PROJECT MANUAL

UNLV SOUTH COMPLEX RENOVATION

UNLV PROJECT # CAM 1703 / PC-6234

February 20, 2017

4505 MARYLAND PARKWAY
LAS VEGAS, Nevada

SH Architecture
7250 Peak Drive, #216
Las Vegas, Nevada 89128

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INSTRUCTIONS TO BIDDERS

BID DOCUMENTS AND CONTRACT DOCUMENTS

1.01 AVAILABILITY

A. Bid Documents are only available to general contract bidders.

B. Bid Documents may be obtained at the office of Owner .

C. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

1.02 EXAMINATION

A. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.

B. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

1.03 INQUIRIES/ADDENDA

A. Direct questions to JoJo Ruiz, email: jruiz@s-architecture.com.

B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.

C. Verbal answers are not binding on any party.

D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply may be in the form of an Addendum, a copy of which will be forwarded to known plan holders .

1.04 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

A. Where the Bid Documents stipulate a particular product, pre-bid substitutions will be considered up to 10 days before receipt of bids.

B. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request.
   1. Attach a description of changes to the Contract Documents that the proposed substitution will require for proper installation. Include product description, specifications, drawings, photographs, and performance data.

C. When a request to substitute a product is made, Architect may approve the substitution and will issue an Addendum to known bidders.

QUALIFICATIONS

BID ENCLOSURES/REQUIREMENTS

3.01 ADDITIONAL BID INFORMATION

A. Submit the following Supplements concurrent with bid submission:
   1. Document 00 4322 - Unit Prices Form: Include a listing of unit prices specifically requested by the Contract Documents.
   2. Document 00 4323 - Alternates Form: Include the cost variation to the Bid Amount applicable to the Work described in Section 01 2300 - Alternates.
   3. Document 00 4327 - Separate Prices Break-Out Form: Include a listing of separate prices as specifically requested in the Contract Documents.

END OF SECTION

SECTION 00 3100
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of the Contract Documents, as follows:

B. Roofing Inspection Reports by Eberhard Southwest Roofing, Inc., dated March 10, 2016.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

Eberhard SOUTHWEST ROOFING, INC.

ROOF INSPECTION REPORT

Gym Road S. Resident Services Bldg. (RHW)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

1994 20 Years of Excellence 2014 EBERHARD SOUTHWEST ROOFING, INC. LAS VEGAS, NV

Eberhard SOUTHWEST ROOFING, INC.

March 10, 2016

UNLV
4505 S. Maryland Parkway
Las Vegas, Nevada 89154
Attn: Kim Nichols

Re: Gym Road S. Resident Services Bldg (RHW) – Roof Inspection Report

Dear Kim,

ROOF INSPECTION REPORT

BUILDING DESIGNATION(s):

Bldg	Address	Approx. SF	Roof Age	Roof Condition
RHW	Gym Services S. Resident Services Bldg	4,053	20+	fair

EXISTING ROOF ASSEMBLY:

Flat Roof -
Hot asphalt built-up roofing with mineral cap sheet surfacing.

Wall Flashing -
Cap sheet roofing approx. 1', and terminated with metal counterflashing.

OVERALL ROOF CONDITION: Fair

ESTIMATED LIFE EXPECTANCY: These buildings are believed to have been installed more than 20 years ago.

NOTE: The information contained in this report is based on visual observations only. No warranty is made or implied as to the condition or life span of the roof.

(continued)

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Eberhard SOUTHWEST ROOFING, INC.

VISUAL OBSERVATIONS

Gym Road S. Resident Services Bldg. (RHW)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
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Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Gym Road S. Resident Services Bldg (RHW)
Inspection Date: 2/16/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS:

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

PROPERTY: Gym Road S. Resident Services Bldg (RHW)
Inspection Date: 2/16/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS

Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Gym Road S. Resident Services Bldg (RHW)
Repair Date: 3/3/2016

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Roof service removing debris and at drains.

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Service at scuppers and at pitch pans.

Eberhard SOUTHWEST ROOFING, INC.

CONCLUSIONS:

1. There was a lot of debris from surrounding trees.
2. The stucco at top of parapet walls is damaged from pigeons.
3. These roofs are believed to have been installed more than 20 years ago.
4. These roofs should remain in a serviceable condition but will soon need an entire roof replacement.
5. We recommend ongoing maintenance to extend the life of these roofs.

Thank you for calling Eberhard Southwest Roofing. Please call me at 873-2212 with any questions regarding this report.

Sincerely,

Hector Barrera

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

Eberhard SOUTHWEST ROOFING, INC.

ROOF INSPECTION REPORT

Kitty Rodman Residence Hall (KRH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
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Eberhard SOUTHWEST ROOFING, INC.

March 10, 2016

UNLV
4505 S. Maryland Parkway
Las Vegas, Nevada 89154
Attn: Kim Nichols

Re: Kitty Rodman Residence Hall (KRH) – Roof Inspection Report

Dear Kim,

ROOF INSPECTION REPORT

BUILDING DESIGNATION(s):

Bldg	Address	Approx. SF	Roof Age	Roof Condition
KRH	Kitty Rodman Residence Hall.	8,249	20+	fair

EXISTING ROOF ASSEMBLY:

Flat Roof -
Hot asphalt built-up roofing with mineral cap sheet surfacing.

Wall Flashing -
Cap sheet roofing approx. 1', and terminated with metal counterflashing.

OVERALL ROOF CONDITION: Fair

ESTIMATED LIFE EXPECTANCY: These buildings are believed to have been installed more than 20 years ago.

NOTE: The information contained in this report is based on visual observations only. No warranty is made or implied as to the condition or life span of the roof.

(continued)

Eberhard SOUTHWEST ROOFING, INC.

VISUAL OBSERVATIONS

Kitty Rodman Residence Hall (KRH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

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Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Kitty Rodman Residence Hall (KRH)
Inspection Date: 1/22/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS:

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Kitty Rodman Residence Hall (KRH)
Inspection Date: 1/22/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
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Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Kitty Rodman Residence Hall (KRH)
Repair Date: 1/25/2016

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Roof service at existing drooping wall flashings and at drains.

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Service at drains and pipe flashings.

Eberhard SOUTHWEST ROOFING, INC.

CONCLUSIONS:

1. Wall flashings were coming off and all the pipe penetrations were cracked.
2. The protective granule surface layer is deteriorating.
3. These roofs are believed to have been installed more than 20 years ago.
4. These roofs should remain in a serviceable condition but will soon need an entire roof replacement.
5. We recommend ongoing maintenance to extend the life of these roofs.

Thank you for calling Eberhard Southwest Roofing. Please call me at 873-2212 with any questions regarding this report.

Sincerely,

Hector Barrera

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

Eberhard SOUTHWEST ROOFING, INC.

ROOF INSPECTION REPORT

William Boyd Residence Hall (WBH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

1994 20 Years of Excellence 2014

Eberhard SOUTHWEST ROOFING, INC.

March 10, 2016

UNLV
4505 S. Maryland Parkway
Las Vegas, Nevada 89154
Attn: Kim Nichols

Re: William Boyd Residence Hall (WBH) – Roof Inspection Report

Dear Kim,

ROOF INSPECTION REPORT

BUILDING DESIGNATION(s):

Bldg	Address	Approx. SF	Roof Age	Roof Condition
WBH	Student Affairs Maintenance	10,414	20+	Poor

EXISTING ROOF ASSEMBLY:

Flat Roof -
Hot asphalt built-up roofing with mineral cap sheet surfacing.

Wall Flashing -
Cap sheet roofing approx. 1', and terminated with metal counterflashing.

OVERALL ROOF CONDITION: Fair

ESTIMATED LIFE EXPECTANCY: These buildings are believed to have been installed more than 20 years ago.

NOTE: The information contained in this report is based on visual observations only. No warranty is made or implied as to the condition or life span of the roof.

(continued)

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Eberhard SOUTHWEST ROOFING, INC.

VISUAL OBSERVATIONS

William Boyd Residence Hall (WBH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
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Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: William Boyd Residence Hall (WBH)
Inspection Date: 1/22/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: Poor

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS:

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ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS

Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: William Boyd Residence Hall (WBH)
Repair Date: 1/29/2016

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Roof service at drains, pipe penetrations & wall flashings.

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Service at field area seams and at caulk joints of stucco.

Eberhard SOUTHWEST ROOFING, INC.

CONCLUSIONS:

1. This roof has lost a lot of its protective surface granules leaving the fiberglass exposed.
2. Wall flashings were failing and completely separated from parapet wall.
3. These roofs should remain in a serviceable condition but will soon need an entire roof replacement.
4. We recommend ongoing maintenance to extend the life of these roofs.

Thank you for calling Eberhard Southwest Roofing. Please call me at 873-2212 with any questions regarding this report.

Sincerely,

Hector Barrera

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

Eberhard SOUTHWEST ROOFING, INC.

ROOF INSPECTION REPORT

Claudine Williams Residence Hall (CWH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
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Eberhard SOUTHWEST ROOFING, INC.

March 10, 2016

UNLV
4505 S. Maryland Parkway
Las Vegas, Nevada 89154
Attn: Kim Nichols

Re: Claudine Williams Residence Hall (CWH) – Roof Inspection Report

Dear Kim,

ROOF INSPECTION REPORT

BUILDING DESIGNATION(s):

Bldg	Address	Approx. SF	Roof Age	Roof Condition
CWH	Claudine Williams Residence Hall	8,766	20+	fair

EXISTING ROOF ASSEMBLY:

Flat Roof -
Hot asphalt built-up roofing with mineral cap sheet surfacing.

Wall Flashing -
Cap sheet roofing approx. 1', and terminated with metal counterflashing.

OVERALL ROOF CONDITION: Fair

ESTIMATED LIFE EXPECTANCY: These buildings are believed to have been installed more than 20 years ago.

NOTE: The information contained in this report is based on visual observations only. No warranty is made or implied as to the condition or life span of the roof.

(continued)

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Eberhard SOUTHWEST ROOFING, INC.

VISUAL OBSERVATIONS

Claudine Williams Residence Hall (CWH)

Las Vegas, NV

Prepared for UNLV Facilities Management
March 10, 2016

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Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Claudine Williams Residence Hall (CWH)
Inspection Date: 1/22/2016

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS:

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

ROOF TYPE: Built Up Roof
OVERALL ROOF CONDITION: FAIR

Note: Below are shown some typical conditions found on this roof.

VISUAL OBSERVATIONS

Eberhard SOUTHWEST ROOFING, INC.

PROPERTY: Claudine Williams Residence Hall (CWH)
Repair Date: 1/25/2016

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Roof service at drains and pipe penetrations.

3995 W. Dewey Dr., Las Vegas, NV 89118
Tel (702) 873-2212 • Fax (702) 873-8330 • Lic. #39099
www.eberhardco.com

1994 20 Years of Excellence 2014 EBERHARD SOUTHWEST ROOFING, INC. LAS VEGAS, NV

PICTURES SHOWING TYPICAL REPAIRS

VISUAL OBSERVATIONS

Service at field area seams and at caulk joints of stucco.

Eberhard SOUTHWEST ROOFING, INC.

CONCLUSIONS:

1. This roof appears to be the original roof.
2. All of the plastic cement work needed to be resealed and recoated.
3. All of the debris was removed and the drains were resealed.
4. This roof will need to get an entire roof replacement soon.
5. Past repair and maintenance work has helped extend the life of these roofs.
6. These roofs should remain in a serviceable condition and will soon need a roof replacement.
7. We recommend ongoing maintenance to extend the life of these roofs.

Thank you for calling Eberhard Southwest Roofing. Please call me at 873-2212 with any questions regarding this report.

Sincerely,

Hector Barrera

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SECTION 00 4322

UNIT PRICES FORM

PARTICULARS

1.01 THE FOLLOWING IS THE LIST OF UNIT PRICES REFERENCED IN THE BID SUBMITTED BY:

1.02 (BIDDER) _____

1.03 DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

UNIT PRICE LIST

	ITEM DESCRIPTION	UNIT QUANTITY	UNIT VALUE	TOTAL
2.02	CONCRETE FLOOR SURFACE REPAIR	4,500 SF	_____	_____

END OF UNIT PRICES FORM

SECTION 00 4327

SEPARATE PRICES BREAK-OUT FORM

PARTICULARS

THE FOLLOWING IS THE LIST OF SEPARATE PRICES REFERENCED IN THE BID SUBMITTED BY:

(BIDDER) _____

DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

ITEM DESCRIPTIONS

5.01 ITEM # 1:

A. Description: _____

B. Value: $ _____

END OF SEPARATE PRICES BREAK-OUT FORM

SECTION 00 5000

CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Post-Award Certificates and Other Forms:
   1. Affidavit of Payment Form: AIA G706.
   2. Stored Material Form: CSI Form 2.5A.

C. Clarification and Modification Forms:
   1. Request for Interpretation Form: CSI form 13.2a, AIA G716 or other standard form approved by Architect.
   2. Substitution Request Form (During Construction): CSI Form 13.1A.
   3. Request for Proposal Form: AIA Form G709 Work Changes Proposal Request.
   4. Proposal Worksheet Summary Form: CSI Form 13.6D.
   5. Proposal Worksheet Detail Form: CSI Form 13.6C.
   6. Change Order Request Form (Proposal): CSI Form 13.6A.
   7. Nonconforming Work Notice: CSI Form 9.8A.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.01 ENVIRONMENTAL GOALS

A. General: The Architect has incorporated Sustainable design principles into the project and the contract documents as specified and as follows:
   1. Enhancing indoor environmental quality. As specified and as follows:
      a. Low-Emitting Materials, Adhesives & Sealants.
      b. Low-Emitting Materials, Paints & Coatings.
      c. Low-Emitting Materials, Flooring Systems.
      d. Construction IAQ Management Plan, During Construction.
   2. Reducing the environmental impact of materials. As specified and as follows:
      a. Construction Waste Management.
      b. Optimize Use of Indoor Air Quality Compliant Products.
      c. Recycled Content Products.
      d. Regional Materials.

1.02 INDEPENDENT ENVIROMENTAL VERIFICATION

A. No independent verification is required. The Architect has incorporated Sustainable design principles into the project and the contract documents as specified. The Contractor is required to comply with these requirements through selection and installation of products (materials and equipment) and as specified in the contract documents.

1.03 OWNER OCCUPANCY

A. Owner intends to continue to occupy portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Owner intends to occupy a certain portion of the Project prior to the completion date for the conduct of normal operations.

D. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

E. Schedule the Work to accommodate Owner occupancy.

1.04 CONTRACTOR USE OF SITE AND PREMISES

A. Arrange use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Owner.

B. Provide access to and from site as required by law and by Owner:
   1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
   2. Do not obstruct roadways, sidewalks, or other public ways without permission.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Change procedures.

1.02 RELATED REQUIREMENTS

A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

1.03 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

B. Forms filled out by hand will not be accepted.

C. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section.

E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

B. Forms filled out by hand will not be accepted.

C. Execute certification by signature of authorized officer.

D. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

E. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

F. Include the following with the application:
   1. Construction progress schedule, revised and current as specified in Section 01 3000.
   2. Conditional lien release upon payment Subcontractors and vendors.
   3. Unconditional lien release for previous payments.
   4. Affidavits attesting to off-site stored products.

1.05 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change . Contractor shall prepare and submit a fixed price quotation within 14 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for

the change, and the effect on the Contract Sum and Contract Time with full documentation . Document any requested substitutions in accordance with Section 01 6000.

1. Provide a substantiation of cost utilizing CSI form 13.6a, Change Order Request (Proposal).
2. Provide a proposal worksheet summary utilizing CSI Form 13.6d, Proposal Worksheet Summary.
3. Provide a detailed worksheet utilizing CSI Form 13.6c, Proposal Worksheet Detail.

E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

I. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 7000.
2. Final Inspections have been completed and all punch list items are complete..

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200

UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

C. Defect assessment and non-payment for rejected work.

1.02 COSTS INCLUDED

A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.04 MEASUREMENT OF QUANTITIES

A. Take all measurements and compute quantities. Measurements and quantities will be verified by Owner.

B. Assist by providing necessary equipment, workers, and survey personnel as required.

C. Measurement by Area: Measured by square dimension using mean length and width or radius.

D. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

E. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.05 PAYMENT

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

B. Payment will not be made for any of the following:
   1. Products wasted or disposed of in a manner that is not acceptable.
   2. Products determined as unacceptable before or after placement.
   3. Products not completely unloaded from the transporting vehicle.
   4. Products placed beyond the lines and levels of the required Work.
   5. Products remaining on hand after completion of the Work.
   6. Loading, hauling, and disposing of rejected Products.

1.06 DEFECT ASSESSMENT

A. Replace Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct one of the following remedies:
   1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Owner.
   2. The defective Work will be partially repaired to the instructions of the Owner, and the unit price will be adjusted to a new unit price at the discretion of Owner.

1.07 SCHEDULE OF UNIT PRICES

A. Item: Concrete Floor Surface Repair; Section 03 0100 - Maintenance of Concrete.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittals.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Construction progress schedule.

F. Submittals for review, information, and project closeout.

G. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01 3117 - Request for Interpretation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTALS

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via email or uploaded to the Architect via Newforma® Project Center.

1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, and any other document any participant wishes to make part of the project record.
2. It is Contractor's responsibility to submit documents in PDF format.
3. Users of Newforma® Project Center need an email address, Internet access, and PDF review software (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com).
4. Paper document transmittals will not be reviewed.
5. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

3.02 PRECONSTRUCTION MEETING

A. Schedule meeting after Notice of Award.

B. Attendance Required:

1. Owner.
2. Architect.
3. Contractor.

C. Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract and Architect.
6. Communication and Correspondence requirements.
7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Claims for delays.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

A. Schedule meeting at the Project site prior to Contractor occupancy.

B. Site Mobilization Meeting may be combined with the Preconstruction Meeting.

C. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

D. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner's requirements and occupancy prior to completion.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   6. Security and housekeeping procedures.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   10. Procedures for maintaining record documents.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

A. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216

A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

3.06 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below .

3.07 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. IAQ Management Plan.
   6. Final Summary Of Solid Waste Disposal And Diversion.
   7. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specifications sections; samples will be returned to Contractor.
   1. Contractor to maintain one record copy of returned samples on-site.

3.10 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 3117

CONTRACTOR REQUEST FOR INTERPRETATION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Administrative requirements for Request for Interpretation.

1.02 RELATED SECTIONS

A. Section 01 3000 Administrative Requirements:

1.03 DEFINITIONS

A. Request for interpretation: A document submitted by the Contractor requesting Interpretation or clarification of a portion of the Contract Documents that is required to properly perform the work, hereinafter referred to as RFI.
   1. Request shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect. In the RFI form the Contractor shall set forth their own interpretation or understanding of the requirement along with reasons why they have reached such an understanding. The Architect will review all RFI's to determine whether the RFI is within the meaning of this term.

B. Proper RFI's:
   1. A properly prepared Request for Interpretation shall include a detailed written statement that indicates the specific drawing or specification section in need of clarification and the nature of the clarification requested.
      a. Drawing(s) shall be identified by drawing number and location on the drawing sheet.
      b. Specification shall be identified by section number, page and paragraph.

C. Improper RFI's:
   1. RFI's that are not properly prepared.
   2. Improper RFI's will incur additional processing expenses to the Architect.

D. Frivolous RFI's:
   1. Frivolous RFI's are RFI's that request interpretation that is clearly shown on the Contract Documents.
   2. Frivolous RFI's may be returned unanswered or may be processed by the Architect at standard hourly rates.

1.04 ADDITIONAL SERVICES

A. Improper RFI's and Frivolous RFI's: The Architect may charge the Owner for additional services at the Architect's standard hourly rate for the additional processing expenses incurred from Improper and Frivolous RFI's. Such cost will be deducted from monies still due the Contractor.
   1. The Contractor will be notified in writting by the Architect prior to the processing of Improper and Frivolous RFI's.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTRACTOR'S REQUEST FOR INTERPRETATION

A. When the Contractor is unable to determine from the Contract Documents the material or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item.
   1. Wherever possible, such clarification shall be requested at the next appropriate project meeting, with the response entered into the meeting minutes. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect.

2. If clarification of an item is required of a document known to have been prepared by a consultant the Architect, the Contractor may NOT direct the RFI directly to the consultant. Each RFI shall be processed through the Architect.

B. RFI's shall be submitted electronically on CSI form 13.2a - Request for Interpretation or similar form approved by Architect.
   1. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after photo copying or transmission by email.
   2. RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
   3. Each page or attachments to RFI's shall bear the RFI number and shall be consecutively numbered in chronological order.

C. RFI's shall be originated by the Contractor.
   1. RFI's from subcontractor's or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect utilizing the proper form.
      a. Pass through RFI's from subcontractors will be considered an Improper RFI.
   2. RFI's sent by a subcontractor or material supplier directly to the Owner, Owner's Representative, Architect or the Architect's consultants shall not be accepted and will be returned unanswered.

D. RFI's issued to request clarification of coordination issues, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.

E. RFI's shall not be used for the following purposes:
   1. To request approval of products.
   2. To request approval of substitutions.
   3. To request changes which entail additional cost or credits to the contract sum.
   4. To request methods of performing work.

F. The Contractor shall prepare and maintain a log of RFI's for review at Progress Meetings. The Contractor shall note unanswered RFI's in the log.

3.02 ARCHITECT'S RESPONSE TO RFI'S

A. Contractor shall allow time for the Architect's review and response for RFI's as stated in the Conditions of the Contract, after receipt at Architect's office, however, the Architect will endeavor to respond in a timely manner. If additional time is required beyond the days stated in the Conditions of the Contract, the Architect shall notify the Contractor in writting.
   1. RFI's shall NOT state requested or required date/time for response, however, the RFI should be identified as urgent if the critical path schedule is affected.
   2. The Contractor shall endeavor to foresee and coordinate all future work activities to avoid schedule delays as a result of RFI processing.
   3. Lack of foresight or coordination resulting in urgent RFI's will not be grounds for changes in Contract Time.

B. Architect will respond to properly prepared RFI's in one of the following manners:
   1. Directly upon the RFI form or attachments;
   2. or Supplemental Information Form;
   3. or Sketches.

C. The Architect may opt to retain RFI's for discussion during regularly scheduled project meetings for inclusion of responses in meeting minutes in lieu of responding in written form. Responses shall be recorded in the meeting minutes and reflected in the Contractor's RFI log.

D. Responses from the Architect will not change any requirement of the Contract Documents unless so noted by the Architect in the response to the RFI. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Architect within 14 days of Architect's response stating that the Contractor considers the response to be a Change Order. Failure to give complete written notice shall waive the Contractor's right to seek additional time or cost.

END OF SECTION

SECTION 01 3216

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

C. Recovery Schedules.

1.02 RECOVERY SCHEDULES

A. If a Monthly Schedule Update indicates the progress of the work is deemed unsatisfactory in accordance with the Conditions of the Contract, the Contractor shall prepare a Proposed Recovery Schedule demonstrating Contractor's plan to regain the time lost. The Recovery Schedule shall be submitted either in advance of or concurrent with the Monthly Schedule Update and Contractor's progress request. Both the Monthly Schedule Update and the Proposed Recovery Schedule shall be based on the same percentages of completion and actual completion date accepted by the Owner.

B. The Proposed Recovery Schedule shall be based on a copy of the Monthly Schedule Update for the calendar month during which the progress is deemed unsatisfactory.

C. The Proposed Recovery Schedule shall include a narrative that identifies the causes of the delay on the critical path and provides Contractor’s proposed corrective action to ensure timely completion of all Milestones and the Substantial Completion Date. Contractor’s corrective actions shall include but are not limited to increasing concurrent operations, increasing labor, adding multiple shifts in a 24-hour period, and adding overtime.

D. Contractor’s progress payment may not be processed until the Owner accepts the Proposed Recovery Schedule. Following such an acceptance, the Proposed Recovery Schedule will be known as the Recovery Schedule and future Work will be performed by the Contractor in accordance with it.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a preliminary network diagram.

3.02 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

D. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes. Include scheduled for owner-furnished products and products identified under Allowances, if any.

E. Indicate delivery dates for owner-furnished products and products identified under Allowances, if any.

F. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.

G. Provide legend for symbols and abbreviations used.

3.03 NETWORK ANALYSIS

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 15 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Percentage of activity completed.
   13. Responsibility.

D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

E. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.

3.04 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 3329.07

PROHIBITED CONTENT INSTALLER CERTIFICATION

PROJECT NAME: UNLV SOUTH COMPLEX RENOVATION; NO.: 160181.

USE OF THIS FORM

BECAUSE INSTALLERS ARE ALLOWED AND DIRECTED TO CHOOSE ACCESSORY MATERIALS SUITABLE FOR THE APPLICABLE INSTALLATION, THERE IS A POSSIBILITY THAT SUCH ACCESSORY MATERIALS MIGHT CONTAIN VOC CONTENT IN EXCESS OF THAT PERMITTED, ESPECIALLY WHERE SUCH MATERIALS HAVE NOT BEEN EXPLICITLY SPECIFIED.

CONTRACTOR IS REQUIRED TO OBTAIN AND SUBMIT THIS FORM FROM EACH INSTALLER OF WORK ON THIS PROJECT.

FOR EACH PRODUCT CATEGORY LISTED, CIRCLE THE CORRECT WORDS IN BRACKETS: EITHER [HAS] OR [HAS NOT].

IF ANY OF THESE ACCESSORY MATERIALS HAS BEEN USED, ATTACH TO THIS FORM PRODUCT DATA AND MSDS SHEET FOR EACH SUCH PRODUCT.

VOC CONTENT RESTRICTIONS ARE SPECIFIED IN SECTION 01 6116.

PRODUCT CERTIFICATION

I CERTIFY THAT THE INSTALLATION WORK OF MY FIRM ON THIS PROJECT:

A. [HAS] [HAS NOT] required the use of ADHESIVES.

B. [HAS] [HAS NOT] required the use of JOINT SEALANTS.

C. [HAS] [HAS NOT] required the use of PAINTS OR COATINGS.

___ LIST OF PRODUCTS OF THESE TYPES THAT WERE USED IS ATTACHED, WITH MANUFACTURER AND BRAND NAME.

___ PRODUCT DATA AND MSDS SHEETS FOR THESE PRODUCTS:

A. ___ Are attached.

B. ___ Were submitted as normal submittals.

C. ___ Were submitted as sustainable design submittals using the Material Content Form.

CERTIFIED BY: (INSTALLER/MANUFACTURER/SUPPLIER FIRM)

FIRM NAME: _____

PRINT NAME: _____

SIGNATURE: _____

TITLE: _____ **(OFFICER OF COMPANY)**

DATE: _____

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Control of installation.

D. Mock-ups.

E. Tolerances.

F. Defect Assessment.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
   2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit report within 30 days of observation to Architect for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the

standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Owner, it is not practical to remove and replace the Work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary sanitary facilities.

C. Security requirements.

D. Vehicular access and parking.

E. Waste removal facilities and services.

F. Project identification sign.

G. Field offices.

1.02 TEMPORARY UTILITIES

A. Owner will provide the following:

1. Electrical power and metering, consisting of connection to existing facilities.
2. Water supply, consisting of connection to existing facilities.

B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

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

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.06 SECURITY

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

B. Coordinate with Owner's security program.

1.07 VEHICULAR ACCESS AND PARKING

A. Coordinate access and haul routes with Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Designated existing on-site roads may be used for construction traffic.

D. Coordinate temporary and use of existing parking areas to accommodate construction personnel with Owner. When site space is not adequate, coordinate additional space locations with Owner.

1.08 WASTE REMOVAL

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.09 PROJECT IDENTIFICATION

A. Contractor may provide and install one Contractor's identification sign, 48 s.f. maximum, at location approved by Architect/Owner.

B. Contractor shall install Architect's provided identification sign, 48 s.f., at location approved by Architect/Owner. Sign shall be removed upon substantial completion and returned to Architect.

C. No other signs are allowed without Owner permission except those required by law.

1.10 FIELD OFFICES

A. Contractor's Field Office: Use of an existing space within the building will be provided by Owner the Owner for the Contractor's use.

B. Locate offices a minimum distance of 30 feet (10 m) from existing and new structures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Sustainable design-related product requirements.

C. Re-use of existing products.

D. Transportation, handling, storage and protection.

E. Product option requirements.

F. Substitution limitations and procedures.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.03 REFERENCE STANDARDS

A. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2012.

B. GreenScreen (LIST) - GreenScreen for Safer Chemicals List Translator; Clean Production Action; www.greenscreenchemicals.org.

C. GreenScreen (METH) - GreenScreen for Safer Chemicals Method v1.2; Clean Production Action; www.greenscreenchemicals.org.

D. HPDC (Tool) - Create an HPD On-Line Tool; Health Product Declaration Collaborative; http://www.hpd-collaborative.org/.

E. ISO 14025 - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures; 2006.

F. ISO 14040 - Environmental management -- Life cycle assessment -- Principles and framework; 2006.

G. ISO 14044 - Environmental management -- Life cycle assessment -- Requirements and guidelines; 2006.

H. ISO 21930 - Sustainability in building construction -- Environmental declaration of building products; 2007.

1.04 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

1.05 QUALITY ASSURANCE

A. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.

1. Good: Product-specific; compliant with ISO 14044.

2. Better: Industry-wide, generic; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
3. Best: Commercial-product-specific; compliant with ISO 21930, or with ISO 14044, ISO 14040, ISO 14025, and EN 15804; Type III third-party certification with external verification, in which the manufacturer is recognized as the program operator.
4. Where demonstration of impact reduction below industry average is required, submit both industry-wide and commercial-product-specific declarations; or submit at least 5 declarations for products of the same type by other manufacturers in the same industry.

B. GreenScreen Chemical Hazard Analysis: All ingredients of 100 parts-per-million or greater evaluated using GreenScreen for Safer Chemicals Method v1.2.
1. Good: GreenScreen List Translator evaluation to identify Benchmark 1 hazards; a Health Product Declaration includes this information.
2. Better: GreenScreen Full Assessment.
3. Best: GreenScreen Full Assessment by GreenScreen Licensed Profiler.
4. Acceptable Evidence: GreenScreen report.

C. Health Product Declarations (HPD): Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "Create an HPD" on-line tool; HPD's with "unknown" listed for any hazard will not be considered acceptable.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Where all other criteria are met, Contractor shall give preference to products that:
1. If used on interior, have lower emissions, as defined in Section 01 6116.
2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
3. Have a published Environmental Product Declaration (EPD).
4. Have a published Health Product Declaration (HPD).
5. Have a published GreenScreen Chemical Hazard Analysis.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed unless otherwise indicated.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

B. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for Indoor-Emissions-Restricted products.

B. Requirements for VOC-Content-Restricted products.

C. Requirement for installer certification that they did not use any non-compliant products.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 3329.07 - Prohibited Content Installer Certification: Form for certifying that no non-compliant products were used.

1.03 DEFINITIONS

A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings.
   2. Interior adhesives and sealants, including flooring adhesives.
   3. Flooring.
   4. Products making up wall and ceiling assemblies.
   5. Other products when specifically stated in the specifications.

B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   1. Interior paints and coatings.
   2. Interior adhesives and sealants, including flooring adhesives.

C. Interior of Building: Anywhere inside the exterior weather barrier.

D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
   1. Concrete.
   2. Clay brick.
   3. Metals that are plated, anodized, or powder-coated.
   4. Glass.
   5. Ceramics.
   6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).

C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.

D. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2007.

E. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.

F. CRI (GLP) - Green Label Plus Testing Program - Certified Products; www.carpet-rug.org; current edition.

G. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; current edition.

H. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

I. SCS (CPD) - SCS Certified Products; current listings at www.scscertified.com.

J. UL (GGG) - GREENGUARD Gold Certified Products; current listings at http://http://productguide.ulenvironment.com/QuickSearch.aspx.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

C. Installer Certifications Regarding Prohibited Content: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.

1.06 QUALITY ASSURANCE

A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
   1. Wet-Applied Products: State amount applied in mass per surface area.
   2. Paints and Coatings: Test tinted products, not just tinting bases.
   3. Evidence of Compliance: Acceptable types of evidence are the following;
      a. Current UL (GGG) certification.
      b. Current SCS (CPD) Floorscore certification.
      c. Current SCS (CPD) Indoor Advantage Gold certification.
      d. Current listing in CHPS (HPPD) as a low-emitting product.
      e. Current CRI (GLP) certification.
      f. Test report showing compliance and stating exposure scenario used.
   4. Product data submittal showing VOC content is NOT acceptable evidence.
   5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.

B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Indoor-Emissions-Restricted Products: Comply with Indoor Emissions Standard and Test Method, except for:
   1. Inherently Non-Emitting Materials.

C. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
   2. Joint Sealants: SCAQMD 1168 Rule.

3. Paints and Coatings: Each color; most stringent of the following:
    a. 40 CFR 59, Subpart D.
    b. SCAQMD 1113 Rule.
    c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION

SECTION 01 7000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Cutting and patching.

C. Cleaning and protection.

D. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

E. General requirements for maintenance service.

1.02 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

C. Smoking Control: Provide methods and means to prevent smoking near or within facilities once the superstructure is in place and work on the building are upon completion of the superstructure and commencement of the exterior enclosure.

1.03 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate completion and clean-up of work of separate sections.

C. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 CLEANING REQUIREMENTS

A. Special cleaning requirements for specific construction elements are included in appropriate sections.

1.05 FINAL CLEANING REQUIREMENTS

A. Purpose: To employ processes that utilize equipment and products to ensure a clean environment for the building occupants while reducing contaminants to the extent technologically and economically feasible.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Examine and verify specific conditions described in individual specification sections.

C. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

D. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

C. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.07 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion.

B. Cleaning Equipment:
   1. Vacuum cleaner must meet the requirements of the Carpet and Rug Institute Green Label Program and will be capable of capturing 96% of particulates 0.3 micron in size.
   2. Hot water extraction equipment for deep cleaning carpets will be capable of removing sufficient moisture so that the carpet will dry in less than 24 hours.
   3. Powered custodial equipment including floor buffers, burnishers and automatic scrubbers will be equipped with vacuum, guards and/or other devices for capturing fine particles.
   4. Use micro fiber dusting cloths and flat mops to capture dirt and remove it.

C. Use cleaning materials that are nonhazardous.
   1. Comply with Green Seal GS 37 for general purpose cleaning and bathroom cleaning. Use natural cleaning materials where feasible.

D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

E. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

F. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.08 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

B. Required Recycling: The following may not be disposed of in landfills or by incineration:
   1. Glass.
   2. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (http://flooring.dupont.com) and Interface (www.interfaceinc.com) conduct reclamation programs.

C. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

B. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

C. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

D. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

END OF SECTION

SECTION 02 4100

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

A. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

A. Remove existing flooring.

B. Remove other items indicated.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Protect existing elements that are not to be removed.

B. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction are based on casual field observation and existing record documents only.
   1. Verify that construction arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   2. Repair adjacent construction and finishes damaged during removal work.
   3. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 0100

MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resurfacing of concrete surfaces having spalled areas and other damage.

B. Repair of deteriorated concrete.

1.02 RELATED REQUIREMENTS

A. Section 01 2200 - Unit Prices: Descriptions of unit price items, administrative requirements.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 01 2200 - Unit Prices, for additional unit price requirements.

B. Concrete Floor Surface Repair: By the square foot (meter). Includes resurfacing of concrete surfaces having spalled areas and other damage, and repair of deteriorated concrete.

1.04 REFERENCE STANDARDS

A. ASTM C928/C928M - Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Material for Concrete Repairs; 2013.

PART 2 PRODUCTS

2.01 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

A. Cementitious Repair Mortar, Trowel Grade: One- or two-component, factory-mixed, polymer-modified cementitious mortar.
   1. In-place material resistant to freeze/thaw conditions.
   2. Mixed with water or latex type bonding agent in proportions as recommended by manufacturer.

2.02 ACCESSORIES

A. Water: Clean and potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.02 CONCRETE SURFACE REPAIR USING CEMENTITIOUS MATERIALS

A. Clean concrete surfaces, cracks, and joints of dirt, laitance, corrosion, and other contamination using method(s) specified above and allow to dry.

B. Apply coating of bonding agent to entire concrete surface to be repaired.

C. Fill voids with cementitious mortar flush with surface.

D. Apply repair mortar by steel trowel to a minimum thickness of 1/4 inch (6 mm) over entire surface, terminating at a vertical change in plane on all sides.

E. Trowel finish to match adjacent concrete surfaces.

END OF SECTION

SECTION 05 5133

INCLINED METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum Ships Ladders.

1.02 SUBMITTALS

A. 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.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store ladder until installation inside under cover. If stored outside, under a tarp or suitable cover.

1.04 WARRANTY

A. Limited Warranty: Five years against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

PART 2 PRODUCTS

2.01 ALUMINUM SHIPS LADDER

A. Aluminum Ships Ladder
   1. Capacity: Unit shall support a 1000 lb (454 kg) total load without failure.
   2. Degree of Incline: 60 to 75 degrees.

B. Components: Ladder, mounting brackets and handrails on both sides.
   1. Ladder Stringer: 5 inch by 2 inch by 3/16 inch (127 mm by 51 mm by 5 mm) extruded 6005-T5 aluminum channel.
   2. Ladder Treads: 5-3/16 inch by 1-1/8 inch by 1/8 inch (131 mm by 29 mm by 3 mm) extruded 6005-T5 aluminum with serrated slip resistance surface standard. 1-1/4 inch by 1-1/4 by 1-1/4 inch angle welded to underside of treads. Treads shall be welded and bolted to stringer with 1/4” stainless steel bolts.
   3. Ladder Mounting Brackets:
      a. Floor Brackets: 2 inch by 3 inch by 1/4 inch (51 mm by 76 mm by 6 mm) aluminum angle.
      b. Top Bracket: 4-3/4 inch by 5 inch by 1/4 inch (121 mm by 127 mm by 6 mm) aluminum angle.
   4. Handrails: 1-1/4 inches (32 mm) Schedule 40, 6005-T5 aluminum pipe provided with internal aluminum fittings.
   5. Platform:
      a. Surface: Platforms 9 Sq Ft or less shall be made of standard tread material. Platforms larger than 9 Sq Ft shall have a bar grating surface.
      b. Toe Boards: 4 inch by 1/4” 6005 T-5 aluminum.
      c. Handrails: 1-1/4 inches (32 mm) Schedule 40, 6005-T5 aluminum pipe provided with internal aluminum fittings.
   6. Finishes:
      a. Standard: Mill finish on aluminum ladder components.

C. Options
   1. Crossover ladders with platform between two ladders.

2.02 FABRICATION

A. Completely fabricate ladder ready for installation before shipment to the site.

B. Completely fabricate handrail components ready for field assembly to ladder before shipment to site.

PART 3 EXECUTION

3.01 EXAMINATION

A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

SECTION 06 4100

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

1.02 RELATED REQUIREMENTS

A. Section 12 3600 - Countertops.

1.03 REFERENCE STANDARDS

A. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.

B. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. On casework and countertop elevations show the location of backing required for attachment within walls.
2. Provide the information required by AWI/AWMAC/WI (AWS).
3. Include certification program label.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

B. Single Source Responsibility: A single manufacturer shall provide and install the work of described in this Section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.07 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI (AWS) for Premium Grade.

B. Cabinets:

1. Finish - Exposed Interior Surfaces: Manufacturer's standard interior cabinet liner, color: white.
2. Casework Construction Type: Type A - Frameless.
3. Interface Style for Cabinet and Door: Style 1 - Overlay; flush overlay.
4. Adjustable Shelf Loading: 50 lbs. per sq. ft..

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Provide sustainably harvested wood, certified or labeled as specified in Section 01 6000.

C. Lumber: In accordance with the Architectural Woodwork Standards Grade specified for the product being fabricated.
   1. Moisture Content: 6% to 12% for boards up to 2" nominal thickness, and not to exceed 19% for thicker pieces.

D. Core: MDF meeting the requirements of Architectural Woodwork Standards.

2.03 LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corporation: www.formica.com.
   2. Panolam Industries International, Inc\Nevamar: www.nevamar.com.
   3. Wilsonart, LLC: www.wilsonart.com.
   4. Arborite Plus: www.arborite.com.
   5. Laminart: www.laminart.com.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
   1. Type: Through color.
   2. Color: As indicated on drawings.
   3. Finish: Satin, unless noted otherwise.

2.04 COUNTERTOPS

A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

2.05 ACCESSORIES

A. Adhesive: Water-based contact adhesive, Greenguard Indoor Air Quality Certified.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

2.06 HARDWARE

A. Hardware: BHMA A156.9, types meeting the requirements of the AWS for quality grade specified.

B. Drawer and Door Pulls: "U" shaped wire pull, aluminum with satin finish, 4 inch centers ("U" shaped wire pull, aluminum with satin finish, 100 mm centers).

C. Catches: Touch type.

D. Drawer Slides:
   1. Type: Extension types as scheduled.
   2. Static Load Capacity: Commercial grade.
   3. Mounting: Side mounted.
   4. Features: Provide self closing/stay closed type.

E. Hinges: European style concealed self-closing type, steel with satin finish.

2.07 FABRICATION

A. General:
   1. All materials and methods of construction are to meet the requirements of Architectural Woodwork Standards for the grade or grades specified.
      a. Where locking drawers are indicated, provide dust panels above and below drawer.

B. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.

E. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches (400 mm) on center.

F. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use concealed joint fasteners to align and secure adjoining cabinet units.

C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim for this purpose.

D. Secure cabinets to floor using appropriate angles and anchorages.

3.03 FIELD QUALITY CONTROL

A. Provide Woodwork Institute Certified Seismic Installation Program inspection reports and certification.

3.04 ADJUSTING

A. Test installed work for rigidity and ability to support loads.

B. Adjust moving or operating parts to function smoothly and correctly.

3.05 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 0150.19

PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of existing roofing system in preparation for a new roof membrane system.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with affected mechanical and electrical work associated with roof penetrations.

B. Preinstallation Meeting: Convene one week before starting work of this section.

C. Schedule work to coincide with commencement of installation of new roofing system.

1.03 FIELD CONDITIONS

A. Do not remove existing roofing membrane when weather conditions threaten the integrity of the building contents or intended continued occupancy.

B. Maintain continuous temporary protection prior to and during installation of new roofing system.

PART 2 PRODUCTS

2.01 MATERIALS

A. Temporary Protection: Sheet fiber reinforced plastic; provide weights to retain sheeting in position.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing roof surface is clear and ready for work of this section.

3.02 PREPARATION

A. Sweep roof surface clean of loose matter.

B. Remove loose refuse and dispose off site.

3.03 MATERIAL REMOVAL

A. Remove only existing roofing materials that can be replaced with new materials the same day.

B. Fold up metal counter flashings to permit access to top edge of base flashings.

C. Remove damaged cant strips, blocking, and deck surface.

D. Repair or replace damaged and missing cant strips, blocking, and deck surfaces to provide smooth working surface for new roof system.

3.04 PROTECTION

A. Provide temporary protective sheeting over uncovered deck surfaces.

B. Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights.

C. Provide for surface drainage from sheeting to existing drainage facilities.

D. Do not permit traffic over unprotected or repaired deck surface.

END OF SECTION

SECTION 07 5100

BUILT-UP BITUMINOUS ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Built-up roofing membrane, conventional application.

B. Insulation, flat and tapered.

C. Base flashings.

D. Roofing cant strips, accessories, and walkways.

1.02 RELATED REQUIREMENTS

A. Section 07 7100 - Roof Specialties: Counterflashings .

1.03 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

D. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011.

E. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing; 2015.

F. ASTM D3909/D3909M - Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules; 2014.

G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).

H. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2011.

I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, with interim updates.

J. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of associated counterflashings installed by other sections as the work of this section proceeds.

B. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Attendees:
      a. Architect
      b. Owner
      c. Contractor
      d. Manufacturer
      e. Installer

C. Review preparation and installation procedures and coordinating and scheduling required with related work.
   1. Attendees shall review all pertinent details and specifications, noting any potential problems and making any changes, deletions, or additions as deemed necessary. Also included in the discussion will be the following: nature and availability of roofing materials, guaranteed submittal requirements, scheduling and forecast of weather conditions, regulatory requirements, protection of building, building components, and completed roof system; proposed installation procedures, and any additional items related to the total roof system.

2. Attendees shall tour representative areas of roofing substrates (decks), and discuss substrate construction and general conditions, including deck slope, expansion joints, curb and penetration installation, drain locations, and material compatibility.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating membrane and bitumen materials, base flashing materials, insulation, and surfacing.

C. Specimen Warranty: For approval.

D. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, and supplementary instructions given.

E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.

B. Store products in weather protected environment, clear of ground and moisture.

C. Protect foam insulation from direct exposure to sunlight.

1.08 PROJECT CONDITIONS

A. Coordinate the work with installation of associated counterflashings installed by other sections as the work of this section proceeds.

1.09 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.

B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a two year period after Date of Substantial Completion.

1. Inspect and make necessary repairs to defects or leaks in the roof and flashings. Emergency leaks will be attended to within twenty-four (24) hours from receipt of notice from Owner. As soon as weather permits, Contractor will restore affected areas to standards of this contract without voiding the Guarantee and repair any damages from these leaks without cost to Owner, except for leaks caused by abuse to roof by others or by abnormal weather conditions such as lightning, severe hail, or other unusual climatic phenomena. This Guarantee must be submitted in writing before final payment is released for the project.

C. Provide fifteen year manufacturer's systems warranty to cover failure to prevent penetration of water.

1. Submit a Manufacturer's Unlimited penal sum guarantee covering any and all repairs/replacements to keep the roof, including the field and flashing, watertight beginning at the time of substantial completion. Cost of the warranty to be included in the Work.
2. The warranty shall be executed by the Manufacturer to cover any and all costs for repairs necessary to stop leaks which occur resultant of, but not limited to, the following:

a. Deterioration of the roofing membrane or base flashing system resulting from ordinary wear and tear by the elements.
b. Workmanship on the part of the Approved Applicator in application of the roofing membrane or base flashing system.
c. Blisters, fishmouths, bare spots, ridges, or wrinkles in the built-up roof.
d. Splits or cracks in the built-up roofing membrane not caused by structural movement.
e. Slippage of the built-up roofing membrane or base flashing.

3. If, 24 hours after notification of roof leakage Contractor has not responded, Owner shall have the right, without invalidating his Guarantees and at the expense of the Contractor, to make any emergency temporary repairs that are required in order to protect the building and its contents from damage due to roof leakage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Sheet and Bitumen Materials:
1. CertainTeed Corporation: www.certainteed.com.
2. GAF: www.gaf.com.
3. Johns Manville: www.jm.com.
4. Conglas: www.conglas.com.
5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ROOFING - CONVENTIONAL APPLICATION

A. Built-up Bituminous Roofing: Asphalt felt membrane, four ply .

B. Roofing Assembly Requirements:
1. Solar Reflectance Index (SRI): 78, minimum, calculated in accordance with ASTM E1980.
a. Field applied coating may not be used to achieve specified SRI.
2. Roof Covering External Fire Resistance Classification: UL Class C.
3. Insulation Thermal Value (R), minimum: R-30 (U-0.0333); provide insulation of thickness required.

C. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.

D. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.

2.03 SHEET MATERIALS

A. Base Sheet: ASTM D312/D312M Type III.

B. Mineral Surface Cap Sheet: ASTM D1863; Asphalt-saturated glass fiber roll roofing; white colored mineral granules.

C. Base Flashing Material: Asphalt-impregnated and -coated glass-fiber-reinforced felt, heavy weight, mineral surfaced.

2.04 BITUMINOUS MATERIALS

A. Bitumen: 1 Type III, asphalt.

B. Primer: ASTM D41/D41M, asphalt type.

C. Roof Cement: ASTM D4586/D4586M, Type I, asbestos free.

2.05 DECK SHEATHING AND COVER BOARDS

A. Coated Cellulose Fiber Coverboard:

2.06 INSULATION

A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 2, and with the following characteristics:
1. Compressive Strength: 20 psi (138 kPa)

2. Board Size: 48 by 96 inch (1220 by 2440 mm).
3. Thermal Resistance: R-value (RSI-value) of R-6 per inch (1.06 per inch).

B. Extruded Polystyrene (XPS) Board Insulation: ASTM C578, Type IV; extruded polystyrene board with natural skin surfaces; with the following characteristics:
1. Board Size: 48 by 96 inch (1220 by 2440 mm).
2. Thermal Resistance: R-value of 5.0 (RSI-value of 0.88) per 1 inch (25.4 mm) at 75 degrees F (24 degrees C) mean temperature using ASTM C177 test method.
3. Compressive Resistance: 20 psi (138 kPa).
4. Board Density: 1.6 lb/cu ft (26 kg/cu m).
5. Water Absorption: 0.3 percent by volume, maximum.

2.07 ACCESSORIES

A. Cant and Edge Strips: Bitumen-impregnated wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle and tapered edge strips.

B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 INSULATION INSTALLATION

A. Attachment of Insulation:
1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
2. Embed second layer of insulation into flood coat mopping of hot bitumen in accordance with roofing and insulation manufacturers' instructions.

B. Lay subsequent layers of insulation with joints staggered minimum 6 inch (150 mm) from joints of preceding layer.

C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

D. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.

E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

F. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

G. At roof drains, use boards cut to slope to slope down to roof drains over a distance of 24 inches (600 mm).

H. Do not apply more insulation than can be covered with membrane in same day.

3.03 MEMBRANE APPLICATION

A. Equiviscous Temperature (EVT) at Point of Application: In accordance with NRCA recommendations.

B. Lay base sheet, coated side down. Lap sides 2 inches (50 mm); lap ends 6 inches (150 mm).

C. Apply membrane plies, weather lap edges and ends, and mop with 20 lb/square (98 kg/100 sq m) of bitumen per ply. Apply plies 2 on 2 in same direction.

D. Apply smooth, free from air pockets, wrinkles, fish-mouths, or tears.

E. At end of day's operation, install two plies membrane and bitumen glaze coat for cut-off. Glaze exposed felts. Remove cut-off before resuming roofing.

F. At intersections with vertical surfaces:
   1. Extend membrane and base sheet over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.
   2. Mop on base flashing of two additional plies of felt and one ply of base flashing material.
   3. Insert base flashing into reglets and secure.

G. Around roof penetrations, mop in and seal flanges and flashings with two additional plies of felt.

H. Install walkway pads in hot bitumen at 20 lb/square (98 kg/100 sq m). Set joints 6 inches (150 mm) apart.

I. Coordinate installation of roof drains and related flashings.

3.04 FIELD QUALITY CONTROL

A. Upon completion of all specified work items, a final roof inspection shall be performed by a Manufacturer's Representative to certify that all materials installed comply in all aspects with the specified requirements and were installed in accordance with the manufacturer's current recommendations.
   1. Any discrepancies or incomplete work shall be documented in a "punch list" which will be issued to the Contractor.
   2. Attendees:
      a. Architect
      b. Owner
      c. Contractor
      d. Manufacturer
      e. Installer

3.05 CLEANING

A. Remove bituminous markings from finished surfaces.

B. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.

C. Repair or replace defaced or damaged finishes caused by work of this section.

3.06 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings and counterflashings.

B. Sealants for joints within sheet metal fabrications.

C. Reglets and accessories.

1.02 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) requirements, except as otherwise indicated.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage (0.0239 inch) (0.61 mm) thick base metal.

2.02 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.

E. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.

F. Plastic Cement: ASTM D4586, Type I.

G. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

F. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing material. Return and brake edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

A. Conform to drawing details and SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association.

B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

END OF SECTION

SECTION 07 7100

ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including copings.

B. Manufactured reglet and snap in flashing systems.

1.02 REFERENCE STANDARDS

A. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Reglets and Counterflashigns:
   1. Architectural Products Co: www.archprod.com.
   2. Fry Reglet Corporation; Springlok Flashing System: www.fryreglet.com.
   3. W.P. Hickman Company: www.wph.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Roof Edge Flashings and Copings:
   1. Architectural Products Co: www.archprod.com.
   2. W.P. Hickman Company: www.wph.com.
   3. Metal-Era Inc: www.metalera.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

A. Copings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
   1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 RE-3 to positive and negative design wind pressure as defined by applicable code.
   3. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.
   4. Finish: 70 percent polyvinylidene fluoride.
   5. Color: To be selected by Architect from manufacturer's standard range.

B. Manufactured reglet and flashing systems: Pre-engineered system of flashing and reglets designed to create a resistance, or "spring" to hold the flashing tight against the parapet wall.
   1. Pull-Off Resistance: Tested and proven to resist high wind velocities up to 110 mph wind load test.
   2. Material: Formed aluminum sheet, 0.025 inch (0.65 mm) thick, minimum.
   3. Fasteners: Stainless steel.
      a. Nails: Flat head, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1" minimum.
      b. Expansion shields: Lead or bronze sleeves.
      c. Screws: Self-tapping type, with round heads.
      d. Blind clips and cleats: Same gage as sheet metal.
   4. Finish: Aluminum – Gray polyester coating.

C. Pipe and Penetration Flashing: Base of rounded aluminum, compatible with specified roof systems, and capable of accomodating pipes sized between 0.375 inches (9.5 mm) and 12 inches (30.5 cm).

2.03 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

2.04 FINISHES

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components in accordance with manufacturer's instructions.

B. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

C. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

D. Coordinate installation of flashing flanges into reglets .

END OF SECTION

SECTION 07 8400

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

A. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, firestopping test or design number, and VOC content documentation for all non-preformed materials..

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. Sustainable Design Submittal: Submit VOC content documentation for all non-preformed materials.

1.04 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. With minimum 3 years documented experience installing work of this type.

1.05 FIELD CONDITIONS

A. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

A. Provide Manufacturers as show on each unique firestopping assembly on the drawings, with UL (or other) System Number for each. Other acceptable manufacturers products are acceptable provide equivalent listed firestopping assemblies are submitted as a Substitution per Section 01 6000 - Prodcut Requirements.

B. Other Acceptable Manufacturers:
   1. A/D Fire Protection Systems Inc: www.adfire.com.
   2. 3M Fire Protection Products: www.3m.com/firestop.
   3. Hilti, Inc: www.us.hilti.com.
   4. Nelson FireStop Products: www.nelsonfirestop.com.
   5. Specified Technologies, Inc: www.stifirestop.com.
   6. Tremco Ltd.: www.tremcofirestop.com.
   7. Nuco Inc.: www.nucoinc.com.
   8. RectorSeal: www.metacaulk.com.

C. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

E. Fire Ratings: See Drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Install labeling required by code.

3.04 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
   2. Bostik Inc: www.bostik-us.com.
   3. Dow Corning Corporation: www.dowcorning.com/construction.
   4. Pecora Corporation: www.pecora.com.
   5. Tremco Global Sealants: www.tremcosealants.com.
   6. Sika Corporation: www.usa-sika.com.
   7. W.R. Meadows, Inc: www.wrmeadows.com.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints as a result of selective demolition (Windows), whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Missing or failed joints between door, window, and other frames and adjacent construction.

B. Exterior Joints: Use nonsag non-staining silicone sealant, unless otherwise indicated.

C. Interior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in South Coast Air Quality Management District (SCAQMD); Rule 1168.

B. Color: Match adjacent finished surfaces unless otherwse indcated on drawings.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multicomponent; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 25 percent, minimum.

C. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

END OF SECTION

SECTION 08 1213
HOLLOW METAL FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal frames for non-hollow metal doors.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

F. ASTM A879/A879M - Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface; 2012.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Samples: Submit one sample of frame metal, 2 inch by 2 inch (50 mm by 50 mm), showing factory finishes, colors, and surface textures.

1.04 DELIVERY, STORAGE, AND HANDLING

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Frames with Integral Casings:
   1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
   2. Republic Doors: www.republicdoor.com.
   3. Steelcraft, an Allegion brand: www.allegion.com/sle.

B. Hollow Metal Frames with Applied Casings, Prefinished:
   1. Timely Industries, Inc.: www.timelyframes.com.

2.02 DESIGN CRITERIA

A. Door Frame Type: Provide hollow metal door frames with either integral casing or applied casings.

B. Steel used for fabrication of frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.

C. Accessibility: Comply with ICC A117.1 and ADA Standards.

D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.

E. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

2.03 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

A. Interior Door Frames, Non-Fire Rated: Knock-down type.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.

2.04 HOLLOW METAL DOOR FRAMES WITH APPLIED CASINGS

A. Frame Type: Knockdown, slip-on drywall frames; separate jambs and head with separate snap-on casings both sides; factory-applied finish on exposed surfaces.
   1. Frame Material: Cold-rolled steel complying with ASTM A1008/A1008M.
   2. Casing Material: Formed steel.
   3. Casing Profile: Square corner.
   4. Finish: Factory-applied baked enamel finish, or electrostatically applied water-based paint.
      a. Color: As scheduled.

B. Interior Door Frames, Non-Fire-Rated:
   1. Frames in Wet Areas: Electro-galvanize components prior to finishing in accordance with ASTM A879/A879M, with manufacturer's standard coating thickness.

2.05 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.06 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Coordinate installation of hardware.

3.03 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 1416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; non-rated.

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - INTERIOR PAINTING: Field finishing of doors.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
   1. Provide the information required by AWI/AWMAC/WI (AWS).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Algoma Hardwoods, Inc.: www.algomahardwoods.com
   2. Eggers Industries: www.eggersindustries.com.
   3. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
   4. Mohawk Flush Doors, Inc.: www.mohawksdoors.com
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

A. All Doors: .
   1. Quality Level: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Wood veneer facing with factory transparent finish to match existing.
   3. Wood veneer facing for field opaque finish to match existing.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Species to match existing, veneer grade in accordance with quality standard indicated, cut to match existing, with match to match exsiting between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. "Running Match" each pair of doors and doors in close proximity to each other.

B. Veneer Facing for Opaque Finish: Medium density overlay (MDO), in compliance with indicated quality standard.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge for hardware reinforcement.
   2. Provide solid blocking for other throughbolted hardware.

C. Vertical edges shall be 1/8 inch (3.2 mm) matching high impact acrylic material bonded to structural composite lumber. Removable edges are not permitted.

D. Horizontal Edges: Structural composite lumber. Bond smooth PVC edge band to structural composite lumber providing cleanable surface.

E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

G. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with WDMA I.S. 1A for Grade specified and as follows:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

END OF SECTION

SECTION 08 3100

ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall access door and frame units.

B. Ceiling access door and frame units.

1.02 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; current edition.

B. UL (FRD) - Fire Resistance Directory; current edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Project Record Documents: Record actual locations of all access units.

PART 2 PRODUCTS

2.01 ACCESS DOOR AND PANEL APPLICATIONS

A. Walls, Unless Otherwise Indicated:
   1. Material: Steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. In All Wall Types: Surface mounted face frame and door surface flush with frame surface.

B. Walls, with panels indicated as recessed (for gypsum wall board in-fill):
   1. Material: Steel.
   2. Size: 12 x 12 inches (300 x 300 mm), unless otherwise indicated.
   3. Standard duty, hinged door.
   4. In All Wall Types: Surface mounted face frame and door surface flush with frame surface.

C. Walls in public (visible) areas to recieve wall tiles:
   1. Material: Stainless steel.
   2. Size: 12 x 12 inches (300 x 300 mm), unless otherwise indicated.
   3. In All Wall Types: Surface mounted face frame and door surface flush with frame surface.
   4. In Masonry: Surface mounted frame with door surface flush with frame surface.

D. Walls in Wet Areas:
   1. Material: Stainless steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.
   3. In All Wall Types: Surface mounted face frame and door surface flush with frame surface.

E. Fire Rated Walls: See drawings for wall fire ratings.
   1. Material: Steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.

F. Ceilings, Unless Otherwise Indicated: Same type as for walls.
   1. Size in Lay-in Grid Ceilings: To match grid module.
   2. Size in Other Ceilings: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.

G. Fire Rated Ceilings: See drawings for ceiling fire ratings.
   1. Material: Steel.
   2. Size: 12 by 12 inch (305 by 305 mm), unless otherwise indicated.

2.02 WALL AND CEILING UNITS

A. Manufacturers:
   1. ACUDOR Products Inc: www.acudor.com.
   2. Babcock-Davis: www.babcockdavis.com.
   3. Cendrex, Inc: www.cendrex.com.
   4. Karp Associates, Inc: www.karpinc.com.

5. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
6. Cesco Products: www.cescoproducts.com.
7. J.L. Industries: www.jlindustries.com
8. BAR-CO. Division of Alfab.: www.alfabinc.com
9. Substitutions: See Section 01 6000 - Product Requirements.

B. Access Doors: Factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies that units are to be installed in.
   1. Door Style: Single thickness with rolled or turned in edges.
   2. Frames: 16 gage, 0.0598 inch (1.52 mm), minimum.
   3. Single Thickness Steel Door Panels: 1/16 inch (1.6 mm), minimum.
   4. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly that access doors are being installed.
      a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for the purpose indicated.
   5. Steel Finish: Primed.
   6. Stainless Steel Finish: No. 4 brushed finish.
   7. Hardware:
      a. Hardware for Fire Rated Units: As required for listing.
      b. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
      c. Lock(s) for non-public areas: Screw driver slot for quarter turn cam lock.
      d. Latch/Lock for public areas: Tamperproof tool-operated cam latch.
      e. Lock(s) for secure areas: Cylinder lock with latch, two keys for each unit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings. Secure rigidly in place.

C. Position units to provide convenient access to the concealed work requiring access.

END OF SECTION

SECTION 08 5113
ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum windows with operating sash and hardware and related components.

B. Factory glazing.

C. Operating hardware.

D. Insect screens.

1.02 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, information on glass and glazing, and descriptions of hardware and accessories.

C. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.

D. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

1.05 WARRANTY

A. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN - AW PERFORMANCE CLASS WINDOWS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 having Performance Class of AW, and Performance Grade at least as high as specified design pressure.

B. Horizontal Sliding; with Matching Fixed Units:
   1. Basis of Design: Win Tech Series 250.

C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another manufacturer.

D. Substitution Procedures: See Section 01 6000 - Product Requirements.

1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.02 WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Provide units factory glazed.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Performance Requirements: Provide products that comply with the following:
   1. Design Pressure (DP): In accordance with applicable codes.
   2. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 12.11 psf (580 Pa).
   3. Air Leakage: Maximum of 0.1 cu ft/min sq ft (0.5 L/sec sq m) per unit area of outside frame dimension, with 6.27 psf (300 Pa) differential pressure when tested in accordance with ASTM E283.

C. Fixed, Non-Operable Type:
   1. Construction: Thermally broken.
   2. Glazing: Single; clear; transparent.
   3. Exterior Finish: Class I natural anodized.
   4. Interior Finish: Class I natural anodized.

D. Horizontal Sliding Type:
   1. Construction: Thermally broken.
   2. Provide screens.
   3. Glazing: Double; clear; low-e.
   4. Exterior Finish: Class I natural anodized.
   5. Interior Finish: Class I natural anodized.

2.03 COMPONENTS

A. Frames: Depth of frame shall not be less than 2-1/2 inches and minimum wall thickness of 0.062 inches. Thermally broken with interior portion of frame insultated from exterior portion.
   1. The perimeter frame, sash and intermediate rail thermal barrier shall be poured and debridged thermal barrier made of two-part polyurethane.
   2. At least the window frame sill extrusion shall have a mechanically staked system consisting of alternating aluminum cleats no more than one inch on center along the thermal barrier pocket. This is intended to minimize the effects of thermal barrier dry shrinkage.

B. Glazing:
   1. Space between lites filled with air.
   2. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
      a. Tint: Green.
      b. Coating: Low-E (passive type), on #2 surface.
   3. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
      a. Tint: Clear.
   4. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.60, nominal.
   5. Solar Heat Gain Coefficient (SHGC): 0.25 percent, nominal.

C. Insect Screens: Half screens only. Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
   1. Hardware: Spring loaded steel pins; four per screen unit.
   2. Screen Mesh: Aluminum or fiberglass, window manufacturer's standard mesh.
   3. Frame Finish: Same as frame and sash.

D. Operable Sash Weatherstripping: Wool or Nylon Pile; permanently resilient, profiled to achieve effective weather seal.

E. Fasteners: Stainless steel.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.05 HARDWARE

A. Sweep latches will be white bronze.

B. Sash shall ride on bronze roller with Stainless Steel axle and raised track, so dirt will not interfere with normal operation.

2.06 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings are ready to receive aluminum windows.

3.02 INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame to opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install operating hardware not pre-installed by manufacturer.

3.03 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.04 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for wood doors.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.

C. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.

D. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.

E. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

F. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

G. NFPA 101 - Life Safety Code; 2015.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

D. Keying Schedule: Submit for approval of Owner.

E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
   1. Submit manufacturer's parts lists and templates.

F. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Lock Cylinders: One for each master keyed group.
   3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.05 QUALITY ASSURANCE

A. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for door closers.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Allegion Brands; Ives, LCN, Schlage, Steelcraft, or Von Duprin: www.allegion.com/us.

B. Assa Abloy Brands; Corbin Russwin, Curries, McKinney, Norton, Sargent, or Yale: www.assaabloydss.com.

C. Best Access Systems, division of Stanley Security Solutions: www.bestaccess.com.

D. DORMA USA, Inc: www.dorma.com.

E. Hager Companies: www.hagerco.com.

2.02 DOOR HARDWARE - GENERAL

A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Applicable provisions of NFPA 101, Life Safety Code.

D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.

E. Finishes: Match Existing.

F. Fasteners:
   1. Concrete and Masonry Substrates: Stainless steel machine screws and lead expansion shields.

2.03 LOCKS AND LATCHES

A. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.

B. Keying: Keyed differently.

C. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.04 HINGES

A. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated.

2.05 CYLINDRICAL LOCKSETS

A. Locking Functions: As defined in BHMA A156.2, and as follows.
   1. Always-Locked: F86, key required to lock, may not be left unlocked.

B. Manufacturers - Cylindrical Locksets:
   1. Assa Abloy Brands; Corbin Russwin, Sargent, or Yale: www.assaabloydss.com.
   2. Best Access Systems, division of Stanley Security Solutions: www.bestaccess.com.

3. DORMA USA, Inc.; C300 Series, C500 Series, C800 Series, CL700 Series, and CK700 Series: www.dorma.com.
4. Hager Companies: www.hagerco.com.
5. Schlage, an Allegion brand: www.allegion.com/us.

2.06 CLOSERS

A. Closers: Complying with BHMA A156.4.
1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
2. Provide a door closer on every exterior door.
3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.

B. Manufacturers - Surface Mounted Closers:
1. Assa Abloy Brands; Corbin Russwin, Norton, Rixson, Sargent, or Yale: www.assaabloydss.com.
2. C. R. Laurence Co., Inc: www.crl-arch.com.
3. DORMA USA, Inc.; 7400 Series, 8600 Series, 8900 Series, and TS93: www.dorma.com.
4. Hager Companies: www.hagerco.com.
5. LCN, an Allegion brand: www.allegion.com/us.

2.07 STOPS AND HOLDERS

A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
1. Provide wall stops, unless otherwise indicated.
2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

B. Manufacturers - Wall and Floor Stops/Holders:
1. Assa Abloy Brands; McKinney: www.assaabloydss.com.
2. C. R. Laurence Co., Inc: www.crl-arch.com.
3. Hager Companies: www.hagerco.com.
4. Hiawatha, Inc, division of Activar Construction Products Group, Inc: www.activarcpg.com/hiawatha.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Mounting heights for hardware from finished floor to center line of hardware item.
1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

3.03 ADJUSTING

A. Adjust hardware for smooth operation.

B. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

A. Protect finished Work under provisions of Section 01 7000.

B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 09 0561

COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to all floors identified in the contract documents as to receive the following types of floor coverings:

B. Preparation of existing concrete floor slabs for installation of floor coverings.

PART 2 PRODUCTS - SEE SECTION 03 0100 - MAINTENANCE OF CONCRETE

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Preliminary cleaning.
   2. Specified remediation, if required.
   3. Patching, smoothing, and leveling, as required.
   4. Other preparation specified.
   5. Adhesive bond and compatibility test.
   6. Protection.

3.02 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.

B. Do not use solvents or other chemicals for cleaning.

3.03 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

3.04 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.05 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Acoustic insulation.

D. Gypsum wallboard.

E. Joint treatment and accessories.

F. Textured finish system.

1.02 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.

E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.

G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.

I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

J. ASTM E413 - Classification for Rating Sound Insulation; 2010.

K. GA-216 - Application and Finishing of Gypsum Board; 2013.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 50-54 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

2.02 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
   1. Studs: "C" shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.

B. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short.

2.03 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
      a. Vertical Surfaces: 5/8 inch (16 mm).
      b. Ceilings: 5/8 inch (16 mm).

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 2 inch (51 mm).

B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
   2. Ready-mixed vinyl-based joint compound.

D. Textured Finish Materials: Latex-based compound; plain.

E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center (at 406 mm on center).
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

3.04 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Corner Beads: Install at external corners, using longest practical lengths.

3.06 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

3.07 TEXTURE FINISH

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match existing conditions.

END OF SECTION

SECTION 09 3000

TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Ceramic trim.

1.02 REFERENCE STANDARDS

A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.

B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.

C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

D. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).

K. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).

L. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).

M. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).

N. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).

O. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Revised).

P. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installation; 2014.

Q. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2013.1.

R. ASTM C373 - Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products, Ceramic Tiles, and Glass Tiles; 2014a.

S. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
   1. Recycled Content:
      a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled.
      b. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

C. Shop Drawings: Indicate tile layout, perimeter conditions, and control and expansion joints.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches (457 by 457 mm) in size illustrating pattern, color variations, and grout joint size variations.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Tile: 2 percent of each size, color, and surface finish combination.

1.04 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1.05 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

1.06 FIELD CONDITIONS

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide ten year manufacturer warranty for labor and materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products by the same manufacturer.
   1. American Olean Corporation: www.americanolean.com.
   2. Dal-Tile Corporation: www.daltile.com.
   3. Emser Tile, LLC: www.emser.com.
   4. Terrazzo & Marble Supply Companies: www.tmsupply.com.
   5. Summitville Tiles, Inc: www.summitville.com..
   6. Florida Tile: www.floridatile.com.
   7. Monarch Tile: www.monarchtile.com.
   8. Interceramic: www.interceramic.com.
   9. Crossville Inc.: www.crossvilleinc.com.
   10. Substitutions: See Section 01 6000 - Product Requirements.

B. Porcelain Tile: ANSI A137.1, standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Edges: Cushioned.
   3. Surface Finish: Unglazed.

4. Trim Units: Matching bullnose, double bullnose, cove base, and cove shapes in sizes coordinated with field tile.

C. Recycled Content: Minimum [10] percent post-consumer recycled content, or minimum [40] percent pre-consumer recycled content.

2.02 TRIM AND ACCESSORIES

A. Trim: Matching bullnose, cove base, and cove ceramic shapes in sizes coordinated with field tile.
   1. Applications:
      a. Open Edges: Bullnose.
      b. Floor to Wall Joints: Cove base.
   2. Manufacturers: Same as for tile.

2.03 SETTING MATERIALS

A. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, GS-36 for Commercial Adhesive, South Coast Air Quality Management District Rule 1168, and as specified.

B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
   1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
   2. Products:
      a. ARDEX Engineered Cements; ARDEX X 77 MICROTEC: www.ardexamericas.com.
      b. AVM Industries, Inc; Thin-Set 780: www.avmindustries.com.
      c. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com.
      d. Merkrete, by Parex USA, Inc; Merkrete 720 Marble Pro: www.merkrete.com.
      e. ProSpec, an Oldcastle brand; Permalastic System: www.prospec.com.
      f. Custom Building Products; VersaBond: www.custombuildingproducts.com..
      g. Substitutions: See Section 01 6000 - Product Requirements.

2.04 GROUTS

A. Manufacturers:
   1. ARDEX Engineered Cements: www.ardexamericas.com.
   2. Bostik Inc: www.bostik-us.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.
   5. ProSpec, an Oldcastle brand: www.prospec.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.

B. Toxicity/IEQ: Cement based, petroleum-free and plastic-free grout; ANSI A118.4.

C. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
   2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
   3. Color(s): As shown on the drawings.
   4. Products:
      a. ARDEX Engineered Cements; ARDEX FG-C MICROTEC: www.ardexamericas.com.
      b. Bostik Inc; Ceramic Tile Grout: www.bostik-us.com.
      c. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com.
      d. Merkrete, by Parex USA, Inc; Merkrete Non-Sanded Color Grout: www.merkrete.com.
      e. ProSpec, an Oldcastle brand; ProColor Sanded Tile Grout: www.prospec.com.
      f. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
   1. Thickness: 20 mils (0.5 mm), maximum.
   2. Crack Resistance: No failure at 1/16 inch (1.6 mm) gap, minimum.
   3. Products:
      a. LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane: www.laticrete.com.
      b. Merkrete, by Parex USA, Inc.; Merkrete Fracture Guard 5000: www.merkrete.com.
      c. Proflex Products, Inc; Maxxim Sim-40: www.proflex.us.
      d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. When there are any obvious defects or conditions preventing a satisfactory tile installation, the installer is to notify (per ANSI A108.02) the architect and general contractor in writing; installer shall not to proceed until sastisfactory conditions are provided.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces .

C. Prior to installing tile, ensure that surfaces to be covered are sound, clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, effloresecence, form oil, loose plaster, paint, and any other bond breaking materials or debris.

D. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

E. Prepare direct bond substrates to meet ANSI A108.02 Section 4.0 ("General Requirements") inlcuding but not limited to griding high spots on concrete surface or applying a self-leveling or patching mortar to make the surface resonably flat within the specidied plan.

F. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

I. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

J. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates with no movement, bending stressess and/or deflection, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with latex-portland cement grout.

1. Use TCNA (HB) Method F113A, dry-set or latex-Portland cement bond coat recommended by manufacturer for above-ground use on elevated concrete substrates subject to movement, bending stressess, and/or deflection.

3.05 TOLERANCES

A. Maximum lippage per ANSI A108.02, Section 4.3.7

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 6500

RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

1.02 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.

B. ASTM F1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2014).

C. ASTM F1700 - Standard Specification for Solid Vinyl Tile; 2013a.

D. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

1.03 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

B. Verification Samples: Submit two samples, illustrating color and pattern for each resilient flooring product specified.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Wall Base: 30 linear feet (9.15 linear meters) of each type and color.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store all materials off of the floor in an acclimatized, weather-tight space.

B. Protect roll materials from damage by storing on end.

1.05 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Tile: Printed film type, with transparent or translucent wear layer.
   1. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   3. Recycled Content: Minimum [5] percent post-consumer recycled content, or minimum [35] percent pre-consumer recycled content.
   4. Wear Layer Thickness: 0.020 inch (0.50 mm).
   5. Minimum Total Thickness: 0.125 inch (3 mm).
   6. Color: As scheduled.
   7. Basis of Design: As scheduled on drawings.
   8. Other Acceptable Manufacturers:
      a. Armstrong World Industries, Inc: www.armstrong.com.
      b. Burke Flooring: www.burkeflooring.com.

c. Azrck: www.azrock.com.

2.02 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   2. Height: 4 inch (100 mm).
   3. Thickness: 0.125 inch (3.2 mm) thick.
   4. Finish: Satin.
   5. Length: Roll.
   6. Accessories: Premolded external corners and end stops.

2.03 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Same material as flooring.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.

D. Prohibit traffic until filler is fully cured.

E. Clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install in accordance with manufacturer's instructions.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Fit joints and butt seams tightly.

E. Set flooring in place, press with heavy roller to attain full adhesion.

F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   1. Resilient Strips: Attach to substrate using adhesive.

H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

3.05 RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, adhered.

B. Removal of existing carpet tile.

1.02 RELATED REQUIREMENTS

A. Section 03 0100 - Maintenance of Concrete: Cleaning, re-surfacing and repair of concrete slabs and flors.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2006 (Reapproved 2011).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.

D. CRI (GLP) - Green Label Plus Testing Program - Certified Products; www.carpet-rug.org; current edition.

E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

1.04 SUBMITTALS

A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
   1. VOC data:
      a. Adhesives:
         1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
   2. Carpet: Submit independent, third party certification of compliance with Carpet and Rug Institute's Green Label Plus Indoor Air Quality program.

B. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 WEAR WARRANTY

A. Ten-Year Commercial Warranty against excessive wear, delamination, edge ravel, zippering, resiliency loss, and static.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: As indicated on drawings.

B. Other Acceptable Manufacturers:
   1. Interface, Inc: www.interfaceinc.com.
   2. Lees Carpets: www.leescarpets.com.
   3. Mannington: www.mannington.com.
   4. Milliken & Company: www.milliken.com.

5. Shaw: www.shaw.com.
6. Atlas Carpet Mills, Inc. : www.atlascarpetmills.com.

2.02 MATERIALS

A. Tile Carpeting: Tufted, manufactured in one color dye lot.
   1. Pile Thickness: 0.108 inch (2.74 mm).
   2. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   3. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
   4. VOC Content: Provide CRI (GLP) certified product.
   5. Maximum Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
   6. Gage: 1/12 inch (2.1 mm).
   7. Stitches: 10 per inch (3.937 per cm).
   8. Primary Backing Material: Polypropylene.

2.03 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Transitions and Edge Strips: Rubber, color as selected by Architect.

C. Adhesives:
   1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified.

D. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
   1. Test in accordance with ASTM F710.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

A. Remove existing carpet.

B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

C. See Section 03 0100 - Maintenance of Concrete for cleaning, re-surfacing and repair of existing concrete

D. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

E. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

F. Vacuum clean substrate.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet tile in accordance with manufacturer's instructions and CRI (CIS).

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in square pattern, with pile direction alternating to next unit, set parallel to building lines.

F. Trim carpet tile neatly at walls and around interruptions.

G. Complete installation of edge strips, concealing exposed edges.

3.04 INDOOR AIR QUALITY

A. Temporary ventilation: Provide temporary ventilation as specified in Section 01 5721 - Indoor Air Quality Controls, and as follows:
   1. Ventilate products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degree F maximum continuously for minimum 72 hours.

B. Immediately after installation, clean carpet thoroughly with a [high-efficiency particulate air (HEPA) filtration vacuum] [certified CRI Green Label vacuum cleaner].

3.05 WASTE MANAGMENT

A. As specified in Section 01 7419 - Construction Waste Management and Disposal.

B. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product.

3.06 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 09 9113

EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

D. Work under this Scope shall also include, but not necessarily be limited to:
   1. High pressure washing and abrasive blasting.
   2. Moisture testing of substrates.
   3. Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under MPI Repainting Manual Preparation requirements.
   4. Specific pre-treatments noted herein or specified in the MPI Repainting Manual.
   5. Sealing / priming surfaces for repainting in accordance with MPI Repainting Manual requirements.

E. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

F. SSPC-SP 1 - Solvent Cleaning; 2015.

G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

I. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

1.03 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).

3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.

C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Paint and Finish Materials: 5 gallons (20 L) of each color; from the same product run, store where directed.
   2. Label each container with color in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE

A. All materials, preparation and workmanship shall conform to the standards contained in the latest edition of the Master Painters Institute (MPI) Maintenance and Repainting Manual (herein referred to as the MPI Repainting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Behr Process Corporation: www.behr.com.
   2. Benjamin Moore & Co: www.benjaminmoore.com.
   3. PPG Paints: www.ppgpaints.com.
   4. Pratt & Lambert Paints: www.prattandlambert.com.
   5. Sherwin-Williams Company: www.sherwin-williams.com.

6. Valspar Corporation: www.valsparpaint.com.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
   2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - EXTERIOR

A. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, cement board, primed wood, and primed metal.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Exterior Latex; MPI #214, MPI #119.
   3. Top Coat Sheen:
      a. Velvet: MPI gloss level 2; use this sheen at exterior wall surfaces inlcuding stucco, concrete or concrete masonry units..
      b. Gloss: MPI gloss level 6; use this sheen at doors and door frames, railings and exposed steel structural members.
   4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. The degree of surface deterioration (DSD) shall be assessed using the assessment criteria indicated in the MPI Maintenance Repainting Manual. In general the MPI DSD ratings and descriptions are as follows:
   1. DSD-0: Sound Surface (may include visual (aesthetic) defects that do not affect film’s protective properties).

2. DSD-1: Slightly Deteriorated Surface (may show fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.) / Minor cosmetic defects (runs, sags, etc.).
3. DSD-2: Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
4. DSD-3: Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
5. DSD-4: Substrate Damage (repair or replacement of surface required by Owner).

E. Structural and DSD-4 substrate defects discovered prior to and after surface preparation or after first coat of paint shall be repaired by Owner, unless otherwise agreed to by the Owner.

F. No repainting work shall commence until all such DSD-4 adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Contractor. The Contractor shall not be responsible for the condition of the substrate or for correcting defects and deficiencies in the substrate, which may adversely affect the painting work except for minimal work normally performed by the Contractor and as, indicated herein. It shall always, however, be the responsibility of the Contractor to see that surfaces are properly prepared before any paint or coating is applied. It shall also be the Contractor's responsibility to paint the surface as specified providing that the owner accepts responsibility for uncorrected DSD-4 substrate conditions.

G. Test shop-applied primer for compatibility with subsequent cover materials.

H. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Exterior Plaster and Stucco: 12 percent.
2. Fiber Cement Siding: 12 percent.
3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Prepare all exterior surfaces for repainting in accordance with MPI Repainting Manual requirements.

B. Clean surfaces thoroughly and correct defects prior to application.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
2. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi (10,350 to 27,580 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.
3. Clean concrete according to ASTM D4258. Allow to dry.
4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Masonry:
1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
2. Prepare surface as recommended by top coat manufacturer.

3. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi (10,350 to 27,580 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.

I. Fiber Cement Siding: Remove dirt, dust and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

J. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

K. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

L. Ferrous Metal:
   1. Solvent clean according to SSPC-SP1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

M. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

F. Sand metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

END OF SECTION

SECTION 09 9123

INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.

D. Work under this Scope shall also include, but not necessarily be limited to:
   1. Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under MPI Repainting Manual Preparation requirements.
      a. Condition of substrates, correction of DSD-4 defects and deficiencies in substrates which may adversely affect repainting work, except for minimal work performed by this trade and preparation of surfaces to receive paint and finishes under this section of work.
   2. Specific pre-treatments noted herein or specified in the MPI Repainting Manual.
   3. Sealing / priming surfaces for repainting in accordance with MPI Repainting Manual requirements.
   4. Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.

E. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other tiles.
   9. Glass.
   10. Acoustical materials, unless specifically indicated.
   11. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

E. SSPC-SP 1 - Solvent Cleaning; 2015.

F. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

G. SSPC-SP 13 - Surface Preparation of Concrete; (Reaffirmed 2015); 2003.

1.03 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.

C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

D. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Paint and Finish Materials: 5 gallons (20 L) of each color; from the same product run, store where directed.
   2. Label each container with color in addition to the manufacturer's label.

1.04 QUALITY ASSURANCE

A. All materials, preparation and workmanship shall conform to the standards contained in the latest edition of the Master Painters Institute (MPI) Maintenance and Repainting Manual (herein referred to as the MPI Repainting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Behr Process Corporation: www.behr.com.
   2. Benjamin Moore & Co: www.benjaminmoore.com.
   3. Cloverdale Paint, Brand Products of Rodda Paint Company: www.cloverdalepaint.com.
   4. PPG Paints: www.ppgpaints.com.
   5. Pratt & Lambert Paints: www.prattandlambert.com.
   6. Rodda Paint Co: www.roddapaint.com.
   7. Sherwin-Williams Company: www.sherwin-williams.com.
   8. Valspar Corporation: www.valsparpaint.com.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - INTERIOR

A. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
   1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
   2. Two top coats and one coat primer.
   3. Top Coat(s): Interior Light Industrial Coating, Water Based; MPE #153.
   4. Top Coat Sheen:
      a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   5. Primer: As recommended by top coat manufacturer for specific substrate.

B. Medium Duty Vertical and Overhead: Including gypsum board, plaster, concrete, concrete masonry units, uncoated steel, shop primed steel, galvanized steel, and aluminum.
   1. Two top coats and one coat primer.
   2. Top Coat(s): High Performance Architectural Interior Latex; MPI #139, 141.
   3. Top Coat Sheen:
      a. Eggshell: MPI gloss level 3; use this sheen at all locations.
      b. Semi-Gloss: MPI gloss level 5; use this sheen at toilet rooms, mechanical rooms, electrical rooms, utility rooms, janitor rooms and similar high abuse areas.
      c. Semi-Gloss: MPI gloss level 5; use this sheen for metal surfaces.
   4. Primer: As recommended by top coat manufacturer for specific substrate.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. The degree of surface deterioration (DSD) shall be assessed using the assessment criteria indicated in the MPI Maintenance Repainting Manual. In general the MPI DSD ratings and descriptions are as follows:
   1. DSD-0: Sound Surface (may include visual (aesthetic) defects that do not affect film's protective properties).
   2. DSD-1: Slightly Deteriorated Surface (may show fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.) / Minor cosmetic defects (runs, sags, etc.).
   3. DSD-2: Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
   4. DSD-3: Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
   5. DSD-4: Substrate Damage (repair or replacement of surface required by Owner).

E. Structural and DSD-4 substrate defects discovered prior to and after surface preparation or after first coat of paint shall be repaired by Owner, unless otherwise agreed to by the Owner.

F. No repainting work shall commence until all such DSD-4 adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Contractor. The Contractor shall not be responsible for the condition of the substrate or for correcting defects and deficiencies in the substrate, which may adversely affect the painting work except for minimal work normally performed by the Contractor and as, indicated herein. It shall always, however, be the responsibility of the Contractor to see that surfaces are properly prepared before any paint or coating is applied. It shall also be the Contractor's responsibility to paint the surface as specified providing that the owner accepts responsibility for uncorrected DSD-4 substrate conditions.

G. Test shop-applied primer for compatibility with subsequent cover materials.

H. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units : 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Prepare all interior surfaces for repainting in accordance with MPI Repainting Manual requirements.

B. Clean surfaces thoroughly and correct defects prior to application.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. Remove or repair existing paints or finishes that exhibit surface defects.

E. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

F. Seal surfaces that might cause bleed through or staining of topcoat.

G. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

H. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi (10,350 to 27,580 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.
   3. Clean concrete according to ASTM D4258. Allow to dry.
   4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

I. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.
   3. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi (10,350 to 27,580 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.

J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

K. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

L. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

M. Galvanized Surfaces:

N. Ferrous Metal:
   1. Solvent clean according to SSPC-SP1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Sand metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

END OF SECTION

SECTION 10 2800

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms, showers, and residential bathrooms.

1.02 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

C. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2011.

D. ASTM C1036 - Standard Specification for Flat Glass; 2011.

E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.01 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Tubing: ASTM A269/A269M, Type 304 or 316.

D. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

E. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

2.02 FINISHES

A. Stainless Steel: No. 8 Mirror finish.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

2.03 TOILET ROOM ACCESSORIES

A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, chrome-plated zinc alloy brackets.

B. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.
   1. Frame: 0.05 inch (1.3 mm) angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.8 finish.

2.04 SHOWER AND TUB ACCESSORIES

A. Towel Bar: Stainless steel Type 304, 3/4 inch (20 mm) square tubular bar; rectangular brackets, concealed attachment, bright polished finish.
   1. Length: 30 inches (760 mm).

B. Towel Ring: Stainless steel, 2-1/2 inch (64 mm) extension from wall, with 1/4 inch (6 mm) diameter trapezoidal shaped ring, rectangular-shaped bracket and backplate for concealed attachment, bright polished finish.

2.05 RESIDENTIAL ACCESSORIES

A. Medicine Cabinet: One-piece construction of heavy-gage steel with factory-applied, gloss white, baked enamel finish, surface-mounted, bright polished finish stainless steel mirror frame.
   1. Shelves: Adjustable, aluminum or glass; provide not less than 3 shelves.
   2. Door: Fitted with continuous piano-type hinge, shock-absorbing spring-and-rod door stop, magnetized catch, swing as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.02 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

END OF SECTION

SECTION 11 3100

RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Laundry appliances.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

PART 2 PRODUCTS

2.01 LAUNDRY APPLIANCES

A. Clothes Washer: Front-loading.
   1. Controls: Solid state electronic.
   2. Cycles: Include normal, permanent press, delicate, soak, and automatic soak.
   3. Motor Speed: Single-speed.
   4. Features: Include optional second rinse, bleach dispenser, fabric softener dispenser, self-cleaning lint filter, sound insulation, and end of cycle signal.
   5. Finish: Painted steel, color white.

B. Clothes Dryer: Electric, stationary.
   1. Controls: Solid state electronic, with timer dry control.
   2. Temperature Selections: Three.
   3. Cycles: Include normal, permanent press, knit/delicate, and air only.
   4. Features: Include interior light, reversible door, stationary rack, sound insulation, and end of cycle signal.
   5. Finish: Painted steel, color white.

END OF SECTION

SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

1.02 RELATED REQUIREMENTS

A. Section 06 4100 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

C. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

F. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 COUNTERTOP ASSEMBLIES

A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
      b. Color and Pattern: As indicated on drawings.
   3. Other Components Thickness: 1/2 inch (12 mm), minimum.

4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
6. Skirts: As indicated on drawings.
7. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

2.02 ACCESSORY MATERIALS

A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.03 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

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

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Seal joint between back/end splashes and vertical surfaces.

3.03 CLEANING

A. Clean countertops surfaces thoroughly.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 21 05 00

WORK FOR FIRE SPRINKLER REPLACEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. 2012 *International Building Code (IBC)* with State of NV amendments

B. 2012 *International Fire Code (IFC)* with State of NV amendments

C. NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition)

D. UNLV South Residence Halls Floor Plans – Rodman, Boyd & Williams

1.02 WORK INCLUDED

A. Existing standard coverage sidewall sprinkler replacement in designated areas.

1.03 GENERAL DESCRIPTION OF REPLACEMENT WORK

A. The existing standard coverage sidewall sprinklers within the designated lounges will be replaced with new extended coverage quick response sprinklers to provide required floor area coverage. All other existing sidewall sprinklers will remain as-is.

1.04 QUALITY ASSURANCE

A. Contractor Qualifications: Work shall be performed by a Contractor regularly engaged in the design and installation of fire protection systems in accordance with NFPA requirements and having at least five (5) years continuous experience in this type of work.

1.05 DESIGN REQUIREMENTS

A. Design Criteria: Comply with all requirements of NFPA 13, NFPA 25, IBC and IFC.

B. Requirements of Regulatory Agencies: Total system shall be acceptable upon completion and testing to the following:

1. NV State Fire Marshal

C. Certificate of Installation: Submit certificate upon completion of fire protection work, stating that the work has been completed and tested in accordance with the specified standards, that there are no defects in the system and it is fully operational. See NFPA 13 Sections 10.10 and 25.1.

1.06 SUBMITTALS AND SHOP DRAWINGS

A. General:

1. All equipment and material submitted shall bear evidence of listing and/or approval for use in fire sprinkler systems

2. Do not begin work until shop drawings are reviewed and approved by all parties

B. Shop Drawings:

1. Furnish shop drawing to AHJ for review showing all replacement sprinkler locations

C. Submit Manufacturer's Data for the following:

1. Sprinkler system:

a. Sprinklers/escutcheons

b. Piping

c. Fittings

1.07 TESTING

A. Automatic Sprinkler Piping:

1. The automatic sprinkler systems shall be hydrostatically tested in their entirety or in zones defined by shutoff valves. The piping shall be tested at a pressure of 200 psig or 50 psi in excess of working pressures greater than 150 psi, measured at the low point in the system or zone, and shall be proved tight at this pressure for a period of not less than 1-hour. Leaks detected shall be repaired by tightening, rewelding joints, or replacing damaged pipe or fittings.

PART 2 PRODUCTS

2.01 FIRE SPRINKLER SYSTEM

A. Piping:

1. Pipe: Schedule 40 black steel
2. Fittings: 250 lb. cast iron screwed
3. Ridge grooved joint (cut not rolled) mechanical fittings, with maximum working pressure rating of at least 300 psig
    a. Design basis: Victaulic

B. Sprinklers:

1. Manufacturers:
    a. Automatic Sprinkler
    b. Reliable
    c. Tyco
    d. Victaulic
    e. Viking
2. Type: Quick response extended coverage sidewall
3. Finish: Chrome
4. Escutcheons: Solid, adjustable, white
5. Spare Sprinklers and Wrench: Furnish additional fire sprinklers, amounting to one unit for every 100 installed units, but not less than six units of each type and wrench sized to sprinklers.

PART 3 EXECUTION

3.01 SPRINKLER LAYOUT

A. Sprinkler layout is shown on drawings:

1. Provide complete sprinkler layout with shop drawing submittal.
2. Coordinate with ceiling layout.

END OF SECTION

TERPconsulting

20 February 2017

Mr. Albert Ruiz
Nevada State Fire Marshal
107 Jacobsen Way
Carson City, NV 89701

Re: University of Nevada, Las Vegas
South Residence Halls
Fire Sprinkler System Deficiency
TC Project # 17.0031

Dear Albert:

The South Residence Halls contain a sprinkler system deficiency in various locations as sidewall sprinklers located within common areas lounges do not provide adequate floor coverage. The University of Nevada, Las Vegas (UNLV) proposes to voluntarily replace the inadequate conventional sidewall sprinklers with extended coverage sidewall sprinklers within the following South Residence Halls:

- Claudine Williams Hall – 2nd through 5th floors
- Kitty Rodman Hall – 2nd and 3rd floors
- William S. Boyd Hall – 2nd through 4th floors

This report is to document the proposed sidewall sprinkler replacement scope of work. The project scope of work is limited to the sprinkler replacement and does not include modifications to existing fire protection and life safety systems beyond the installation of the new extended coverage sprinklers.

The sprinkler head replacement project will be in accordance with the following:

- 2012 International Fire Code with State of Nevada amendments (SNFC)
- NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition)
- NFPA 25 – *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* (2013 edition)

DESCRIPTION

The existing standard coverage sidewall sprinklers within the designated lounges will be replaced with new extended coverage quick response sprinklers to provide required floor area coverage. All other existing sidewall sprinklers will remain in as-is.

The areas requiring sidewall sprinkler replacement will be shown on fire sprinkler layout drawings. The existing combination sprinkler/standpipe systems should receive adequate water supply to meet the requirements of extended coverage quick response sidewall sprinklers due to their close proximity to the standpipe sprinkler system floor control assembly.

SYSTEM REPLACEMENT PROCESS AND TIMEFRAME

The building is expected to remain occupied during the sprinkler replacement process; therefore, careful consideration must be given to occupant and building protection. The existing fire sprinkler system will remain active during the replacement process.

The work will be isolated within each specific floor. The standpipe hose valves will remain active when the sprinkler system is drained during work hours, thus providing fire protection when sprinkler systems are inactive.

Sprinkler system design and installation will be in accordance with NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition). Detailed design drawings depicting sprinkler replacement will be submitted to the Nevada State Fire Marshal (NSFM) for review and approval.

Inspections and pressure testing will be required for the sprinkler system modifications. Testing will be consistent with the requirements of NFPA 13, NFPA 25 and NSFM, as applicable. The sprinkler replacement process is expected to begin in May 2017 and will be complete in September 2017.

If you have any questions regarding the above, please do not hesitate to contact our office.

Regards,

TERPconsulting
Prepared by:

William G. Koenig, PE, S.E.T.
fire protection engineer

SECTION 21 05 00

WORK FOR FIRE SPRINKLER REPLACEMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. 2012 *International Building Code (IBC)* with State of NV amendments

B. 2012 *International Fire Code (IFC)* with State of NV amendments

C. NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition)

D. UNLV South Residence Halls Floor Plans – Rodman, Boyd & Williams

1.02 WORK INCLUDED

A. Existing standard coverage sidewall sprinkler replacement in designated areas.

1.03 GENERAL DESCRIPTION OF REPLACEMENT WORK

A. The existing standard coverage sidewall sprinklers within the designated lounges will be replaced with new extended coverage quick response sprinklers to provide required floor area coverage. All other existing sidewall sprinklers will remain as-is.

1.04 QUALITY ASSURANCE

A. Contractor Qualifications: Work shall be performed by a Contractor regularly engaged in the design and installation of fire protection systems in accordance with NFPA requirements and having at least five (5) years continuous experience in this type of work.

1.05 DESIGN REQUIREMENTS

A. Design Criteria: Comply with all requirements of NFPA 13, NFPA 25, IBC and IFC.

B. Requirements of Regulatory Agencies: Total system shall be acceptable upon completion and testing to the following:

1. NV State Fire Marshal

C. Certificate of Installation: Submit certificate upon completion of fire protection work, stating that the work has been completed and tested in accordance with the specified standards, that there are no defects in the system and it is fully operational. See NFPA 13 Sections 10.10 and 25.1.

1.06 SUBMITTALS AND SHOP DRAWINGS

A. General:

1. All equipment and material submitted shall bear evidence of listing and/or approval for use in fire sprinkler systems

2. Do not begin work until shop drawings are reviewed and approved by all parties

B. Shop Drawings:

1. Furnish shop drawing to AHJ for review showing all replacement sprinkler locations

C. Submit Manufacturer's Data for the following:

1. Sprinkler system:

a. Sprinklers/escutcheons

b. Piping

c. Fittings

1.07 TESTING

A. Automatic Sprinkler Piping:

1. The automatic sprinkler systems shall be hydrostatically tested in their entirety or in zones defined by shutoff valves. The piping shall be tested at a pressure of 200 psig or 50 psi in excess of working pressures greater than 150 psi, measured at the low point in the system or zone, and shall be proved tight at this pressure for a period of not less than 1-hour. Leaks detected shall be repaired by tightening, rewelding joints, or replacing damaged pipe or fittings.

PART 2 PRODUCTS

2.01 FIRE SPRINKLER SYSTEM

A. Piping:

1. Pipe: Schedule 40 black steel
2. Fittings: 250 lb. cast iron screwed
3. Ridge grooved joint (cut not rolled) mechanical fittings, with maximum working pressure rating of at least 300 psig
    a. Design basis: Victaulic

B. Sprinklers:

1. Manufacturers:
    a. Automatic Sprinkler
    b. Reliable
    c. Tyco
    d. Victaulic
    e. Viking
2. Type: Quick response extended coverage sidewall
3. Finish: Chrome
4. Escutcheons: Solid, adjustable, white
5. Spare Sprinklers and Wrench: Furnish additional fire sprinklers, amounting to one unit for every 100 installed units, but not less than six units of each type and wrench sized to sprinklers.

PART 3 EXECUTION

3.01 SPRINKLER LAYOUT

A. Sprinkler layout is shown on drawings:

1. Provide complete sprinkler layout with shop drawing submittal.
2. Coordinate with ceiling layout.

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

1.02 RELATED REQUIREMENTS

A. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2014.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:
   1. Aeroflex USA, Inc ; _____: www.aeroflexusa.com.
   2. Armacell LLC ; _____: www.armacell.us.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
   1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
   2. Maximum Service Temperature: 220 degrees F (104 degrees C).
   3. Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.03 SCHEDULES

A. Plumbing Systems:

1. Domestic Hot Water Supply:
   a. Cellular Melamine Foam Insulation:

END OF SECTION

SECTION 22 1005

PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.
   1. Sanitary sewer.
   2. Domestic water.
   3. Flanges, unions, and couplings.
   4. Pipe hangers and supports.
   5. Valves.

1.02 RELATED REQUIREMENTS

A. Section 22 0719 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers ; 2012 (ANSI B16.18).

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; The American Society of Mechanical Engineers ; 2013.

C. ASTM B32 - Standard Specification for Solder Metal ; 2008 (Reapproved 2014).

D. ASTM B88 - Standard Specification for Seamless Copper Water Tube ; 2014.

E. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric) ; 2013.

F. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube ; 2010.

G. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings ; 2002 (Reapproved 2010).

H. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; Cast Iron Soil Pipe Institute ; 2009.

I. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; Cast Iron Soil Pipe Institute ; 2011

J. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. ; 2009.

K. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. ; 2010.

L. NSF 61 - Drinking Water System Components - Health Effects ; 2014 (Errata 2015).

M. NSF 372 - Drinking Water System Components - Lead Content ; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

A. Cast Iron Pipe: CISPI 301, hubless.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.

2.03 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.04 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, alloy Sn95 solder.

2.05 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 3 Inches (80 mm) and Under:
   1. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 1 Inch (25 mm):
   1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.06 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.
   1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
   2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
   3. Trapeze Hangers: Welded steel channel frames attached to structure.
   4. Vertical Pipe Support: Steel riser clamp.
   5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.

B. Plumbing Piping - Drain, Waste, and Vent:
   1. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.
   2. Hangers for Pipe Sizes 2 Inches (50 mm) and Over: Carbon steel, adjustable, clevis.
   3. Wall Support for Pipe Sizes to 3 Inches (80 mm): Cast iron hook.
   4. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

C. Plumbing Piping - Water:
   1. Hangers for Pipe Sizes 1/2 Inch (15 mm) to 1-1/2 Inches (40 mm): Malleable iron, adjustable swivel, split ring.

2.07 BALL VALVES

A. Manufacturers:
   1. Grinnell Products, a Tyco Business ; _____: www.grinnell.com.
   2. Nibco, Inc ; _____: www.nibco.com.

B. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder, threaded, or grooved ends with union.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.

3.04 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

3.05 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches (15 mm) to 1-1/4 inches (32 mm):
         1) Maximum hanger spacing: 6.5 ft (2 m).
         2) Hanger rod diameter: 3/8 inches (9 mm).

END OF SECTION

SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water closets.

B. Lavatories.

C. Sinks.

D. Showers.

1.02 RELATED REQUIREMENTS

A. Section 12 3600 - Countertops: Preparation of counters for sinks and lavatories.

B. Section 22 1005 - Plumbing Piping.

1.03 REFERENCE STANDARDS

A. ANSI Z124.1.2 - American National Standard for Plastic Bathtub and Shower Units; 2005.

B. ASME A112.18.1 - Plumbing Supply Fittings; 2012.

C. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2013.

D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use); 2008 (R2013).

E. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2011.

F. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).

G. NSF 372 - Drinking Water System Components - Lead Content; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.01 GENERAL

A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.02 TANK TYPE WATER CLOSETS

A. Tank Type Water Closet Manufacturers:
   1. American Standard, Inc : www.americanstandard-us.com.
   2. Zurn Industries, Inc : www.zurn.com.

B. Bowl: ASME A112.19.2; floor mounted, vitreous china reverse trap, close-coupled closet combination with regular rim, insulated vitreous china closet tank with fittings and lever flushing valve, bolt caps.

C. Seat: Solid white plastic, closed front, brass bolts, with cover.

2.03 LAVATORIES

A. Lavatory Manufacturers:
   1. American Standard, Inc ; _____: www.americanstandard-us.com.

B. Vitreous China Counter Top Basin: ASME A112.19.2; vitreous china self-rimming counter top lavatory, 20 by 17 inch (___ by ___ mm) with drillings on 4 inch (100 mm) centers, front overflow, seal of putty, calking, or concealed vinyl gasket.

C. Supply Faucet Manufacturers:
   1. Zurn Industries, Inc ; _____: www.zurn.com.

D. Supply Faucet: ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 0.5 gallon per minute (low-flow) (1.9 liters per minute (low-flow)), indexed handles.

E. Accessories:
   1. Chrome plated 17 gage, 0.0538 inch (1.37 mm) brass P-trap with clean-out plug and arm with escutcheon.
   2. Rigid supplies.

2.04 SINKS

A. Sink Manufacturers:
   1. ELKAY.

B. Double Compartment Bowl: ASME A112.19.3; 33 by 19 by 5.5 inch (_____ by _____ by _____ mm) outside dimensions 20 gage, 0.0359 inch (0.91 mm) thick, Type 302 stainless steel, self rimming and undercoated, with ledge back drilled for trim.
   1. Drain: 3-1/2 inch (90 mm) crumb cup and tailpiece.

2.05 SHOWERS

A. Shower Manufacturers:
   1. Aqua Glass Corporation ; _____: www.aquaglass.com.

B. Trim: ASME A112.18.1; concealed shower supply with pressure balanced mixing valves, integral service stops, bent shower arm with adjustable spray ball joint shower head with maximum flow, and escutcheon.

C. Shower Head:
   1. ASME A112.18.1; chrome plated vandal-proof institutional head with integral wall bracket, built-in 2.5 gpm (0.16 L/s) flow control.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

B. Install components level and plumb.

3.04 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.05 CLEANING

A. Clean plumbing fixtures and equipment.

3.06 PROTECTION

A. Protect installed products from damage due to subsequent construction operations.

B. Repair or replace damaged products before Date of Substantial Completion.

3.07 SCHEDULES

A. Fixture Heights: Install fixtures to heights above finished floor as indicated.
   1. Water Closet:
      a. Accessible: 18 inches (455 mm) to top of seat.
   2. Lavatory:
      a. Standard: 31 inches (785 mm) to top of basin rim.
   3. Shower Heads:
      a. Adult Male: 69.5 inches (1765 mm) to bottom of head.

END OF SECTION

SECTION 23 0548

VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof curbs.

1.02 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data:
   1. Provide manufacturer's product literature documenting compliance with PART 2 PRODUCTS.
   2. Include seismic rating documentation for each isolator and restraint component accounting for horizontal, vertical, and combined loads.

1.04 QUALITY ASSURANCE

A. Perform design and installation in accordance with applicable codes.

B. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and registered and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General:
   1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.
   2. Steel springs to function without undue stress or overloading.

2.02 ROOF CURBS

A. Vibration Isolation Curbs:
   1. Seismic Curb:
      a. Location: Between structure and rooftop equipment.
      b. Construction: Steel.
      c. Integral vibration isolation to conform to requirements of this section.
      d. Snubbers consist of minimum 0.25 inch (6 mm) thick resilient pads to avoid metal-to-metal contact without compromising vibration isolating capabilities.
      e. Weather exposed components consist of corrosion resistant materials.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 0553

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Adhesive-backed duct markers.

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

A. Air Handling Units: Nameplates.

B. Ductwork: Nameplates.

2.02 NAMEPLATES

A. Manufacturers:
   1. Advanced Graphic Engraving, LLC: www.advancedgraphicengraving.com.
   2. Brimar Industries, Inc.: www.pipemarker.com.
   3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com.
   4. Seton Identification Products, a Tricor Direct Company: www.seton.com.

B. Letter Color: White.

C. Letter Height: 1/4 inch (6 mm).

D. Background Color: Black.

E. Plastic: Conform to ASTM D709.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 23 0593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Employment of testing agency and payment for services.

1.03 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.

C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; 2005, Seventh Edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
   1. Submit under provisions of Section 01 4000.
   2. Revise TAB plan to reflect actual procedures and submit as part of final report.
   3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
   4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
   5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
   6. Units of Measure: Report data in I-P (inch-pound) units only.
   7. Include the following on the title page of each report:
      a. Name of Testing, Adjusting, and Balancing Agency.
      b. Address of Testing, Adjusting, and Balancing Agency.
      c. Telephone number of Testing, Adjusting, and Balancing Agency.
      d. Project name.
      e. Project location.
      f. Project Engineer.
      g. Project Contractor.
      h. Report date.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:
   1. AABC MN-1, AABC National Standards for Total System Balance.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:
   1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
   2. Having minimum of three years documented experience.
   3. Certified by one of the following:
      a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 ADJUSTMENT TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.03 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:
   1. Running log of events and issues.
   2. Discrepancies, deficient or uncompleted work by others.
   3. Contract interpretation requests.
   4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.04 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Measure air quantities at air inlets and outlets.

END OF SECTION

SECTION 23 0713
DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

1.02 RELATED REQUIREMENTS

A. Section 23 0553 - Identification for HVAC Piping and Equipment.

B. Section 23 3100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.

D. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2014.

E. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts; 2011.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, RIGID

A. Manufacturer:
   1. Knauf Insulation: www.knaufinsulation.com.
   2. Johns Manville: www.jm.com.

3. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C612; rigid, noncombustible blanket.
1. 'K' ('Ksi') Value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
2. Maximum Service Temperature: 450 degrees F (232 degrees C).
3. Maximum Water Vapor Absorption: 5.0 percent.
4. Maximum Density: 8.0 lb/cu ft (128 kg/cu m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.

B. Duct cleaning.

1.02 RELATED REQUIREMENTS

A. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

B. Section 23 0713 - Duct Insulation: External insulation and duct liner.

C. Section 23 3300 - Air Duct Accessories.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2012.

D. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2012.

E. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2013.

F. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2013.

G. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for duct materials.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES

A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.

B. Ducts: Galvanized steel, unless otherwise indicated.

C. Low Pressure Supply (Heating Systems): 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

D. Low Pressure Supply (System with Cooling Coils): 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

E. General Exhaust: 1/2 inch w.g. (125 Pa) pressure class, galvanized steel.

2.02 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

C. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
   1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
   2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.

3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

2.03 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.

B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

E. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA (DCS).

B. Flexible Ducts: Connect to metal ducts with adhesive.

C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet (1.5 m) maximum length of flexible duct held in place with strap or clamp.

3.02 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

END OF SECTION

SECTION 23 7413

PACKAGED OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Packaged roof top unit.

B. Roof mounting curb and base.

1.02 RELATED REQUIREMENTS

A. Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.

1.03 REFERENCE STANDARDS

A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008.

B. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2008.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.

C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

D. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Filters: One set for each unit.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. York International Corporation/Johnson Controls Inc: www.johnsoncontrols.com.

2.02 PERFORMANCE REQUIREMENTS - PER SCHEDULE ON CONSTRUCTION DOCUMENTS

2.03 MANUFACTURED UNITS

A. General: Roof mounted units having gas burner and electric refrigeration.

B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, return fan, heat exchanger and burner, heat recovery coil, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.

C. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

D. Disconnect Switch: Factory mount disconnect switch in control panel.

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backdraft dampers - metal.

B. Backdraft dampers - fabric.

C. Flexible duct connections.

D. Volume control dampers.

1.02 RELATED REQUIREMENTS

A. Section 23 3100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.

B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 BACKDRAFT DAMPERS - METAL

A. Manufacturers:
   1. Louvers & Dampers, Inc: www.louvers-dampers.com.
   2. Nailor Industries Inc: www.nailor.com.
   3. Ruskin Company: www.ruskin.com.

B. Gravity Backdraft Dampers, Size 18 by 18 inches (450 by 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.02 BACKDRAFT DAMPERS - FABRIC

A. Fabric Backdraft Dampers: Factory-fabricated.
   1. Blades: Neoprene coated fabric material.
   2. Birdscreen: 1/2 inch (12 mm) nominal mesh of galvanized steel or aluminum.
   3. Maximum Velocity: 1000 fpm (5 m/sec) face velocity.

2.03 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:
   1. Carlisle HVAC Products; Dynair Connector Plus G90 Steel Offset Seam Neoprene Fabric: www.carlislehvac.com.
   2. Elgen Manufacturing: www.elgenmfg.com.

B. Fabricate in accordance with SMACNA (DCS) and as indicated.

C. Flexible Duct Connections: Fabric crimped into metal edging strip.

2.04 VOLUME CONTROL DAMPERS

A. Manufacturers:
   1. Louvers & Dampers, Inc: www.louvers-dampers.com.
   2. Nailor Industries Inc: www.nailor.com.
   3. Ruskin Company: www.ruskin.com.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

D. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

E. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

2.04 FABRICATION

A. Cabinet: Steel with baked enamel finish, including access panels with screwdriver operated flush cam type fasteners. Structural members shall be minimum 18 gage, 0.0478 inch (1.21 mm), with access doors or panels of minimum 20 gage, 0.0359 inch (0.91 mm).

B. Heat Exchangers: Aluminized steel, of welded construction.

C. Supply and Return Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch motor pulley, and rubber isolated hinge mounted high efficiency motor or direct drive as indicated. Isolate complete fan assembly. Refer to Section 22 0548.

D. Supply and Return Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch pulley, and rubber isolated hinge mounted high efficiency motor or direct drive as indicated. Isolate complete fan assembly. Refer to Section 23 0548.

E. Air Filters:
   1. 2 inch (50 mm) thick glass fiber disposable media in metal frames.

F. Roof Mounting Curb: 14 inches (350 mm) high galvanized steel, channel frame with gaskets, nailer strips.

2.05 EVAPORATOR COIL

A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.

B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons (21 kw) capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons (26 kw) cooling capacity and larger.

2.06 COMPRESSOR

A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gage ports, and filter drier.

B. Five minute timed off circuit to delay compressor start.

C. For heat pump units, provide reversing valve, suction line accumulator, discharge muffler, flow control check valve, and solid-state defrost control utilizing thermistors.

2.07 CONDENSER COIL

A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.

B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

C. Provide refrigerant pressure switches to cycle condenser fans.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that roof is ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that proper power supply is available.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount units on factory built roof mounting curb providing watertight enclosure to protect ductwork and utility services. Install roof mounting curb level.

3.03 SYSTEM STARTUP

A. Prepare and start equipment. Adjust for proper operation.

3.04 CLOSEOUT ACTIVITIES

A. Demonstrate operation to Owner's maintenance personnel.

END OF SECTION

SECTION 26 0501

MINOR ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify field measurements and circuiting arrangements are as shown on Drawings.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition drawings are based on casual field observation and existing record documents.

D. Report discrepancies to Architect before disturbing existing installation.

E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

B. Coordinate utility service outages with utility company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Make notifications at least 24 hours in advance.

F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

F. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Nonmetallic-sheathed cable.

C. Metal-clad cable.

D. Wiring connectors.

E. Electrical tape.

F. Wire pulling lubricant.

G. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 26 0501 - Minor Electrical Demolition: Disconnection, removal, and/or extension of existing electrical conductors and cables.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

G. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.

H. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2007.

I. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

L. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

N. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

P. UL 719 - Nonmetallic-Sheathed Cables; Current Edition, Including All Revisions.

Q. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Metal-clad cable is permitted only as follows:
   1. Where not otherwise restricted, may be used:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
         1) Maximum Length: 6 feet (1.8 m).
      b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
         1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
         3) 20 A, 277 V circuits longer than 150 feet (46 m): 10 AWG, for voltage drop.

I. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.

3) Phase C: Blue.
4) Neutral/Grounded: White.

b. Equipment Ground, All Systems: Green.

c. Isolated Ground, All Systems: Green with yellow stripe.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:
   a. Cerro Wire LLC : www.cerrowire.com.
   b. Encore Wire Corporation : www.encorewire.com.
   c. Southwire Company : www.southwire.com.
   d. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:
   a. Size 10 AWG and Smaller: Solid.
   b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2 , except as indicated below.
   a. Size 4 AWG and Larger: Type XHHW-2.

2.04 NONMETALLIC-SHEATHED CABLE

A. Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719, Type NM-B.

B. Conductor Stranding:

1. Size 10 AWG and Smaller: Solid.
2. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

2.05 METAL-CLAD CABLE

A. Manufacturers:

1. AFC Cable Systems Inc : www.afcweb.com.
2. Encore Wire Corporation : www.encorewire.com.
3. Southwire Company : www.southwire.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:

1. Size 10 AWG and Smaller: Solid.
2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

F. Grounding: Full-size integral equipment grounding conductor.

1. Provide additional isolated/insulated grounding conductor where indicated or required.

G. Armor: Steel, interlocked tape.

2.06 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Terminations:

2.07 WIRING ACCESSORIES

A. Electrical Tape:
   1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

C. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as shown on the drawings.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Maintain separation of wiring for emergency systems in accordance with NFPA 70.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Install nonmetallic-sheathed cable (Type NM-B) in accordance with NECA 121.

E. Install metal-clad cable (Type MC) in accordance with NECA 120.

F. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

I. Terminate cables using suitable fittings.
   1. Metal-Clad Cable (Type MC):

a. Use listed fittings.
b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

J. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

M. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Do not remove conductor strands to facilitate insertion into connector.
3. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Nonmetallic-sheathed cable.

C. Metal-clad cable.

D. Wiring connectors.

E. Electrical tape.

F. Wire pulling lubricant.

G. Cable ties.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 26 0501 - Minor Electrical Demolition: Disconnection, removal, and/or extension of existing electrical conductors and cables.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

G. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.

H. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2007.

I. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

L. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

N. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

P. UL 719 - Nonmetallic-Sheathed Cables; Current Edition, Including All Revisions.

Q. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Metal-clad cable is permitted only as follows:
   1. Where not otherwise restricted, may be used:
      a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
         1) Maximum Length: 6 feet (1.8 m).
      b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
         1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
         3) 20 A, 277 V circuits longer than 150 feet (46 m): 10 AWG, for voltage drop.

I. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.

3) Phase C: Blue.
4) Neutral/Grounded: White.

b. Equipment Ground, All Systems: Green.

c. Isolated Ground, All Systems: Green with yellow stripe.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:
   a. Cerro Wire LLC : www.cerrowire.com.
   b. Encore Wire Corporation : www.encorewire.com.
   c. Southwire Company : www.southwire.com.
   d. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:
   a. Size 10 AWG and Smaller: Solid.
   b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2 , except as indicated below.
   a. Size 4 AWG and Larger: Type XHHW-2.

2.04 NONMETALLIC-SHEATHED CABLE

A. Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719, Type NM-B.

B. Conductor Stranding:

1. Size 10 AWG and Smaller: Solid.
2. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

2.05 METAL-CLAD CABLE

A. Manufacturers:

1. AFC Cable Systems Inc : www.afcweb.com.
2. Encore Wire Corporation : www.encorewire.com.
3. Southwire Company : www.southwire.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:

1. Size 10 AWG and Smaller: Solid.
2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

F. Grounding: Full-size integral equipment grounding conductor.

1. Provide additional isolated/insulated grounding conductor where indicated or required.

G. Armor: Steel, interlocked tape.

2.06 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Wiring Connectors for Terminations:

2.07 WIRING ACCESSORIES

A. Electrical Tape:
   1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

C. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as shown on the drawings.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Maintain separation of wiring for emergency systems in accordance with NFPA 70.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Install nonmetallic-sheathed cable (Type NM-B) in accordance with NECA 121.

E. Install metal-clad cable (Type MC) in accordance with NECA 120.

F. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

I. Terminate cables using suitable fittings.
   1. Metal-Clad Cable (Type MC):

a. Use listed fittings.
b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.

J. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

M. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Do not remove conductor strands to facilitate insertion into connector.
3. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

O. Insulate ends of spare conductors using vinyl insulating electrical tape.

P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association ; 2010.

B. NFPA 70 - National Electrical Code; National Fire Protection Association ; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 467 - Grounding and Bonding Equipment ; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as shown on the drawings.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.

C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION

SECTION 26 0534
CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical metallic tubing (EMT).

B. Liquidtight flexible nonmetallic conduit (LFNC).

C. Conduit fittings.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.

C. Section 26 0526 - Grounding and Bonding for Electrical Systems.

D. Section 26 0529 - Hangers and Supports for Electrical Systems.

E. Section 26 0537 - Boxes.

F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

C. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

G. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

H. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

2.02 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube & Conduit: www.alliedeg.com.
   2. Republic Conduit: www.republic-conduit.com.
   3. Wheatland Tube Company: www.wheatland.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.
   4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.04 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com.
   2. Electri-Flex Company: www.electriflex.com.
   3. _____.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.

C. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

D. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

A. Section 26 0534 - Conduit: Additional support and attachment requirements for conduits.

B. Section 26 0536 - Cable Trays for Electrical Systems: Additional support and attachment requirements for cable tray.

C. Section 26 0537 - Boxes: Additional support and attachment requirements for boxes.

D. Section 26 2501 - Low-Voltage Busways: Additional support and attachment requirements for busway.

E. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

F. Section 26 5113 - Luminaires, Ballasts, and Drivers - Lutron: Additional support and attachment requirements for luminaires.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

D. MFMA-4 - Metal Framing Standards Publication; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of _____. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
a. Cooper Crouse-Hinds, a division of Eaton Corporation : www.cooperindustries.com.
b. Erico International Corporation : www.erico.com.
c. O-Z/Gedney, a brand of Emerson Industrial Automation : www.emersonindustrial.com.
d. Thomas & Betts Corporation : www.tnb.com.
e. Substitutions: See Section 01 6000 - Product Requirements.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
a. Cooper Crouse-Hinds, a division of Eaton Corporation : www.cooperindustries.com.
b. Erico International Corporation : www.erico.com.
c. O-Z/Gedney, a brand of Emerson Industrial Automation : www.emersonindustrial.com.
d. Thomas & Betts Corporation : www.tnb.com.
e. Substitutions: See Section 01 6000 - Product Requirements.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
a. Equipment Supports: 1/2 inch (13 mm) diameter.
b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch (6 mm) diameter.
c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch (10 mm) diameter.
d. Outlet Boxes: 1/4 inch (6 mm) diameter.
e. Luminaires: 1/4 inch (6 mm) diameter.

F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
4. Hollow Masonry: Use toggle bolts.
5. Hollow Stud Walls: Use toggle bolts.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
a. Comply with MFMA-4.
b. Channel Material: Use galvanized steel.
c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.

C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

H. Conduit Support and Attachment: Also comply with Section 26 0534.

I. Cable Tray Support and Attachment: Also comply with Section 26 0536.

J. Box Support and Attachment: Also comply with Section 26 0537.

K. Busway Support and Attachment: Also comply with Section 26 2501.

L. Interior Luminaire Support and Attachment: Also comply with Section 26 5100.

M. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

N. Secure fasteners according to manufacturer's recommended torque settings.

O. Remove temporary supports.

END OF SECTION

SECTION 26 0534
CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical metallic tubing (EMT).

B. Liquidtight flexible nonmetallic conduit (LFNC).

C. Conduit fittings.

1.02 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables : Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.

C. Section 26 0526 - Grounding and Bonding for Electrical Systems.

D. Section 26 0529 - Hangers and Supports for Electrical Systems.

E. Section 26 0537 - Boxes.

F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

C. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.

D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

G. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

H. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

2.02 CONDUIT REQUIREMENTS

A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube & Conduit : www.alliedeg.com.
   2. Republic Conduit : www.republic-conduit.com.
   3. Wheatland Tube Company : www.wheatland.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.
   4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.04 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

A. Manufacturers:
   1. AFC Cable Systems, Inc : www.afcweb.com.
   2. Electri-Flex Company : www.electriflex.com.
   3. _____.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660 .

C. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

D. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.

E. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.

F. Connections and Terminations:
   1. Use suitable adapters where required to transition from one type of conduit to another.
   2. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
   3. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
   4. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

G. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Conceal bends for conduit risers emerging above ground.
   5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
   6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
   7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty . Include proposed locations of penetrations and methods for sealing with submittals.
   8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

I. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

J. Provide grounding and bonding in accordance with Section 26 0526.

K. Identify conduits in accordance with Section 26 0553.

3.02 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

END OF SECTION

SECTION 26 0537

BOXES

PART 2 PRODUCTS

1.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use suitable concrete type boxes where flush-mounted in concrete.
   4. Use suitable masonry type boxes where flush-mounted in masonry walls.
   5. Use raised covers suitable for the type of wall construction and device configuration where required.
   6. Use shallow boxes where required by the type of wall construction.
   7. Do not use "through-wall" boxes designed for access from both sides of wall.
   8. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A ; furnish with threaded hubs.
   9. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
   10. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
   11. Minimum Box Size, Unless Otherwise Indicated:
      a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
      b. Communications Systems Outlets: Comply with Section 27 1005.
   12. Wall Plates: Comply with Section 26 2726.
   13. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation : www.cooperindustries.com.
      b. Hubbell Incorporated; Bell Products : www.hubbell-rtb.com.
      c. Hubbell Incorporated; RACO Products : www.hubbell-rtb.com.
      d. O-Z/Gedney, a brand of Emerson Industrial Automation : www.emersonindustrial.com.
      e. Thomas & Betts Corporation : www.tnb.com.
      f. Substitutions: See Section 01 6000 - Product Requirements.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
   3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
      a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

2.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130 , including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as required where approved by the Architect.

E. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

F. Install boxes plumb and level.

G. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

H. Install boxes as required to preserve insulation integrity.

I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

J. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

K. Close unused box openings.

L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

M. Provide grounding and bonding in accordance with Section 26 0526.

2.03 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Voltage markers.

D. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 27 1005 - Structured Cabling for Voice and Data - Inside-Plant: Identification for communications cabling and devices.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

C. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
   2. Identification for Communications Conductors and Cables: Comply with Section 27 1005.
   3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

D. Identification for Raceways:
   1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet (6.1 m).

E. Identification for Boxes:

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Manufacturers:
      a. Brimar Industries, Inc : www.brimar.com.
      b. Kolbi Pipe Marker Co : www.kolbipipemarkers.com.
      c. Seton Identification Products : www.seton.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2. Materials:
    a. Indoor Clean, Dry Locations: Use plastic nameplates.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Manufacturers:
    a. Brady Corporation : www.bradyid.com.
    b. Brother International Corporation : www.brother-usa.com.
    c. Panduit Corp : www.panduit.com.
    d. Substitutions: See Section 01 6000 - Product Requirements.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
    a. Use only for indoor locations.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 VOLTAGE MARKERS

A. Manufacturers:
1. Brady Corporation : www.bradyid.com.
2. Brimar Industries, Inc : www.brimar.com.
3. Seton Identification Products : www.seton.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

C. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

D. Minimum Size:
1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

E. Legend:
1. Markers for Voltage Identification: Highest voltage present.

F. Color: Black text on orange background unless otherwise indicated.

2.04 WARNING SIGNS AND LABELS

A. Manufacturers:
1. Brimar Industries, Inc : www.brimar.com.
2. Clarion Safety Systems, LLC : www.clarionsafety.com.
3. Seton Identification Products : www.seton.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:
1. Materials:
    a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.

D. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant ; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.

3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Interior Components: Legible from the point of access.
   6. Conduits: Legible from the floor.
   7. Boxes: Outside face of cover.
   8. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
   1. Do not use adhesives on exterior surfaces except where substrate can not be penetrated.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Voltage markers.

D. Warning signs and labels.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 27 1005 - Structured Cabling for Voice and Data - Inside-Plant: Identification for communications cabling and devices.

1.03 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.

C. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
   2. Identification for Communications Conductors and Cables: Comply with Section 27 1005.
   3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

D. Identification for Raceways:
   1. Use voltage markers to identify highest voltage present for accessible conduits at maximum intervals of 20 feet (6.1 m).

E. Identification for Boxes:

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Manufacturers:
      a. Brimar Industries, Inc : www.brimar.com.
      b. Kolbi Pipe Marker Co : www.kolbipipemarkers.com.
      c. Seton Identification Products : www.seton.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2. Materials:
    a. Indoor Clean, Dry Locations: Use plastic nameplates.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Manufacturers:
    a. Brady Corporation : www.bradyid.com.
    b. Brother International Corporation : www.brother-usa.com.
    c. Panduit Corp : www.panduit.com.
    d. Substitutions: See Section 01 6000 - Product Requirements.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
    a. Use only for indoor locations.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 VOLTAGE MARKERS

A. Manufacturers:
1. Brady Corporation : www.bradyid.com.
2. Brimar Industries, Inc : www.brimar.com.
3. Seton Identification Products : www.seton.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Markers for Conduits: Use factory pre-printed self-adhesive vinyl, self-adhesive vinyl cloth, or vinyl snap-around type markers.

C. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

D. Minimum Size:
1. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.

E. Legend:
1. Markers for Voltage Identification: Highest voltage present.

F. Color: Black text on orange background unless otherwise indicated.

2.04 WARNING SIGNS AND LABELS

A. Manufacturers:
1. Brimar Industries, Inc : www.brimar.com.
2. Clarion Safety Systems, LLC : www.clarionsafety.com.
3. Seton Identification Products : www.seton.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:
1. Materials:
    a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.

D. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant ; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.

3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Interior Components: Legible from the point of access.
   6. Conduits: Legible from the floor.
   7. Boxes: Outside face of cover.
   8. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
   1. Do not use adhesives on exterior surfaces except where substrate can not be penetrated.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION

SECTION 26 0923
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Occupancy sensors.

1.02 RELATED REQUIREMENTS

A. Section 26 0537 - Boxes.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 2726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.

D. Section 26 5100 - Interior Lighting.

E. Section 26 5113 - Luminaires, Ballasts, and Drivers - Lutron.

1.03 ADMINISTRATIVE REQUIREMENTS

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
   1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

C. Field Quality Control Reports.

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.02 OCCUPANCY SENSORS

A. Manufacturers:
   1. Hubbell Building Automation, Inc : www.hubbellautomation.com
   2. Lutron Electronics Company, Inc : www.lutron.com.
   3. Sensor Switch Inc : www.sensorswitch.com.
   4. WattStopper : www.wattstopper.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. All Occupancy Sensors:
   1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
   2. Sensor Technology:
      a. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
      b. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.

3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
5. Turn-Off Delay: Field adjustable , with time delay settings up to 30 minutes.
6. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete , including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130 , including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of lighting control devices provided under this section.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 2726.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Occupancy Sensor Locations:
   1. Location Adjustments: Within the design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage.

3.04 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area . Record test results in written report to be included with submittals.

C. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

END OF SECTION

SECTION 26 5100
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Ballasts and drivers.

E. Fluorescent emergency power supply units.

F. Lamps.

G. Luminaire accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 0537 - Boxes.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 0923 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.

1.03 REFERENCE STANDARDS

A. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; Illuminating Engineering Society ; 2008.

B. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; Illuminating Engineering Society; 2015.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

D. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.

E. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. NFPA 101 - Life Safety Code; 2015.

H. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

I. UL 1598 - Luminaires; Current Edition, Including All Revisions.

J. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
    a. Include estimated useful life, calculated based on IES LM-80 test data.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS - LUMINAIRES

A. Refer to Fixture schedule in drawing package..

B. Substitutions: See Section 01 6000 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.

2.02 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Substitutions: See Section 01 6000 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.

2.03 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.04 EMERGENCY LIGHTING UNITS

A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

C. Battery:
   1. Sealed maintenance-free lead calcium unless otherwise indicated.
   2. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.05 EXIT SIGNS

A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.

2. Directional Arrows: As indicated or as required for the installed location.

2.06 BALLASTS AND DRIVERS

A. Ballasts - General Requirements:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

2.07 FLUORESCENT EMERGENCY POWER SUPPLY UNITS

A. Description: Self-contained fluorescent emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Compatibility:
   1. Ballasts: Compatible with electronic, standard magnetic, energy saving, and dimming AC ballasts, including those with end of lamp life shutdown circuits.

C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the fluorescent emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

D. Diagnostics: Provide accessible and visible multi-chromatic combination test switch/indicator light to display charge, test, and diagnostic status and to manually activate emergency operation.

2.08 LAMPS

A. Lamps - General Requirements:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install accessories furnished with each luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

G. Emergency Lighting Units:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

H. Exit Signs:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

I. Fluorescent Emergency Power Supply Units:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal ballast(s) in luminaire. Bypass local switches, contactors, or other lighting controls.

J. Install lamps in each luminaire.

3.04 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.05 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 28 31 11

DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The following documents and drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section:

1. Division 00 Specification Sections
2. Division 01 Specification Sections
3. Division 02 Specification Sections
4. Division 07 Specification Sections
5. Division 09 Specification Sections
6. Division 26 Specification Sections
7. UNLV South Residence Halls Fire Alarm and Detection System Upgrade Letter

1.02 SCOPE

A. The project scope includes the following:

1. Complete replacement of the existing fire alarm and detection system serving the South Residence Hall building at UNLV. The project area includes all three (3) residence halls.

2. The new system shall consist of an addressable fire detection and alarm signaling system from a single manufacturer. The control panel shall be intelligent device addressable, analog detecting, low voltage and modular, in full compliance with all applicable codes and standards. The features and capacities described in this specification are required as a minimum for this project and shall be furnished by the successful contractor.

3. The system shall be in full compliance with all codes and standards indicated in this specification.

4. The new system shall interface with existing fire protection, and fire safety functions consisting of, but not limited to, the following:

a. Automatic sprinkler systems
b. Fire pump
c. Automatic-closing doors at fire-resistance rated assemblies
d. Door locking systems
e. Elevator recall
f. Air handling equipment automatic shutdown

5. The system shall include all required hardware, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.

6. Existing cable, raceways, and backboxes are expected to be utilized as much as possible for the fire alarm and detection system replacement. Installing contractor shall review existing cable, raceways, and backboxes prior to installation to confirm they can be used. Where existing raceways are not able to be utilized, the Contractor shall notify the UNLV project manager prior to commencing work.

7. New cable, raceways, and backboxes shall be provided as needed for a complete and fully operational system.

8. In order to minimize impacts to existing finishes, existing initiating device and notification appliance locations shall be used as much as possible.

9. Should the existing fire alarm system vendor be needed during the system replacement process, the installing contractor shall include all costs associated with contracting the original vendor.

10. New 120VAC power circuits shall be provided to all new control panels, annunciator panels, and remote power supply panels, as needed.

11. Where existing wall and ceiling mount detection and notification appliance back boxes are not utilized, cover plates painted to match existing finishes shall be provided.

12. All equipment furnished shall be new and the latest state-of-the-art products of a single manufacturer, engaged in the manufacturing and sale of analog fire detection devices for over ten years.

13. The system as specified shall be supplied, installed, tested and approved by the local Authority Having Jurisdiction, and turned over to the owner in an operational condition.

14. In the interest of job coordination and responsibilities, the installing contractor shall contract with a single supplier for fire alarm equipment, engineering, programming, inspection and tests, and shall be capable of providing a “UL-Listing Certificate” for the complete system.

15. The system specified shall meet all project requirements. Other systems shall be submitted 10 days prior to bid date for approval by the Engineer. All systems approved shall meet all the requirements spelled out in this specification. System approval shall be in writing by the Engineer and a copy shall be submitted with the system submittals.

16. As part of the system replacement process, penetrations of existing fire-resistance rated assemblies from new installations or removal of existing equipment in existing fire-resistance rated assemblies shall be protected with new firestopping systems.

17. Existing manual fire alarm boxes throughout the facility shall be removed and not replaced. Blank cover plates painted to match existing finishes shall be installed at each back box.

18. During the course of system replacement, the existing fire alarm and detection system shall remain operational as long as possible in order to minimize the need for fire watches.

19. The installing contractor shall coordinate all work activities with the designated UNLV project manager. Contractor shall attend weekly meetings with the UNLV project manager and provide a schedule outlining all replacement activities including the building areas to be impacted.

20. The installing contractor shall repair all finishes disturbed during the system replacement process.

21. The original fire alarm and detection system shall be removed.

22. The installing contractor shall perform air balance performance testing for sampling tube style duct smoke detectors. Each sampling tube-style duct smoke detector shall be verified to be within the listed air velocity and pressure differential ranges and automatically shut down the associated unit(s). Testing shall be documented on testing reports to be issued to Clark County with final system testing and certification documentation.

23. All addressable devices shall be provided with a printed label indicating the device specific address. Labels to be attached to the device or ceiling grid for ceiling mounted devices.

24. All fire alarm initiating devices and notification appliances shall be provided with a bar code label for testing verification purposes. Barcode label requirements shall be coordinated with the designated UNLV project manager.

25. The installing contractor shall include all costs for the project including, but not limited to, the following:

    a. Equipment
    b. Raceways
    c. Design
    d. Project management
    e. Programming
    f. Installation
    g. System testing (i.e. pretesting, AHJ testing)
    h. Permits
    i. Taxes and fees
    j. Equipment delivery and storage at the project site
    k. Repair of finishes disturbed during the system replacement process
    l. Removal of original fire alarm and detection system
    m. Firestopping
    n. Fire watches

1.03 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. ASME: American Society of Mechanical Engineers.

C. DACT: Digital alarm communicator transmitter.

D. FAAP: Fire alarm annunciator panel.

E. FACP: Fire alarm control panel.

F. FDC: Fire department connection.

G. Furnish: To supply the stated equipment or materials.

H. Install: To set in position and connect or adjust for use.

I. LCD: Liquid crystal display.

J. LED: Light-emitting diode.

K. NAC: Notification appliance circuit.

L. NFPA: National Fire Protection Association. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

M. NICET: National Institute for Certification in Engineering Technologies.

N. NSFM: Nevada State Fire Marshal.

O. Provide: To furnish and install the stated equipment or materials.

P. SNBC: 2012 International Building Code with State of NV amendments.

Q. SNFC: 2012 International Fire Code with State of NV amendments.

R. UL: Underwriters Laboratories.

1.04 SYSTEM DESCRIPTION

A. Basic System - The system shall be a complete, electrically supervised fire detection and notification system, with a microprocessor based operating system having the following capabilities, features, and capacities:

1. Each intelligent addressable device or conventional zone on the system shall be displayed at the FACP and FAAP display by a unique alphanumeric label identifying its location.

1.05 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with NFPA 72 and all contract documents and specification requirements.

B. All interconnections between this system and the monitoring system shall be arranged so that the entire system can be UL-Certificated.

C. System shall be a complete, supervised, non-coded, addressable multiplex fire alarm system conforming to NFPA 72.

D. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal.

E. The FACP shall be provided with equipment to interface with the existing DACT for transmitting the following signals to the monitoring station:

1. Alarm

2. Supervisory

3. System trouble

F. A remote LCD FAAP shall be provided at the required location. The LCD FAAP shall be read-only and not be capable resetting or silencing the system.

G. The FACP shall interface to the existing LED FAAP located in the Residence Hall Complex South Services Building.

H. Addressable area smoke detection shall be provided at the following locations:

1. Common spaces outside of dwelling and sleeping units.

2. Elevator lobbies and machine rooms for elevator recall functions.

3. Automatic-closing doors in fire-resistance rated assemblies for door closure.

4. Rooms housing fire alarm panels.

5. Mechanical equipment and storage rooms.

6. Interior exit corridors.

I. Addressable area smoke detection with sounder bases shall be provided in all dwelling and sleeping units.

J. Addressable duct smoke detectors shall be provided at the following locations:

1. Air handling unit supply air duct serving any system delivering more than 2,000 cfm except for systems serving as recirculation devices for a single room.

K. An addressable manual fire alarm box shall be provided at the FACP.

L. Fire alarm audible notification appliance coverage shall be provided at the following locations:

1. Throughout every occupiable space within the building to provide a sound pressure level of 15 decibels (db) above the average sound level or 5db above maximum sound level having a duration of at least 60 seconds, whichever is greater. Minimum sound pressure levels shall be 90db in mechanical equipment rooms and 80db in all other occupancies. Maximum sound pressure levels shall be 110db at the minimum hearing distance from the appliance.

M. Fire alarm visible notification appliance coverage shall be provided throughout all public and common use areas in the building.

1. The following areas shall not require fire alarm visible notification coverage:

a. Storage rooms less than 400 ft².

b. Janitor closets.

c. Equipment rooms that are not normally occupied or less than 400 ft².

d. Elevator cabs.

e. Stairway exit enclosures.

N. New weatherproof fire alarm notification appliances (horn/strobes) shall be provided on the exterior of the building directly above the associated FDC.

O. The system shall provide the following functions and operating features:

1. The FACP and auxiliary power panels shall provide power, annunciation, supervision and control for the system.

2. Provide Class B initiating device circuits.

3. Provide Class B signaling line circuits for the addressable initiating devices.

4. Provide Class B notification appliance circuits.

5. Strobes shall be synchronized throughout the entire building.

6. Provide electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control panel.

P. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.

Q. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual fire alarm box

2. Addressable area smoke detectors

3. Automatic sprinkler system water flow switches

R. Supervisory signal initiation shall be by one or more of the following:

1. Duct smoke detectors

2. Sprinkler valve supervisory devices

3. Fire pump status signals

S. Activation of any system fire, supervisory, or trouble status shall cause the following actions and indications at the main FACP:

1. Fire Alarm Condition:

a. Activate an audible and visible alarm at the FACP and FAAP.

b. Indicate the specific device in alarm at the FACP and FAAP LCD displays.

c. Activate the associated building alarm LED on the Residence Hall Complex South Services Building FAAP.

d. Log into the system history archives all activity pertaining to the alarm condition.

e. Audible signals shall be silenced and visible appliances shall be turned off from the FACP by an alarm silence switch.

f. Activation of any smoke detector in a single elevator lobby or an elevator equipment room shall, in addition to the actions described, cause the recall of that bank of elevators to the 1st Floor and the lockout of controls. In the event of recall initiation by a detector in the 1st Floor lobby, the recall shall be to the 2nd (alternate) Floor.

g. Activation of an area smoke detector at automatic-closing doors shall close the associated door.

h. Activation of the fire alarm notification appliances.

i. Activation of a sprinkler waterflow switch shall activate the weatherproof notification appliance above the FDC.

j. Activation of any fire alarm condition shall unlock electronically controlled doors.

k. Transmit alarm signal to the monitoring station.

2. Supervisory Condition:

a. Display the origin of the supervisory condition at the FACP and FAAP LCD displays.

b. Activate supervisory audible and visual signal at the FACP and FAAP.

c. Audible signals shall be silenced from the FACP by the supervisory acknowledge switch.

d. Record within system history the device and time of occurrence of the event.

e. System operated duct smoke detectors at air handling units shall shutdown the associated unit.

f. Transmit supervisory signal to remote monitoring station.

3. Trouble Condition

a. Display the origin of the trouble condition at the FACP and FAAP LCD displays.

b. Activate trouble audible and visual signals at the FACP and FAAP.

c. Audible signals shall be silenced from the FACP by a trouble acknowledge switch.

d. Trouble conditions that have been restored to normal shall be automatically removed from the trouble display queue and not require operator intervention. This feature shall be software selectable and shall not preclude the logging of trouble events to the historical file.

e. Trouble reports for primary system power failure to the master control shall be automatically delayed for a period of time equal to 25% of the system standby battery capacity to eliminate spurious reports as a result of power fluctuations.

f. Record within system history, the occurrence of the event and the time of occurrence.

g. Transmit system trouble signal to remote monitoring station.

1.06 SUBMITTALS

A. Product Data: For each type of product indicated, include construction details, material descriptions, dimensions of individual components and profiles, and finishes. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories. Complete manufacturer's catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.

B. Power calculations. Battery capacity calculations. Battery size shall be a minimum of 125% of the calculated requirement. Provide the following supporting information:

1. Supervisory power requirements for all equipment.

2. Alarm power requirements for all equipment.

3. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.

4. Voltage drop calculations for each NAC indicating a minimum of 16 volts at the end of the circuit with a starting voltage of 20.4 volts.

5. Batteries to be sized to sufficient capacity to operate the fire alarm and detection system in non-alarm conditions for a minimum of 24 hours and then capable of operating the system during a fire or other emergency condition for a period of 5 minutes at maximum connected load.

C. Submit manufacturer's requirements for testing signaling line circuits and device addresses prior to connecting to control panel. At a minimum, the following tests shall be required: device address, the usage (alarm, supervisory etc), environmental compensation, temperature ratings for thermal detectors and smoke detector sensitivities. This requirement shall need approval before any wiring is connected to the control panel.

D. Shop Drawings: Shop drawings shall be submitted for review and approval by NSFM prior to system installation. Where the installation changes from the approved shop drawings, corrected shop drawings showing the system as actually installed shall be submitted for review and approval by NSFM prior to inspection. Shop drawings shall include the following:

1. Project name, street and owner's name.

2. Contractor name, address, phone number, license numbers, license classification, and license limit.

3. Wet/electronic signature of licensee (contractor's Master or Qualified Employee).

4. Wet/electronic signature of the NICET designer or Nevada Registered Fire Protection Engineer who prepared the plan, drawing and calculations. For plans prepared by a NICET designer, the designer's printed name and certificate number shall follow the signature.

5. Occupancy classification. For all occupancies, state the occupant load.

6. Fire alarm circuit classification (power-limited or non-power-limited).

7. Class designation of all initiating device circuits, signaling line circuits, and notification appliance circuits.

8. Conductor type and size.

9. Sequence of operation input/output matrix as required by NFPA 72.

10. Symbol legend with equipment description (manufacturer's name and model number) and mounting description (surface, semi-flush, flush, and exterior).

11. Site plan.

12. Floor plan drawn to an indicated scale (1/8” minimum) on sheets of a uniform size showing:
    a. Point of compass (north arrow).
    b. A graphic representation of the scale used on plans.
    c. Walls, doors, windows, openings, stairs, elevators, passageways, high piled storage racks, etc. as applicable to depict the facility.
    d. Room use identification labels.
    e. Alarm initiating device, notification appliance, and auxiliary controlled or monitored equipment and systems, control and annunciation equipment locations.
    f. Conductor/conduit routing and size.
    g. Location of end-of-line resistors.
    h. Device addresses.
    i. Notification appliance numbering by circuit and device corresponding to the riser and/or one line diagrams.
    j. Power panels and circuit connections.
    k. Key plan.
    l. Ceiling heights, and construction (i.e. beam, joist, soffit, or other projection extending below the ceiling when a ceiling mount device and/or appliance is used).
13. Mounting height detail for wall mounted device and/or appliance.
14. Riser diagram including the following information:
    a. General arrangement of the system, in building cross-section.
    b. Type and number of circuits in each riser.
    c. Type and number of fire alarm system components/devices on each circuit, on each floor or level.
15. Standardized calculations for the following:
    a. Batteries (all panels).
    b. Load (all notification appliance and auxiliary circuits).
    c. Voltage drop (all notification appliance circuits, including remote annunciators and auxiliary appliances).
16. Addressable device list with approved alpha numeric descriptor for each device when required by NSFM.
17. Product data submittal including a cover index sheet listing products used by make and model number, manufacturer data sheets and listing information for all equipment, devices, materials, wire and cable.
18. Design number and detail of penetration fire stop system.

19. Any additional information determined necessary by NSFM.

E. Qualification Data: For qualified installer, applicator, manufacturer, fabricator, professional engineer, testing agency, and factory-authorized service representative.

F. Source quality-control reports.

G. Field quality-control reports.

H. Operation and Maintenance Data: For all fire alarm equipment, to include in operation and maintenance manuals.

I. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.

2. Program Software Backup: On magnetic media or compact disk, complete with data files.

3. Device address list.

4. Printout of software application and graphic screens.

J. Warranty: Sample of special warranty.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: The publications listed below form a part of this publication.

1. NFPA 70 – *National Electrical Code* (2011 edition)

2. NFPA 72 – *National Fire Alarm and Signaling Code* (2013 edition)

3. 2012 *International Building Code* with State of NV amendments

4. 2012 *International Fire Code* with State of NV amendments

5. 2012 *Uniform Mechanical Code* with State of NV amendments

6. Underwriters' Laboratories, Inc. (UL) equipment standards, Latest Edition

a. UL Fire Protection Equipment Directory

b. UL Electrical Construction Materials Directory

c. UL 38 – Manually Actuated Signaling Boxes for Use with Fire Protection Signaling Systems

d. UL 228 – Door Holding Devices

e. UL 268 – Smoke Detectors for Fire Protective Signaling Systems

f. UL 268A – Smoke Detectors for Duct Application

g. UL 464 – Audible Signal Appliances

h. UL 497A – Secondary Protectors for Communications Circuits

i. UL 521 – Heat Detectors for Fire Protective Signaling Systems

j. UL 864 – Control Units for Fire Protective Signaling Systems

k. UL 1449 – Transient Voltage Surge Suppressors

l. UL 1971 – Signaling Devices for the Hearing Impaired

B. Supplier Qualifications

1. Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State if required by law.

2. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation and maintenance.

3. The supplies shall furnish evidence they have an experienced service organization, which carries a stock of spare and repair parts for the system being furnished.

4. The equipment supplier shall be authorized and trained by the manufacturer to calculate, design, install, test, and maintain the air sampling system and shall be able to produce a certificate stating such upon request.

C. Installer Qualifications:

1. Before commencing work, submit data showing that the manufacturer has successfully installed fire alarm systems of the same scope, type and design as specified.

2. The contractor shall submit copies of all required Licenses and Bonds as required in the State having jurisdiction.

3. The contractor shall employ on staff a minimum of one NICET Level II technician registered in the State of NV.

4. The contractor shall be qualified by UL for certifying fire alarm systems. Upon completion of the installation, the contractor shall certify the final system meets UL ongoing maintenance.

5. Contractors unable to comply with the provisions of qualification of installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.

D. Testing Agency Qualifications: Qualified for testing indicated.

E. Source Limitations for fire alarm equipment: Obtain fire alarm equipment from single source.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Pre-installation Conference: Conduct conference at Project site.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, and shelf life if applicable.

B. Store materials inside, under cover, above ground, and kept dry and protected from physical damage until ready for use. Remove from site and discard wet or damaged materials.

1.09 PROJECT CONDITIONS

A. Installed products or materials shall be free from any damage including, but not limited to, physical insult, dirt and debris, moisture, and mold damage.

B. Only products of a current equipment model and manufactured within the past year shall be utilized.

C. Environmental Limitations: Do not deliver or install products or materials until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire alarm equipment that fail(s) in materials or workmanship within specified warranty period.

1. Warranty Period: 1 year from date of Substantial Completion.

1.11 SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for 1 year.

B. Upgrade Service: Update software to latest version at project completion. Install and program software upgrades that become available within two years from date of substantial completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.12 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents, as follows:

1. Smoke detectors – Minimum 10% of installed quantity.

2. Smoke detectors with sounder bases – Minimum 10% of installed quantity.

3. Duct smoke detectors – Minimum 10% of quantity installed.

4. Addressable monitor and control modules – Minimum 10% of quantity installed.

5. Fire alarm audible/visible notification appliances – Minimum 10% of quantity installed.

6. Fire alarm audible notification appliances – Minimum 10% of quantity installed.

7. Fire alarm visible notification appliances – Minimum 10% of quantity installed.

8. Relays – Minimum 10% of quantity installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers:

1. EST
2. Notifier
3. Siemens
4. Simplex

2.02 CONTROL PANEL

A. The fire alarm control panel shall be microprocessor-based using multiple microprocessors throughout the system, providing rapid processing of smoke detector and other initiation device information to control system output functions.

B. There shall be a watchdog circuit, which shall verify the system processors and the software program. Problems with either the processors or the system program the panel shall activate a trouble signal and reset the panel.

C. The system shall be capable of supporting unshielded wiring applications.

D. System Components:

1. The FACP status display shall provide a remote LED/LCD display that shows the local status of a system. An LED shall illuminate when alarm, supervisory, and trouble events occur on the system. The display shall consist of a LCD display that has four lines of forty characters each that provides details of the event in alphanumeric form. The display shall have three additional control buttons for acknowledging events, silencing audible circuits, and resetting the system. The display shall have an integral key switch that enables these control buttons to operate. The display shall have the ability to be located within a locked cabinet, so no additional key switch is required for enabling the control buttons.

2. The device loop card shall be capable of minimum 250 intelligent devices. This module controls the signaling from the initiation devices reporting alarms and troubles to the control panel. This module shall also provide the signaling to the field devices for the controlling the output of specific initiation devices. Each circuit shall have the ability to be wired in either a Class B or Class A configuration. When using Class B, T-tapping shall be permitted with no loss of supervision.

3. The signal line circuits shall be tested for opens, shorts and communications with all addressable devices installed before connection to the control panel.

4. The remote printer module shall provide a means for connecting the FACP system to a serial or parallel printer for creating a hard copy of system status and configuration reports.

5. The supervised input module shall provide sixteen input circuits for remote system monitoring. Each input shall have the ability to be individually programmed as supervised (dry contact only) or unsupervised (general purpose input). The input module shall provide two programmable Form C relays. The input module shall be mountable in an enclosure that is remotely located from the main control panel. The input module shall be capable of supervising inputs 500 feet away.

6. The output control module shall provide sixteen open collector outputs to drive LEDs, incandescent lamps or external relays. There shall also be an additional output for a local audible and two inputs for momentary lamp test as well as local audible silence switches. The module shall be mountable in an enclosure that is remotely located from the main control panel.

E. System response time from alarm to output shall be an average of three (3) seconds.

F. To expedite system troubleshooting, the system cards shall have ground fault detection and diagnostic LEDs by card.

G. All system cards and modules shall have Flash memory for downloading the latest module firmware.

H. Passwords:

1. Maintenance/Control Password - There shall be a password that a user must enter into the control panel in order to perform such maintenance- and control-related functions at the panel as:

a. Arming and disarming devices.

b. Activating, deactivating or modifying detector sensitivity settings.

c. Activating and deactivating the History Log function, and deleting obsolete entries.

d. Changing the system time and date.

2. Function Key Password - There shall be a 5-character password that a user must enter into the control panel in order to access the panel's Function Keys: touchscreen buttons which perform custom-programmed system functions.

3. Reports Password - There shall be a password that a user must enter into the control panel in order to access the panel's reporting functions.

I. Software Modifications: The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made. Systems that require the use of external programmers or change of EPROMs are not acceptable.

J. History: The system shall store a minimum of 4,000 events in history.

K. Reports:

1. The system shall have the ability to provide configuration, status, queue and history reports.

2. Configuration reports shall provide the following information:

a. Custom Messages

b. Database information

c. Entity type

d. Device usage

e. Device category

f. Firmware revision

3. Status reports shall provide the following information:

a. Disarmed cards and devices

b. Sensitivity in %/foot

c. Alarm threshold in %/foot

d. Temperature in degrees C

4. Queue reports shall provide the following information:

a. Alarm events with custom message and event time

b. Supervisory events with custom message and event time

c. Security events with custom message and event time

d. Trouble events with custom message and event time

5. History reports shall provide Address, History Type, Description, Time & Date and Custom Message. The following event types shall be reported:

a. Alarm events

b. Supervisory events

c. Security events

d. Status changes

e. Alarm verification

f. Output activation from logic

g. System Reset

h. Event Acknowledgements

i. Block Acknowledgements

j. Audible Silence System Flag Changes

k. Sensitivity Changes

l. Arm / Disarm Commands

m. Arm / Disarm By Logic

n. Manual Output Overrides

o. Output Overrides By Logic

p. Time Changes

q. Menu Logins

r. Device Input to Logic Activations/Deactivations

2.03 POWER SUPPLY

A. The system Power Supply/Charger shall be a 12-amp supply with battery charger. The power supply shall be filtered and regulated. The power supply shall have a minimum of 1 power limited output rated at 4 amps, and a minimum of 1 output rated at 12 amps. The system power supply can be expanded up to 48 amps. The auxiliary power supply module shall share common batteries with the primary power supply. The power supply shall be rated for 120/240 VAC 50/60 Hz.

B. The battery charger shall be able to charge the system batteries up to 50 AH batteries. Battery charging shall be microprocessor controlled and programmed with a special software package to select charging rates and battery sizes. An optional Thermistor for monitoring battery temperature to control charging rate shall be available.

C. Transfer from AC to battery power shall be instantaneous when AC voltage drops to a point where it is not sufficient for normal operation.

2.04 SYSTEM ENCLOSURE

A. Provide the enclosure needed to hold all the cards and modules as specified with at least spare capacity for two cards. The outer doors shall be capable of being a left hand open or a right hand open. System enclosure doors shall provide where required ventilation for the modules or cards in the enclosure.

2.05 INTELLIGENT INITIATING DEVICES

A. Smoke Detectors – Addressable

1. The detector shall have a multicolor LED to streamline system maintenance/inspection by plainly indicating detector status as follows: green for normal operation, red for alarm.

2. The smoke detector shall be an intelligent digital photoelectric detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds.

3. The detector shall be designed to eliminate the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions

of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm condition report.

4. The detector shall support the use of a relay, or LED remote indicator without requiring an additional software address.

5. Where required, there shall be available a programmable remote lamp configurable to remotely duplicate the on-board LED status of another system device with the same software address.

B. Duct Smoke Detectors – Addressable

1. For duct detector applications, the smoke detector shall be an intelligent digital photoelectric detector.

2. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. The detector shall be mounted in a duct detector housing listed for that purpose. The duct detector shall support the use of a remote test switch, relay or LED remote indicator. The duct detector shall be supplied with the appropriate sampling tubes to fit the installation.

3. Where duct detectors are exposed to the weather, a weatherproof enclosure shall be available. The duct housing cover shall include a test port for functional testing of the detector without cover removal. The duct housing shall include a cover removal switch capable of indicating cover removal status to the fire alarm control panel.

4. Where required there shall be available a duct housing with an onboard relay. Also, where required there shall be a standalone housing available with its own power supply and test/reset switch that does not require connection to an FACP.

C. Detector Bases – Addressable

1. Detector bases shall be low-profile, twist-lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box.

2. Where selective localized control of electrical devices is required for system operation, furnish and install detector base with software programmed addressable relay integral to the base. The relay shall switch electrical loads within relay ratings, as indicated on the drawings. Operation of the addressable control circuit shall be independent of the number of detectors and relays on the circuit or the number in an alarm state. Relay bases shall be rated for resistive or inductive load (120VAC or 30VDC) 3 amps.

3. Sounder bases shall be provided with an integral audible sounder. The base shall be capable of operating as an independent local alarm, part of a zone, or system alarm with synchronized audible output. The base shall be field configurable for output tone (steady or temporal) and output volume (low or high dBA) and share the same address the device is connected to. Bases must be connected to a continuous voltage whether the output tone is set to steady or temporal.

D. Manual Fire Alarm Box – Addressable

1. Provide an addressable manual fire alarm box at the required location, to be flush or surface mounted as required. Manual fire alarm box shall contain the intelligence for reporting address, identity, alarm and trouble to the fire alarm control panel. The manual

fire alarm box communications shall allow the station to provide alarm input to the system and alarm output from the system within less than four (4) seconds.

2. The manual fire alarm box shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring. Surface mounted stations where indicated on the drawings shall be mounted using a manufacturer's prescribed matching red enamel outlet box.

3. Provide a double-action manual fire alarm box.

E. Addressable Interface Devices

1. Addressable interface devices shall be provided to monitor contacts for such items as water-flow and tamper switches connected to the fire alarm system. These interface devices shall be able to monitor a single or dual contacts. An address shall be provided for each contact.

2. Where needed a conventional zone module shall connect to the signal line circuit, which will allow the use of conventional initiation devices. This module shall have the ability to support up to 15 convention smoke detectors and an unlimited number of contact devices. This module shall also be capable of monitoring linear beam detectors.

F. Addressable Control Devices

1. Addressable control devices shall be provided with relay contacts to control items such as door controls, elevator recall functions, air handling equipment shutdown. An address shall be provided for each contact.

2.06 NOTIFICATION APPLIANCES

A. Horns and Horn Strobes

1. Horns shall be UL-listed under Standard 464 for Audible Signaling Devices for Fire Alarm and Signaling Systems, and horns equipped with strobes shall be listed under UL Standard 1971 for Emergency Devices for the Hearing-Impaired.

2. All horns located in public and common use areas shall be designed for a field-selectable output of high or low dBA and be factory set to sound in a three-pulse temporal pattern.

3. All horns located in dwelling and sleeping units shall be designed for a low frequency range output of 520HZ ± 10% square wave tone in a three-pulse temporal pattern.

4. All inputs shall employ terminals that accept #12 to #18 AWG wire sizes

5. Strobe portion of the appliance shall produce a flash rate of one (1) flash per second, and shall incorporate a Xenon flashtube enclosed in a rugged Lexan® lens.

6. Strobe shall be of low-current design.

7. Strobe intensity, where multi-candela appliances are specified, shall have field-selectable settings, and shall be rated per UL 1971 for:

a. 15/30/75/110cd (wall-mounted)

b. 135/185cd (wall-mounted)

8. Strobe intensity, where multi-candela appliances are specified, shall have field-selectable settings, and shall be rated per UL 1971 for:

    a. 15/30/75/110cd (ceiling-mounted)

    b. 135/185cd (ceiling-mounted)

9. Selector switch for selecting the candela shall be tamper-resistant.

10. The strobe portion, when synchronization is required, shall be compatible with power supply with built-in protocol.

11. The strobes shall not drift out of synchronization at any time during operation.

12. The strobes shall revert to a non-synchronized flash-rate, if the sync module or power supply should fail to operate.

13. Wall-mount horn and horn-strobe appliances shall be designed for indoor-flush mounting to one-gang, two-gang, or 4” x 4” electrical boxes without need for an extension ring or surface mounting.

14. Ceiling-mount, horn-strobe appliances shall be designed for indoor-flush mounting.

15. Horn and horn strobe shall incorporate a horn-mounting plate with a snap-on grille cover.

16. The finish of the horns and horn strobes shall be white.

17. All horn and horn-strobe appliances shall be listed for Special Applications: Strobes are designed to flash at 1-flash/second minimum over their “Regulated Input Voltage Range”.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Perform work in accordance with the requirements of NFPA 70, NFPA 72 and NECA 1-2006, Standard of Good Workmanship in Electrical Contracting.

B. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.

C. In the event that limited energy cable installation is allowed, all cable runs shall be run at right angles to building walls, supported from structure at intervals not exceeding 3 feet and where installed in environmental air plenums, be rated for such use and tied/supported by components listed for environmental air plenums installation.

D. Wiring Method: Install cables in raceways except within consoles and cabinets.

E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

F. Provide primary power for each panel from normal power panels. Power shall be 120V AC service, transformed through a two-winding, isolation type transformer and rectified to low voltage DC for operation of all circuits and devices.

3.03 BOXES, ENCLOSURES AND WIRING DEVICES

A. Boxes shall be installed plumb and firmly in position.

B. Extension rings with blank covers shall be installed on junction boxes where required.

C. Junction boxes served by concealed conduit shall be flush mounted.

D. Upon initial installation, all wiring outlets, junction, pull and outlet boxes shall have dust covers installed. Dust covers shall not be removed until wiring installation when permanent dust covers or devices are installed.

E. "Fire alarm system" decal or silk-screened label shall be applied to all junction box covers.

3.04 CONDUCTORS

A. Each conductor shall be identified as shown on the drawings at each with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.

B. All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.

C. Wiring for strobe and audible circuits shall be a minimum 14 AWG, signal line circuits; 18 AWG twisted shielded, speaker circuits; 18 AWG twisted, telephone circuit; 18 AWG twisted shielded.

D. All splices shall be made using solder-less connectors. All connectors shall be installed in conformance with the manufacturer recommendations.

E. Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.

F. The installation contractor shall submit for approval prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.

G. Wiring within subpanels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

3.05 DEVICES

A. Relays and other devices to be mounted in auxiliary panels are to be securely fastened to avoid false indications and failures due to shock or vibration.

B. Wiring within panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

C. All devices and appliances shall be mounted to or in an approved electrical box.

3.06 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.

C. A consistent color code for fire alarm system conductors throughout the installation.

3.07 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Testing General:

1. All Alarm Initiating Devices shall be observed and logged for correct zone and sensitivity. These devices and their bases shall be tagged with adhesive tags located in an area not visible when installed, showing the initials of the installing technician and date.

2. Wiring runs shall be tested for continuity, short circuits and grounds before system is energized. Resistance, current and voltage readings shall be made as work progresses.

3. The acceptance inspector shall be notified before the start of the required tests. All items found at variance with the drawings or this specification during testing or inspection by the acceptance inspector shall be corrected.

4. Test reports shall be delivered to the acceptance inspector as completed.

5. All test equipment, instruments, tools and labor required to conduct the system tests shall be made available by the installing contractor. The following equipment shall be a minimum for conducting the tests:

a. Ladders and scaffolds as required to access all installed equipment.

b. Multi-meter for reading voltage, current and resistance.

c. Two-way radios and flashlights.

d. A manufacturer recommended device for measuring air flow through air duct smoke detector sampling assemblies.

e. Decibel meter.

f. In addition to the testing specified to be performed by the installing contractor, the installation shall be subject to test by the acceptance inspector.

3.08 ACCEPTANCE TESTING

A. A written acceptance test procedure (ATP) for testing the fire alarm system components and installation will be prepared by the engineer in accordance with NFPA 72 and this

specification. The contractor shall be responsible for the performance of the ATP, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and programming.

B. A program matrix shall be prepared by the installing contractor referencing each alarm input to every output function affected as a result of an alarm condition on that input.

C. The installing contractor prior to the ATP shall prepare a complete listing of all device labels for alphanumeric annunciator displays.

D. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by the owner and test results recorded for use at the final acceptance test.

E. Preliminary Testing: Conduct preliminary tests to ensure that all devices and circuits are functioning properly. After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that all panel functions were tested and operated properly. The Contractor and an authorized representative from each supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.

F. Final Acceptance Test: Notify the owner in writing when the system is ready for final acceptance testing. Submit request for test at least 14 calendar days prior to the test date. A final acceptance test will not be scheduled until meggar test results, the loop resistance test results, and the submittals required in Part 1 are provided to the owner. Test the system in accordance with the procedures outlined in NFPA 72.

1. Verify that the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.

2. Test each initiating and indicating device and circuit for proper operation and response. Disconnect the confirmation feature for smoke detectors during tests to minimize the amount of smoke or test gas needed to activate the detector.

3. Test the system for all specified functions in accordance with the contract drawings and specifications and the manufacturer's operating and maintenance manual.

4. Visually inspect all wiring.

5. Verify that all software control and data files have been entered or programmed into the FACP.

6. Verify that Shop Drawings reflecting as-built conditions are accurate.

7. Measure the current in circuits to assure that there is the calculated spare capacity for the circuits.

8. Measure voltage readings for circuits to assure that voltage drop is not excessive.

9. Measure the voltage drop at the most remote appliance on each notification appliance circuit.

G. The acceptance inspector shall use the system record drawings in combination with the documents specified in this specification during the testing procedure to verify operation as

programmed. In conducting the ATP, the acceptance inspector shall request demonstration of any or all input and output functions. The items tested shall include but not be limited to the following:

1. System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:

    a. Open, shorted and grounded signal line circuits.

    b. Open, shorted and grounded notification, releasing circuits.

    c. Primary power or battery disconnected.

2. System notification appliances shall be demonstrated as follows:

    a. All alarm notification appliances actuate as programmed

    b. Audibility and visibility at required levels.

3. System indications shall be demonstrated as follows:

    a. Correct message display for each alarm input at each display.

    b. Correct annunciator light for each alarm input at each annunciator.

    c. Correct history logging for all system activity.

4. System off-site reporting functions shall be demonstrated as follows:

    a. Correct zone transmitted for each input.

    b. Trouble signals received for disconnect.

5. Secondary power capabilities shall be demonstrated as follows:

    a. System primary power shall be disconnected for a period of time as specified herein. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period as specified.

    b. System primary power shall be restored for forty-eight hours and system-charging current shall be normal trickle charge for a fully charged battery bank.

    c. System battery voltages and charging currents shall be checked at the fire alarm control panel.

3.09 DOCUMENTATION

A. System documentation shall be furnished to the owner and shall include but not be limited to the following:

1. System record drawings and wiring details including one set of reproducible drawings, and a CD ROM with copies of the record drawings in DXF format for use in a CAD drafting program.

2. System operation, installation and maintenance manuals.

3. System matrix showing interaction of all input signals with output commands.

4. Documentation of system voltage, current and resistance readings taken during the installation, testing and ATP phases of the system installation.

5. System program showing system functions, controls and labeling of equipment and devices.

3.10 PROTECTION

A. Remove and replace devices and panel components that are wet, moisture damaged, or mold damaged.

3.11 DEMONSTRATION

A. Instructor: Include in the project the services of an instructor, who shall have received specific training from the manufacturer for the training of other persons regarding the inspection, testing and maintenance of the system provided. The instructor shall train the employees designated by the owner, in the care, adjustment, maintenance, and operation of the fire alarm system.

B. Training sessions shall cover all aspects of system performance, including system architecture, signaling line circuit configurations, sensor and other initiating device types, locations, and addresses, fire alarm control panel function key operation, and other functions as designated by the owner.

C. Required Instruction Time: Provide 8 hours of instruction after final acceptance of the system. The instruction shall be given during regular working hours on such dates and times as are selected by the owner. The instruction may be divided into two or more periods at the discretion of the owner.One training session shall be videotaped by the contractor. Videotapes shall be delivered to the owner.

D. Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the FACP. The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory and trouble. The instructions shall be approved by the owner.

E. Comprehensive system troubleshooting training shall be provided for a single individual designated by the owner. This session shall be separate and distinct from the above described sessions.

F. All training sessions shall be conducted following final system certification and acceptance. Three additional training sessions shall be provided for all security personnel on all shifts six months after final system certification.

G. All training sessions shall be conducted by an authorized fire alarm system distributor representative, who has received specific training from the manufacturer for the training of other persons regarding the inspection, testing, and maintenance of the system provided.

END OF SECTION

TERPconsulting

6 March 2017

Mr. Albert Ruiz
Nevada State Fire Marshal
107 Jacobsen Way
Carson City, NV 89701

Re: University of Nevada, Las Vegas
South Residence Halls
Fire Alarm and Detection System Upgrade
TC Project # 17.0031

Dear Albert:

University of Nevada, Las Vegas proposes to voluntarily replace the fire alarm and detection system serving the South Residence Halls building consisting of the following residence halls:

- Claudine Williams Hall
- Kitty Rodman Hall
- William S. Boyd Hall

This report is to document the proposed system replacement scope of work. The project scope of work is limited to the fire alarm and detection system replacement and does not include modifications to existing fire protection and life safety systems beyond the fire alarm and detection system.

The fire alarm and detection system replacement project will be in accordance with the following:

- 2012 International Fire Code with State of Nevada amendments (SNFC)
- NFPA 72 – *National Fire Alarm Code* (2013 edition)
- NFPA 70 – *National Electrical Code* (2011 edition)

EXISTING BUILDING DESCRIPTION

The South Residence Halls building consists of three (3) interconnected 4-story dormitory buildings. A single addressable Siemens MXL-IQ fire alarm control panel (FACP) located in the Boyd Hall 1st Floor electrical room serves the entire building. The FACP monitors fire alarm initiating devices (i.e. smoke detectors, duct smoke detectors, heat detectors, manual fire alarm boxes, etc.) and controls and monitors fire alarm notification appliances throughout the building.

A mixture of conventional (hardwired) and addressable devices are tied into the FACP. Additionally, the FACP monitors the building automatic sprinkler systems, fire pump, and interfaces to the elevator control systems for elevator recall functions and exterior door locking system.

A remote LCD fire alarm annunciator panel (FAAP) is located on the exterior of the building adjacent to the east lobby entry doors between the Rodman and Boyd Halls. An additional graphic style FAAP is in the adjacent Residence Hall Complex South Services Building. The FACP interfaces to this FAAP for annunciation of a fire alarm event within the specific residence hall.

The FACP is monitored by the site-wide campus proprietary monitoring system via a digital alarm communicator transmitter (DACT) located adjacent to the FACP. The proprietary monitoring location is the Public Safety Office located at the Howard Public Safety Building.

Area smoke detection is provided throughout the exit corridors, elevator lobbies, and elevator machine rooms. Smoke detection in the elevator lobbies and machine rooms actuate elevator recall functions. The 1st Floor is the primary recall floor with the 2nd Floor being the alternate recall floor. Elevator lobby magnetic door hold open devices de-energize upon activation of elevator lobby smoke detection.

Area heat detection is provided within janitor closets and equipment rooms with duct smoke detection provided at the rooftop units for unit automatic shutdown.

Manual fire alarm boxes are located at each exit door, elevator lobby, and at certain corridor locations and are provided with institutional covers requiring a key to operate.

Fire alarm audible notification appliance (horn) coverage is provided throughout the building and appears to be capable of providing a minimum sound pressure level of 80 dBA. Fire alarm notification appliances are activated on a general alarm basis throughout the entire building. Fire alarm visible notification appliance (strobe) coverage is not provided in the building.

The dormitory unit 120VAC smoke alarms are not connected to the FACP and activate a local alarm within the associated dormitory unit only.

DESCRIPTION OF SYSTEM REPLACEMENT

The existing fire alarm and detection system will be replaced with a new system meeting current requirements as outlined below. A single fire alarm and detection system will continue to serve all three (3) residence halls and be monitored by the existing site-wide campus proprietary monitoring system.

The new FACP will be in the Boyd Hall 1st Floor electrical room with additional transponder and remote power supply panels distributed in the building as needed for a complete system. The FACP will be provided with the following components:

- LCD display with all necessary system control buttons and status indicators
- Interface to existing site-wide campus proprietary monitoring system
- Storage batteries

All fire alarm panels (control panels and remote power supplies) will be connected to a dedicated branch power circuit in accordance with NFPA 72 Section 10.6.5.1. The panel storage batteries will be provided with sufficient capacity to operate the fire alarm and detection system in non-alarm conditions for a minimum of 24 hours and then will be capable of operating the system during a fire or other emergency condition for a period of 5 minutes at maximum connected load. The power circuit to each fire alarm panel will be identified in accordance with NFPA 72 Section 10.6.5.2.

The existing LCD FAAP located on the exterior of the building will be replaced with a new LCD FAAP. If the new FAAP is not rated for use on the exterior of the building or is not capable of being installed within a housing listed for exterior use, the FAAP will be located inside the east lobby entry vestibule between the Rodman and Boyd Halls.

The graphic style FAAP located in the adjacent Residence Hall Complex South Services Building will be maintained with the new FACP interfaced to it for annunciation on a per building basis to maintain existing system operating procedures. The FAAP is shown below:

Existing cable and raceways capable of supporting the new system may be utilized with new raceways and cable provided as needed for a complete and operational system. The fire alarm and detection system circuits will meet the following performance requirements.

- Signaling Line Circuits (SLC) – Class B
- Initiating Device Circuits (IDC) – Class B
- Notification Appliance Circuits (NAC) – Class B
- Network Communication Circuits – Class B

The FACP will be provided with equipment to interface with the existing site-wide campus proprietary monitoring system. The following signals will be transmitted to the monitoring station:

- Alarm – Activation of any area smoke detector, sprinkler waterflow switch, or manual fire alarm box.
- Supervisory – Activation of any dormitory unit smoke detector, sprinkler supervisory switch, duct smoke detector, or fire pump signal.
- Trouble – Activation of any fire alarm panel equipment, device or circuit trouble condition.

New addressable area smoke detection will be provided at the following locations:

- Common spaces outside of dwelling and sleeping units (i.e. lobbies)
- Mechanical equipment and storage rooms
- Interior exit corridors
- Elevator lobbies and machine rooms for elevator recall functions
- Rooms housing fire alarm panels
- At automatic-closing doors in fire-resistance rated assemblies for door closure

Only elevator lobby and elevator machine room area smoke detectors will provide elevator recall functions. Level 1 will be the primary recall floor, while Level 2 will be the alternate recall floor.

Dormitory dwelling and sleeping unit smoke alarms will be interconnected with the fire alarm and detection system per SNFC Section 907.2.9.3. This will be accomplished by replacing the existing 120VAC smoke alarms with addressable smoke detectors with sounder bases.

Existing duct smoke detectors at air handling units will be replaced with new addressable detectors. The duct smoke detectors will be programmed to automatically shut down the associated unit and initiate a supervisory signal on the system as permitted by SNFC Section 907.3.1.

All manual fire alarm boxes will be removed without replacement as permitted by Exception 2 to SNFC Section 907.2.9.1; however, a new manual fire alarm box will be provided at the FACP per SNFC Section 907.2.

Addressable monitor modules will be provided to monitor the following existing systems:

- Automatic sprinkler systems
- Diesel fire pump
    - Fire pump engine running
    - Pump controller main switch off position
    - Controller or engine fault signals

Addressable control modules will be provided to interface with the following existing systems:

- Air handling equipment
- Elevators
- Automatic-closing doors
- Exterior door unlocking

Existing fire alarm audible notification appliances will be removed with new fire alarm audible and visible notification appliances provided throughout the building at the required locations.

Audible alarm notification appliances (horns) will provide a sound pressure level in every occupied space of either 15 decibels (dBA) above the average ambient sound level or 5dBA above the maximum sound level having duration of at least 60 seconds per SNFC Section 907.5.2.1.1. The minimum sound pressure level will be 90dBA in mechanical equipment rooms and 80dBA in other areas. The maximum sound pressure level for audible alarm notification appliances will be 110dBA at the minimum hearing distance from the audible appliance.

Each dormitory dwelling unit and sleeping unit will be provided with an audible alarm notification appliance with appliances also provided in all public and common use areas. Audible appliances located in dormitory sleeping areas will produce a low frequency alarm signal per NFPA 72 Section 18.4.5.3.

New visible alarm notification appliances (strobes) will be installed in all public and common use areas in accordance with SNFC Section 907.5.2.3.1. Visible alarm notification appliances will not be provided in normally unoccupied electrical, mechanical, and storage rooms of less than 400 ft^2, janitor closets, exit enclosures, and elevator cabs as permitted by Exceptions 2 through 5 of SNFC Section 907.5.2.3.

SNFC Section 907.5.2.3.4 requires all dwelling units and sleeping units to be provided with the capability to support visible alarm notification appliances in accordance with ICC A117.1 – *Accessible and Usable Buildings and Facilities* Chapter 10. To accomplish this, all dormitory dwelling unit and sleeping unit audible alarm notification appliances will be capable of being replaced with combination audible/visible appliances without requiring a change in appliance backbox.

Upon operation of any alarm initiating device (i.e. area smoke detector, sprinkler waterflow switch, manual fire alarm box), fire alarm notification appliances will activate throughout the building on a general alarm basis.

NACs will be programmed such that when an alarm signal deactivation (alarm silence) is actuated, both audible and visible notification appliances will be simultaneously deactivated as to not provide conflicting signals for the hearing impaired in accordance with NFPA 72 Section 10.13.2.

The fire alarm system replacement will be detailed on fire alarm shop drawings, including voltage drop and battery calculations, and submitted to the Nevada State Fire Marshal for review and approval.

SYSTEM REPLACEMENT PROCESS AND TIMEFRAME

The building is expected to remain occupied during the system replacement process; therefore, careful consideration must be given to occupant and building protection. The existing fire alarm and detection system will remain operational for as long as possible during the replacement process. When needed, interfaces between the new and old systems will be provided to maintain notification zoning and pertinent auxiliary functions such as elevator recall operation.

When any portion of the building is not protected with an operational fire alarm and detection system, a fire watch will be provided in the affected area.

Testing by an approved inspection agency will be conducted to confirm proper annunciation at the FACP and remote FAAPs, fire alarm notification device activation, auxiliary functions such as elevator recall, etc. Prior to scheduling of testing and inspections, the fire alarm system will be visually inspected and pre-tested by the fire alarm contractor to confirm the system is ready for testing and inspections.

The replacement process is expected to begin in May 2017 and will be complete in September 2017.

If you have any questions regarding the above, please do not hesitate to contact our office.

Regards,

TERPconsulting

Prepared by:

William “Lanny” Ray, S.E.T.
principal fire protection consultant

Reviewed by:

William G. Koenig, PE, S.E.T.
fire protection engineer

TERPconsulting

6 March 2017

Mr. Albert Ruiz
Nevada State Fire Marshal
107 Jacobsen Way
Carson City, NV 89701

Re: University of Nevada, Las Vegas
South Residence Halls
Fire Sprinkler System Deficiency
TC Project # 17.0031

Dear Albert:

The South Residence Halls contain a sprinkler system deficiency in various locations as sidewall sprinklers located within common areas lounges do not provide adequate floor coverage. The University of Nevada, Las Vegas (UNLV) proposes to voluntarily replace the inadequate conventional sidewall sprinklers with extended coverage sidewall sprinklers within the following South Residence Halls:

- Claudine Williams Hall – 2nd through 5th floors
- Kitty Rodman Hall – 2nd and 3rd floors
- William S. Boyd Hall – 2nd through 4th floors

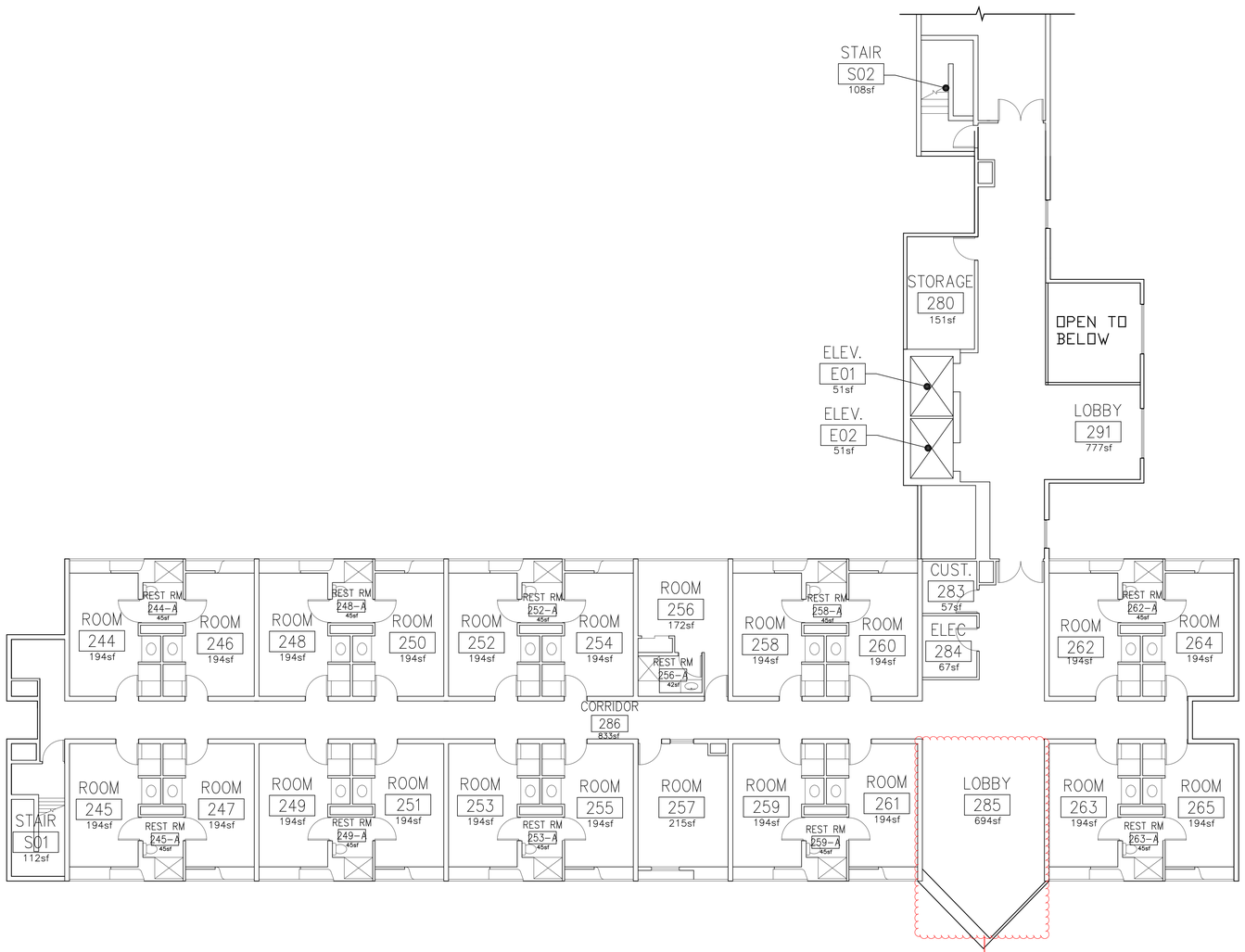
This report is to document the proposed sidewall sprinkler replacement scope of work. The project scope of work is limited to the sprinkler replacement and does not include modifications to existing fire protection and life safety systems beyond the installation of the new extended coverage sprinklers.

The sprinkler head replacement project will be in accordance with the following:

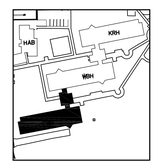
- 2012 International Fire Code with State of Nevada amendments (SNFC)
- NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition)
- NFPA 25 – *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* (2013 edition)

DESCRIPTION

The existing standard coverage sidewall sprinklers within the designated lounges will be replaced with new extended coverage quick response sprinklers to provide required floor area coverage. All other existing sidewall sprinklers will remain in as-is.



WILLIAMS HALL TYPICAL
2ND - 5TH FLOOR PLAN



KEYPLAN

NORTH

Stamp

Consultant

Claudine Williams Residential Hall
Second Floor Plan

Scale: 1/8" = 1'-0"

PLANNING & CONSTRUCTION
4505 MARYLAND PARKWAY
LAS VEGAS, NEVADA 89154
PHONE (702) 895-2500

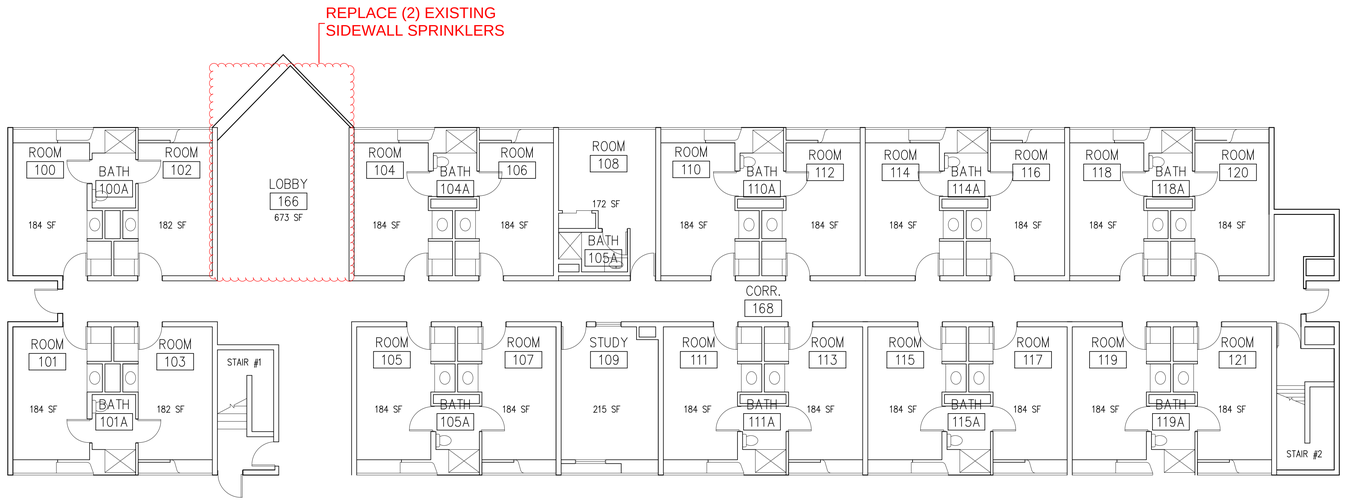
Date: 05/02/11

File: CWH2-1.dwg

UNIVERSITY of NEVADA LAS VEGAS

Sheet:

A1.01



RODMAN HALL TYPICAL
2ND - 3RD FLOOR PLAN

KEYPLAN

Stamp

Consultant

Kitty Rodman Residence Hall
Second Floor Plan

Scale: 1/8" = 1-0"

PLANNING & CONSTRUCTION
4505 MARYLAND PARKWAY
LAS VEGAS, NEVADA 89154
PHONE (702) 895-2500

Date: 07/01/10

File: KRH 2-1.dwg

UNIVERSITY of NEVADA LAS VEGAS

Sheet:

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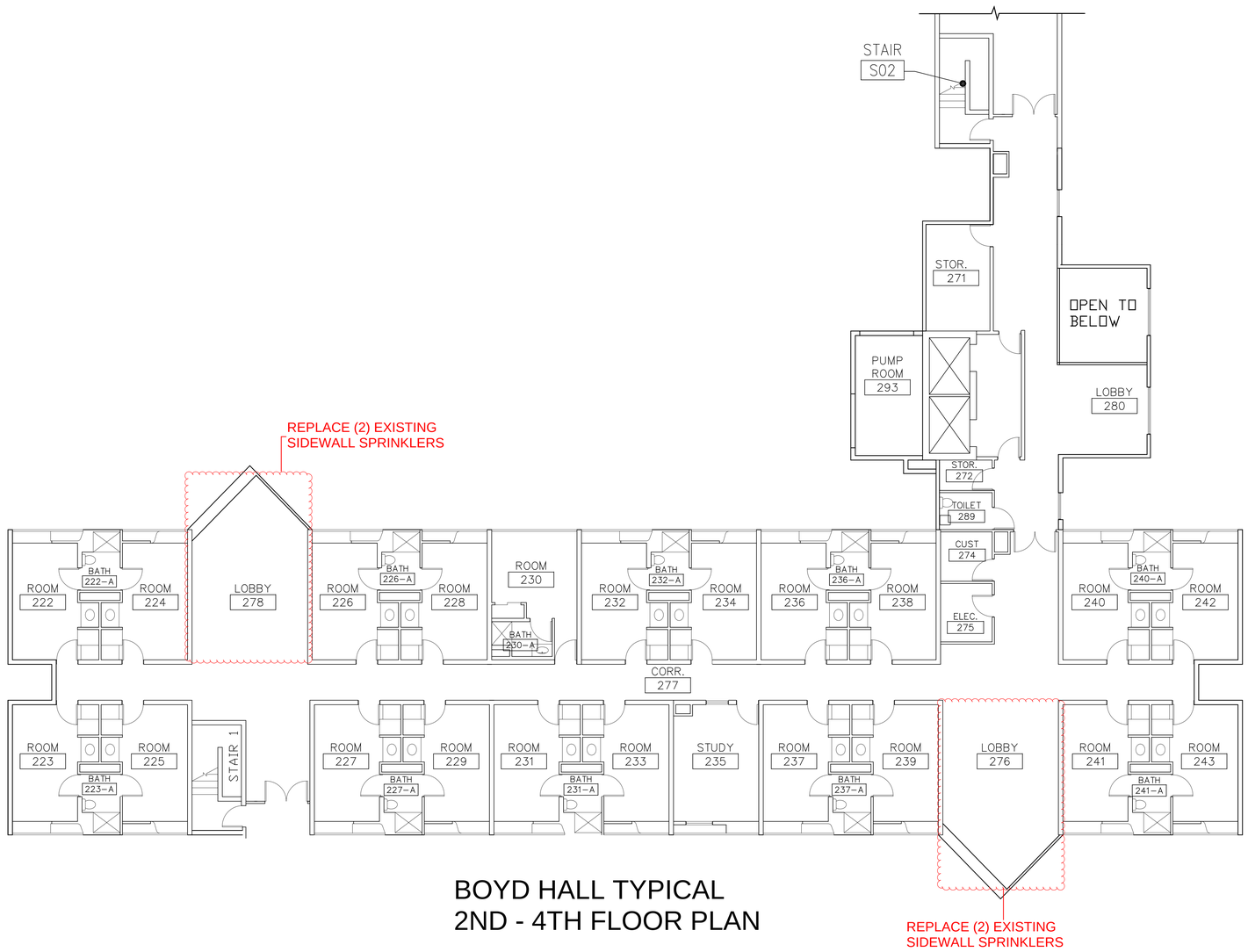

BOYD HALL TYPICAL
2ND - 4TH FLOOR PLAN

KEYPLAN

NORTH

Stamp

Consultant

William S. Body Residential Hall
Second Floor Plan

Scale: 1/8" = 1'-0"

PLANNING & CONSTRUCTION
4505 MARYLAND PARKWAY
LAS VEGAS, NEVADA 89154
PHONE (702) 895-2500

Date: 07/07/10

File: WBH2-1.dwg

UNIVERSITY of NEVADA LAS VEGAS

Sheet:

A1.01

The areas requiring sidewall sprinkler replacement will be shown on fire sprinkler layout drawings. The existing combination sprinkler/standpipe systems should receive adequate water supply to meet the requirements of extended coverage quick response sidewall sprinklers due to their close proximity to the standpipe sprinkler system floor control assembly.

SYSTEM REPLACEMENT PROCESS AND TIMEFRAME

The building is expected to remain occupied during the sprinkler replacement process; therefore, careful consideration must be given to occupant and building protection. The existing fire sprinkler system will remain active during the replacement process.

The work will be isolated within each specific floor. The standpipe hose valves will remain active when the sprinkler system is drained during work hours, thus providing fire protection when sprinkler systems are inactive.

Sprinkler system design and installation will be in accordance with NFPA 13 – *Standard for the Installation of Sprinkler Systems* (2013 edition). Detailed design drawings depicting sprinkler replacement will be submitted to the Nevada State Fire Marshal (NSFM) for review and approval.

Inspections and pressure testing will be required for the sprinkler system modifications. Testing will be consistent with the requirements of NFPA 13, NFPA 25 and NSFM, as applicable. The sprinkler replacement process is expected to begin in May 2017 and will be complete in September 2017.

If you have any questions regarding the above, please do not hesitate to contact our office.

Regards,

TERPconsulting
Prepared by:

William G. Koenig, PE, S.E.T.
fire protection engineer