inverts with smooth surface draining to downstream pipe. Where two or more lines meet at an angle, provide curved channel. Slope manhole bench at 2 inches/ft towards flow channel.

F. Manholes shall be provided with between 4” and 8” of adjusting rings, with the top adjusting ring being 2” thick. Provide butyl sealant material between rings. Once rings are in place, tuck point the exterior joint and provide the entire exterior surface of the adjusting ring riser with a coating of mortar.

1. When indicated on the drawings, the manhole frame shall be set with a Type I frame/chimney joint as specified in the Standard Specifications for Sewer and Water

2. Construction in Wisconsin, latest edition. The frame and adjusting rings shall be sealed with an internal rubber sleeve as detailed in File 12A of the Standard Specifications.
3. Drop manholes shall be constructed in accordance with File No. 19 of the Standard Specifications.

3.17 CASTING INSTALLATION

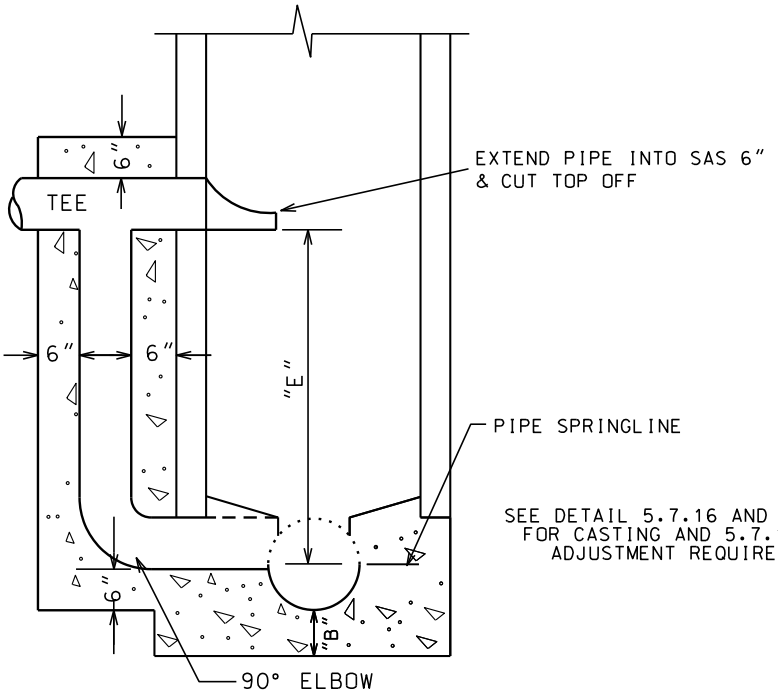
A. Install casting type as indicated on the plans or in the specifications.

B. Provide butyl sealant material between last adjusting ring and casting base. Adjust casting elevation and slope to match adjacent proposed grades.

3.18 CONNECTIONS TO EXISTING STRUCTURES

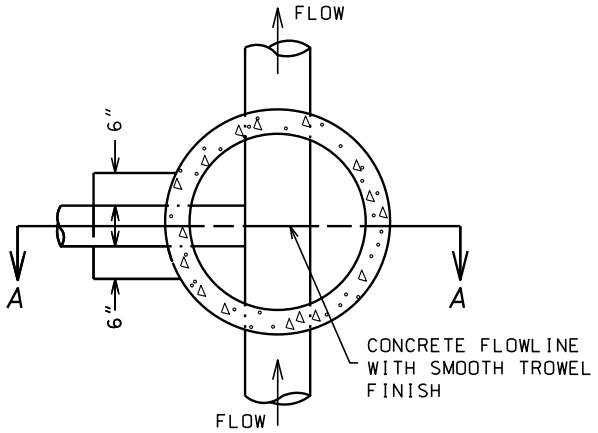
A. Make all necessary openings into existing structures or sewers including the reconstruction of existing inverts or benches, as necessary. Patch all openings permanently watertight with concrete brick and mortar, or hydraulic cement and waterstops, or for sanitary sewers, hydraulic cement and flexible watertight boots.

END OF SECTION

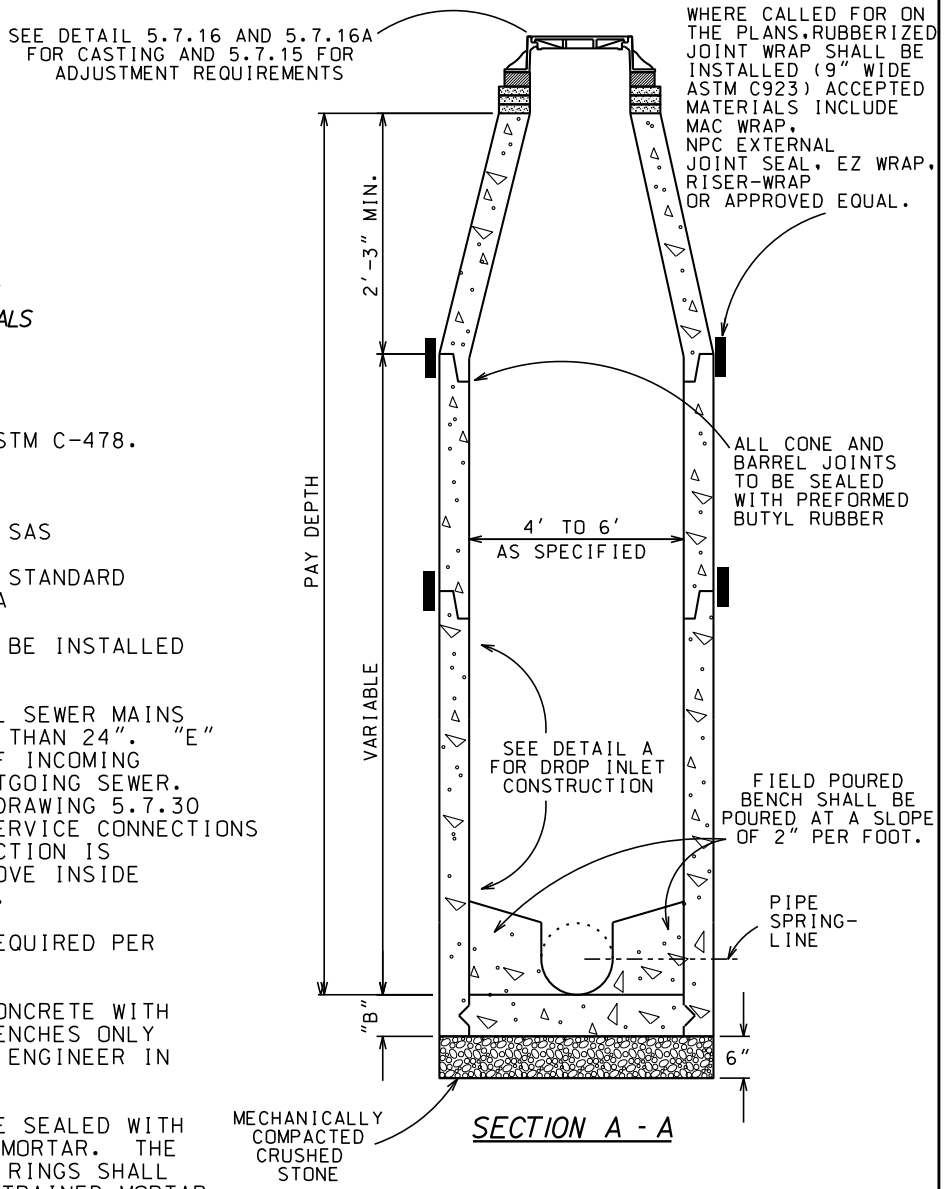


DETAIL A

SHOWING DROP INLET CONSTRUCTION FOR SANITARY SEWER MAINS & LATERALS



TOP VIEW



SECTION A - A

NOTES:

1) PRECAST S.A.S. SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH ASTM C-478.

2) THICKNESS OF BASE, "B":
   6" MIN. FOR 4' DIAMETER SAS
   8" MIN. FOR 5' AND 6' DIAMETER SAS

3) FOR CASTING DESIGNATION REFER TO STANDARD DETAIL DRAWING 5.7.16 AND 5.7.16A

4) CENTERED (CONCENTRIC) CONE SHALL BE INSTALLED UNLESS OTHERWISE DIRECTED.

5) DROP INLET SHALL BE BUILT FOR ALL SEWER MAINS AND LATERALS WHEN "E" IS GREATER THAN 24". "E" SHOULD BE MEASURED FROM INVERT OF INCOMING PIPE TO THE SPRINGLINE OF THE OUTGOING SEWER. INSIDE DROP PER STANDARD DETAIL DRAWING 5.7.30 MAY BE INSTALLED FOR 4" AND 6" SERVICE CONNECTIONS WHERE OUTSIDE DROP INLET CONSTRUCTION IS INFEASIBLE. ENGINEER SHALL APPROVE INSIDE DROP INLET PRIOR TO INSTALLATION.

6) FLEXIBLE PIPE TO SAS CONNECTOR REQUIRED PER STANDARD DETAIL DRAWING 5.7.31

7) ALL BENCHES TO BE FIELD POURED CONCRETE WITH SMOOTH TROWEL FINISH. PRECAST BENCHES ONLY PERMITTED WITH PRIOR APPROVAL OF ENGINEER IN WRITING.

8) ALL JOINTS BETWEEN RINGS SHALL BE SEALED WITH $\frac{3}{8}$" OF AIR-ENTRAINED TYPE M OR S MORTAR. THE OUTSIDE SURFACE OF THE ADJUSTING RINGS SHALL BE SEALED WITH A $\frac{1}{2}$" THICK AIR-ENTRAINED MORTAR TYPE M OR S SEAL. THE METHOD USED FOR SEALING THE OUTSIDE SURFACE SHALL BE COMPATIBLE WITH THAT USED TO SEAL JOINTS BETWEEN THE RINGS.

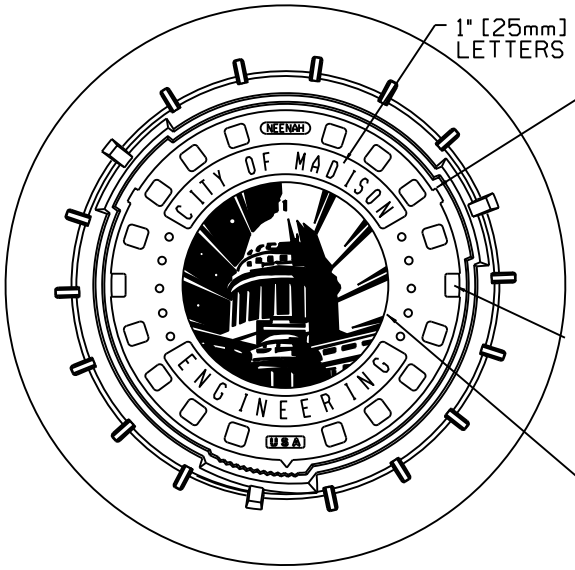
9) PRECAST SANITARY SEWER ACCESS STRUCTURES FOR STREET RECONSTRUCTION PROJECTS AND FOR STREET EXCAVATION PERMITS REQUIRE PRECAST SHOP DRAWING APPROVAL FROM CITY ENGINEERING. PRIOR TO BEING FABRICATED BY THE MANUFACTURER NO PRECAST SHOP DRAWINGS ARE REQUIRED FOR NEW CONSTRUCTION IN SUBDIVISION DEVELOPMENTS.

2015

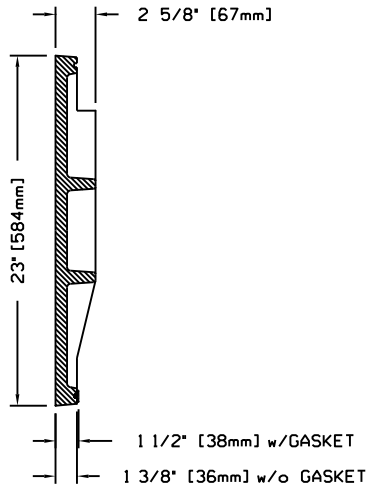
CITY OF MADISON
ENGINEERING DIVISION

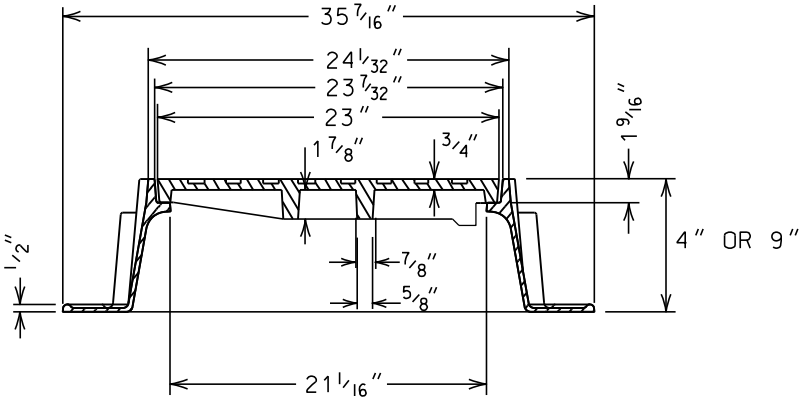
SANITARY SEWER PRECAST SAS

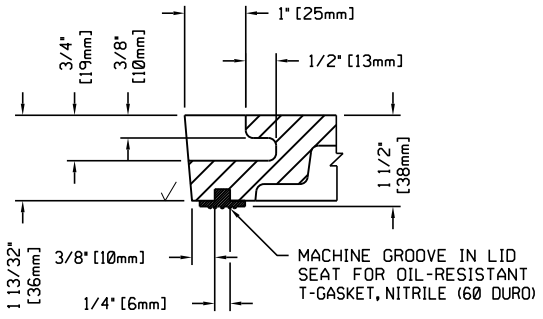
STANDARD DETAIL DRAWING 5.7.2



LOGO DETAIL







T-SEAL GASKET / CONCEALED PICK DETAIL

NOTES:

APPROXIMATE TOTAL WEIGHTS:
R-1550 R-1050 FRAME w/ LOGO LID 1550-0054, 9" FRAME AND LID = 240 LBS.
R-1689 FRAME w/ LOGO LID 1550-0054, 4" FRAME AND LID = 279 LBS.

IF LOCKABLE LID IS NECESSARY, R-1916 C, 83/4" FRAME AND LID = 300 LBS
THERE IS NO CITY OF MADISON LOGO LID AVAILABLE FOR THIS FRAME AND CASTING.

THE FOLLOWING NEENAH FOUNDRY CASTINGS (OR EQUAL CASTINGS) SHALL BE ACCEPTABLE:

1. R-1050, 9" NON-ROCKING ACCESS STRUCTURE FRAME.
2. R-1689, 4" NON-ROCKING ACCESS STRUCTURE FRAME (WHEN REQUESTED BY THE CITY CONSTRUCTION ENGINEER).
3. R-1916 C LOGO WITH A LOCKING CASTING AS WELL AS A LOCKING FRAME. THIS CASTING SHALL BE USED IN GREENWAYS AND EASEMENTS (SEE SDD 5.7.16a)

1. FRAME AND COVER SHALL BE MACHINED AND FITTED SO THAT ROCKING AND CHATTERING WILL BE ELIMINATED.
2. ALL LIDS SHALL BE SELF-SEALING EXCEPT FOR STORM SEWER.
3. ALL LIDS SHALL HAVE CITY OF MADISON LOGO AS SHOWN IN DETAIL (R-1050-0054 OR EQUIV.)

LID NOTES: ALL DIMENSIONS SHOWN ARE IN ENGLISH AND [METRIC]
MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 40A

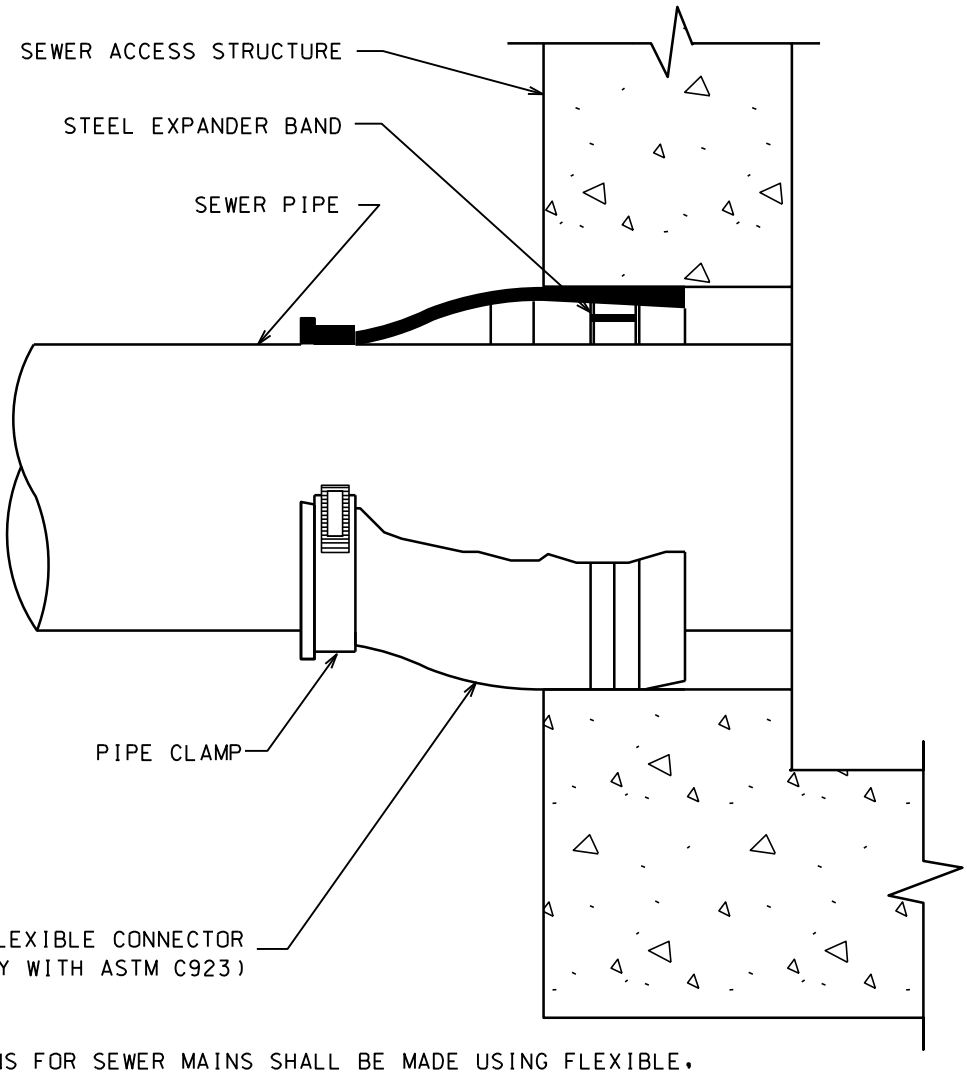
2015

CITY OF MADISON
ENGINEERING DIVISION

SAS FRAME & COVER

STANDARD DETAIL DRAWING 5.7.16

5.7.16



NOTES:

1. S.A.S. CONNECTIONS FOR SEWER MAINS SHALL BE MADE USING FLEXIBLE, WATERTIGHT CONNECTIONS SUCH AS KOR-N-SEAL I OR APPROVED EQUAL, UNLESS DIRECTED OTHERWISE BY ENGINEER.

2. ALL STAINLESS STEEL ELEMENTS OF CONNECTOR SHALL BE TOTALLY NON-MAGNETIC SERIES 304 STAINLESS, EXCLUDING THE WORM SCREW FOR TIGHTENING THE STEEL BAND AROUND THE PIPE WHICH SHALL BE SERIES 305 STAINLESS. THE WORM SCREW FOR TIGHTENING THE STEEL BAND SHALL BE TORQUED BY A BREAK-AWAY TORQUE WRENCH AVAILABLE FOR THE PRECAST S.A.S SUPPLIER AND SET FOR 60 - 70 INCH/LBS.

3. THE CONNECTOR SHALL BE INSTALLED IN THE S.A.S. WALL BY ACTIVATING THE EXPANDING MECHANISM IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE CONNECTOR MANUFACTURER.

4. THE CONNECTOR SHALL BE OF A SIZE SPECIFICALLY DESIGNED FOR THE PIPE MATERIAL AND SIZE BEING UTILIZED ON THE PROJECT.

5. ALL COSTS SHALL BE CONSIDERED INCIDENTAL TO THE S.A.S. AND/OR PIPE. THE ENGINEER RESERVES THE RIGHT TO REQUIRE A "CONCRETE ENCASEMENT" CONNECTION AT NO ADDITIONAL EXPENSE IN THE EVENT OF DESIGN CHANGE.

6. FLEXIBLE, WATERTIGHT CONNECTIONS SHALL ALSO BE USED AS REQUIRED FOR STORM SEWER CONNECTIONS.

2016

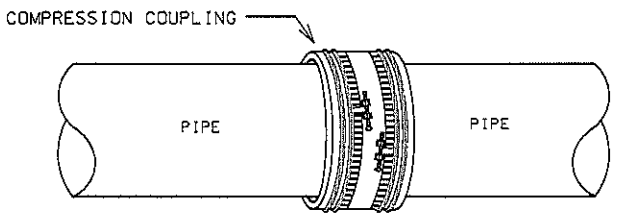
CITY OF MADISON
ENGINEERING DIVISION

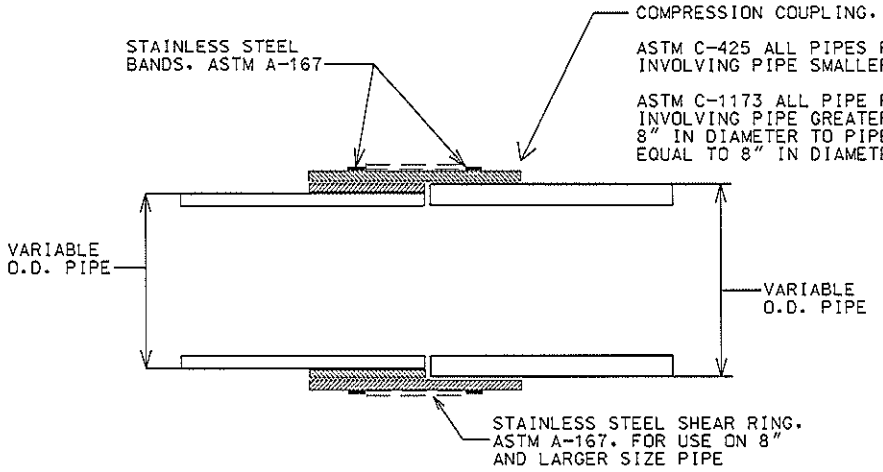
FLEXIBLE PIPE TO S.A.S. CONNECTOR

STANDARD DETAIL DRAWING 5.7.31

COMPRESSION COUPLING

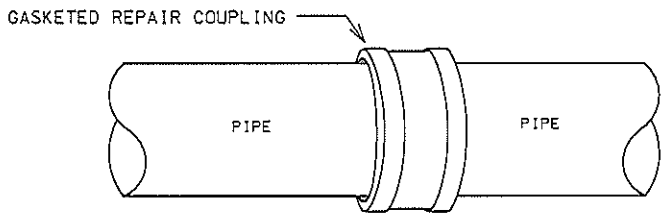
PIPES WITH DIFFERENT MATERIAL TYPES
PIPES WITH DIFFERENT OUTSIDE DIAMETERS

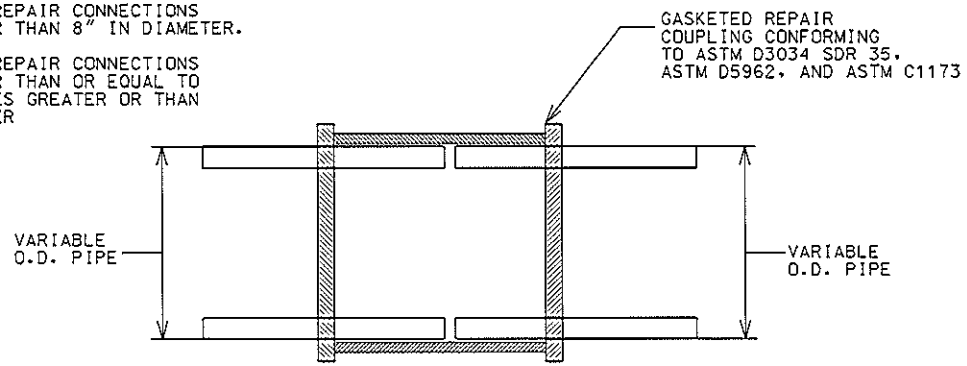




GASKETED REPAIR COUPLING

PVC TO PVC CONNECTION





ALL REPAIRS INVOLVING PIPE CONNECTIONS 8" IN DIAMETER TO 8" IN DIAMETER OR LARGER SHALL UTILIZE THE FERNCO RC STRONGBACK OR EQUIVALENT REPAIR COUPLING. (ASTM C1173).

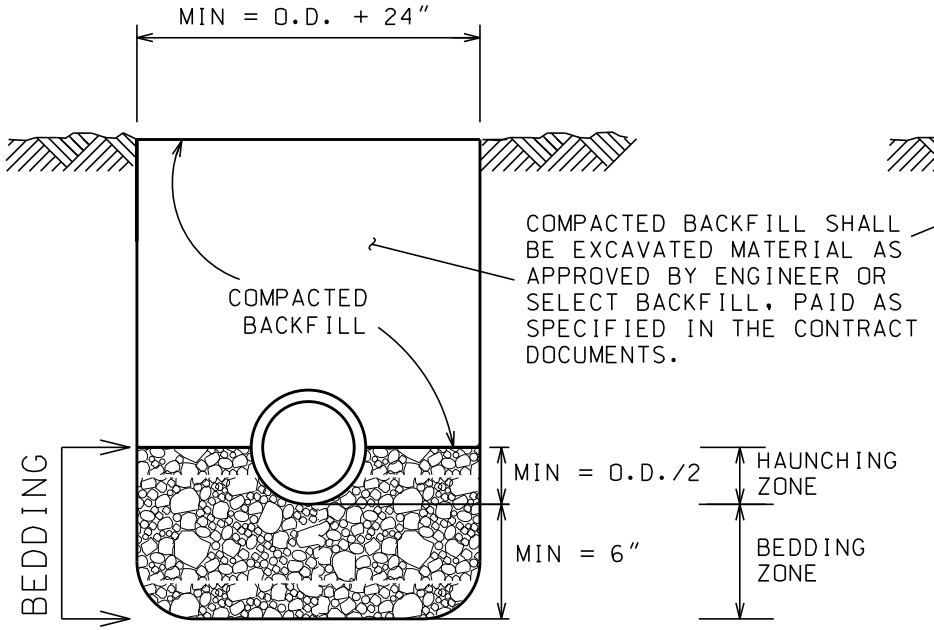
2012

CITY OF MADISON
ENGINEERING DIVISION

COUPLING DETAILS

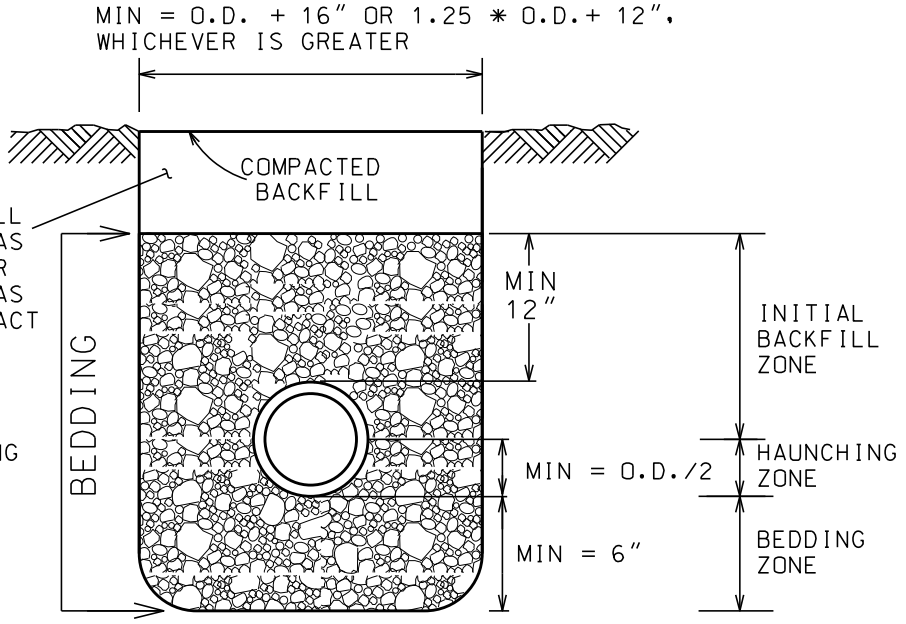
STANDARD DETAIL DRAWING 5.3.3

5.3.3



WASHED GRAVEL OR CRUSHED STONE AS SPECIFIED IN SECTION 502.1 (d), BEDDING OF SEWER PIPES

BEDDING FOR REINFORCED CONCRETE SEWER PIPES



WASHED GRAVEL, CRUSHED STONE, SAND OR LIMESTONE SCREENINGS FOR PIPE SIZES 10" IN DIAMETER OR LESS. WASHED GRAVEL OR CRUSHED STONE FOR PIPE SIZES OVER 10" IN DIAMETER. AS SPECIFIED IN SECTION 502.1 (d), BEDDING OF SEWER PIPES

BEDDING FOR SANITARY PIPE

NOTES:

UNLESS OTHERWISE SPECIFIED, ALL SANITARY PIPES, INCLUDING LATERALS AND LEADS, SHALL BE INSTALLED WITH THE TYPE OF BEDDING SHOWN FOR THE TYPE AND SIZE OF PIPE INSTALLED.

THE COSTS OF BEDDING SHALL BE INCLUDED IN THE UNIT PRICES BID FOR THE PIPE.
FOR RCP, BEDDING INCLUDES THE HAUNCHING & BEDDING ZONES.
FOR PLASTIC PIPES, THE BEDDING INCLUDES THE HAUNCHING, BEDDING & INITIAL BACKFILL ZONES.
THE BEDDING SHALL BE INSTALLED & COMPACTED IN 6" MAXIMUM LIFTS.

ALL TRENCHES SHALL BE HAND BACKFILLED TO A POINT 12" ABOVE THE TOP OF THE PIPE. ALL BEDDING SHALL BE MECHANICALLY COMPACTED.

PAYMENT SHALL NOT BE MADE FOR BACKFILL WITH EXCAVATED MATERIAL, IF APPROVED. SELECT FILL, IF REQUIRED, SHALL BE PAID PER CONTRACT.

THE MAXIMUM ALLOWABLE TRENCH WIDTH SHALL BE 3 * O.D., THE MINIMUM TRENCH WIDTH AS SPECIFIED, AND SHALL APPLY FROM THE BOTTOM OF THE TRENCH TO A POINT 12" ABOVE THE TOP OF THE PIPE. WHERE THIS WIDTH IS EXCEEDED, THE CONTRACTOR SHALL FURNISH AND INSTALL A HIGHER TYPE OF BEDDING AT **NO EXTRA COST.** THE TYPE OF BEDDING SHALL BE DETERMINED BY THE ENGINEER.

O.D. EQUALS THE OUTSIDE DIAMETER OF THE PIPE.

DRAWING NOT TO SCALE

2016

CITY OF MADISON
ENGINEERING DIVISION

PIPE BEDDING AND BACKFILL

STANDARD DETAIL DRAWING 5.2.1