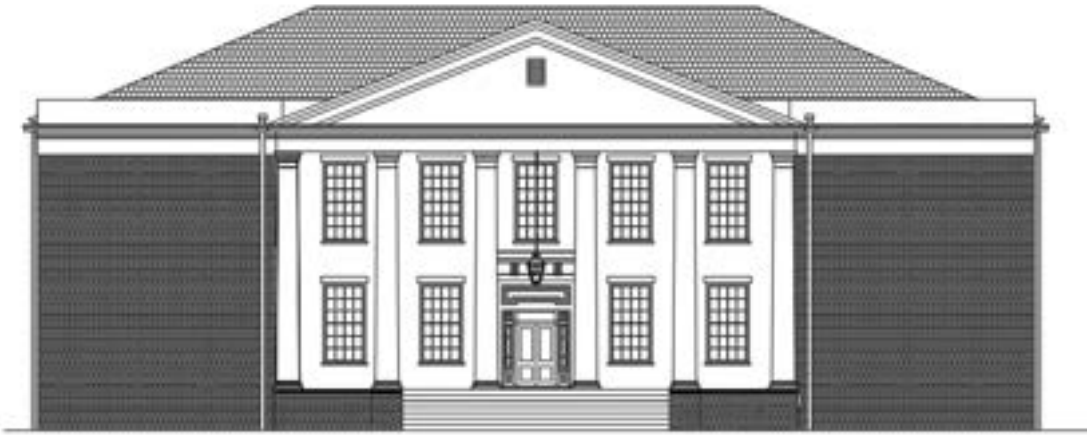
ARCHITECTURE
PLANNING INTERIORS
GRAPHICS

PROJECT MANUAL

HISTORIC JEFFERSON CO. HIGH SCHOOL



Monticello, Florida

EMI Project No. 65000
16 August 2019

Elliott Marshall Innes, PA (EMI Architects) emiarch.com
251 E. 7th Ave | Tallahassee, Fl. 32303 | AA C000409 IB C000153 | (850) 222-7442

DOCUMENT 00 01 01 - PROJECT TITLE PAGE

1.1 PROJECT MANUAL VOLUME

A. **Historic Jefferson County High School Restoration**

B. **Jefferson County**

C. **Monticello, FL.**

D. Owner: Jefferson County Board of County Commissioners

E. Architect Project No. 65000

F. **EMI Architects**

G. 251 East Seventh Avenue

H. Tallahassee, Florida 32303

I. Phone: 850.222.7442

J. Fax: 850.222.7446

K. Web Site: www.emiarch.com

L. Issued: 01 August 2019

END OF DOCUMENT 00 01 01

PROJECT MANUAL
HISTORIC JEFFERSON COUNTY HIGH SCHOOL RESTORATION
Monticello, Florida
For
Jefferson County Board of County Commissioners
Monticello, Florida
Construction Documents
01 August 2019 EMI Project No. 65000

THE BIDDER IS REQUIRED TO COMPARE THE CONTRACT DOCUMENTS WITH THE TABLE OF CONTENTS BELOW AND THE INDEX OF DRAWINGS FOR COMPLETENESS. IF PAGES AND/OR SHEETS ARE MISSING OR ILLEGIBLE, IT IS THE BIDDERS' RESPONSIBILITY TO REQUEST REPLACEMENTS FROM THE CONSTRUCTION MANAGER.

TABLE OF CONTENTS

REFERENCE PUBLICATIONS

The following publications shall be the guideline reference specification for the technique, methodology and guide for the restoration of the of Doors, Transoms, Frames, Stairs, Windows and Wainscot on this project. Note while these guidelines refer to 'windows', restoration of other materials above are; omit non-related window specific items.

PRESERVATION BRIEF 9: THE REPAIR OF HISTORIC WOODEN WINDOWS	Pages 1-8
RESCUING THOSE HOPELESS WINDOWS	Pages 84 – 86
PC PRODUCTS LITERATURE:	
PC ROT TERMINATOR; PC PETRIFIER WOOD HARDENER	5 Pages
MINWAX PRODUCT LITERATURE:	
STAINABLE WOOD FILLER:HIGH PERFORMANCE WOOD FILLER	Pages 1-8

END OF SECTION 00 01 10

DOCUMENT 00 01 15 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Index of Drawings of the separately bound drawing set, as modified by subsequent Addenda and Contract modifications.

END OF DOCUMENT 00 01 15

DOCUMENT 00 26 00 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 26 00 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.

    a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
    b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:

1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
2) Copies of current, independent third-party test data of salient product or system characteristics.
3) Samples where applicable or when requested by Architect.
4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
6) Research reports, where applicable, evidencing compliance with building code in effect for Project.
7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 00 26 00

DOCUMENT 00 31 32 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. A geotechnical investigation report for Project, prepared by Alpha Geotechnical and Testing Services, Inc., dated 25 January 2011 is included in this section for Bidders information.

C. The following Report of Geotechnical Investigation for the above referenced project is furnished by the Owner and included herein for Contractor's use. Contractor shall perform work of the Contract in accordance with this report and the Contract Documents. The information and recommendations contained herein shall be the specification for the work; except as specifically indicated otherwise by other requirements of Structural Specification Sections. Should conflict between this report and other Specification Sections occur, the more stringent shall take precedence and the Contractor shall bring the conflict to attention of the Architect.

1. The Owner assumes no responsibility for the accuracy of the information provided in the following report(s).

    - Subsurface Exploration and Foundation Evaluation for Renovations- Historic Jefferson High School, West Washing Street at Water Street, Monticello, Florida.

D. Refer to the attached Geotechnical Report (7 pages).

END OF DOCUMENT 00 31 32

Alpha Geotechnical
and Testing Services, Inc.
Certificate of Authorization No. 00007967
Foundation Evaluations
Environmental Studies
Construction Materials Testing

January 25, 2011
File No. 10-2194

Mr. Ashley Bass
LLT Building Corporation
1632-A Metropolitan Circle
Tallahassee, FL 32308

Subject: Subsurface Exploration and Foundation Evaluation for *Renovations - Historic Jefferson High School*, West Washington Street at Water Street, Monticello, Florida

Gentlemen:

As authorized by your Mr. Dennis Tribble on 12/10/10, Alpha Geotechnical and Testing Services, Inc. has completed this subsurface exploration and foundation evaluation. The purposes of this exploration were to evaluate subsurface conditions encountered in four soil test borings around the perimeter of the existing two-story with partial basement former high school building and four soil borings inside the building, and to provide you with recommendations for site earthwork and soil design parameters for new foundations for the renovations.

As a summary of our findings, the near surface site soils outside the building footprint appear to be manmade fill consisting of very loose to loose mixed clayey and silty sands until as much as 2' to 4' deep on the north side of the structure and minimal at the south side. A possible silty sand fill layer was encountered in the upper 1' within the test borings conducted through openings made in the floor inside the building. Naturally occurring, loose to medium dense orange clayey sand was next penetrated until about 5' deep inside the building and about 7' below the surface outside the building. Next, variable colored clayey sand to lean clay was encountered until boring termination at 15' or 20' deep. These strata were typically found to be in a medium dense to dense condition and the deeper portions contained some lenses of fat clay (locally referred to as "pipe clay"). Although the concentration of these clays is fairly low, there is a potential for slight volume changes in the clays as they become wet or dry as a result of climatic changes, such as during extended, heavy rain periods or droughts.

Because of the potential for some small differential movement of foundation elements due to slight expansion and contraction of the clays found in the borings, some special stiffening of any new foundations will be needed. Specifically, new shallow foundations should be interconnected with existing foundations by grade beams, or isolated foundations could be supported by underpinning piles (preferably pipe piles with helical discs) penetrating below the level of influence of the clay. Shallow spread footings embedded at least 1 ½' into existing ground may be designed with an allowable bearing capacity of 2,500 psf. Steel pipe piles with a single 10" diameter helical disc at the bottom, screwed to a depth of 20' below the surface should exhibit an axial capacity of 26,000 pounds.

The recommendations submitted in this report are based upon the data obtained from the soil borings presented on Figure 1 and the structure loading conditions outlined. This report does not reflect any variations that may occur between or away from the borings. If modifications in the design or location of the facility are made, we should be notified to review the applicability of the conclusions and recommendations in this report. **Finally, we recommend a review of final design drawings and specifications by our office, to determine if recommendations made herein have been properly interpreted and implemented.** This exploration only deals with the near surface soil deposits. It is not intended to include analysis of deeper soil or rock strata where cavities and caverns may exist. Sinkholes do occur in Jefferson County; however, this report does not address the possibility of sinkhole occurrence at the site. This report documents our findings and recommendations and was prepared exclusively for use by our Client and their Consultants only for this project.

Yours truly,
Alpha Geotechnical and Testing Services, Inc.

Stephen P. Shanley, PE
FL #40653

1.0 PROJECT DESCRIPTION

The existing historic high school building was reportedly built about 1852. The masonry and wood framed structure is two-story with partial basements at the east and west ends. Overall, the building footprint is about 63' x 113'. Interior pier footings support timber beams carrying floor loads; continuous shallow spread footings support wall loads. A few cracks were noticed in the brick veneer, particularly on the east end of the building, and this could be related to some small differential settlement of the existing foundations.

Surrounding ground slopes generally northward. The first floor level is about ½' higher than surrounding ground on the south side of the building and as much as 3 ½' higher than outside ground level on the north side. In general, the ground in the crawl space is about 3' to 4' below the top of the first floor level. Therefore, the ground beneath the building footprint is generally about 2' to 3' lower than outside the building.

We anticipate that for new load conditions, maximum column or pier foundation point loads will be on the order of 25 kips (a kip is 1,000 pounds) each. Timber beams would be used to transfer wall and roof loads to masonry piers. For deep foundations, piles could be embedded in the ground, integrated with surface pier footings, or loads could be transferred to pile caps and then ultimately to pile foundations.

2.0 FIELD EXPLORATION

To evaluate subsurface conditions, we performed eight soil test borings – four bores outside the existing building at approximately the four corners, and four bores inside the building, conducted through holes sawn through the floor by LLT Building Corporation personnel. Borings B-1 through B-4 were advanced to 20'using our mobile drill rig. The borings were done by the Standard Penetration Test (SPT) method (ASTM D 1586). Inside the building, borings B-5 through B-8 were done with hand operated augers (ASTM D 1452) and supplemented with readings from a dynamic cone penetrometer device (ASTM Special Technical Publication #399) to evaluate soil consistency. These last four bores were advanced to 15' deep each. "P-values" obtained with the dynamic cone penetrometer can be correlated to the SPT "N-values".

The locations of the borings are shown on the attached Figure 1. The locations were determined by taped measurement from existing site features. Therefore, locations should be considered accurate to the degree of the method of measurement used.

3.0 SUBSURFACE CONDITIONS

3.1 General

Subsurface conditions encountered during our field exploration are shown on the soil boring profiles presented on Figure 1. The stratification lines represent the approximate boundaries between the soil layers, but subtle changes in the soil matrix may make these changes more gradual than the boundary lines tend to illustrate.

The soil descriptions shown adjacent to the boring profiles on Figure 1 are based on a visual/manual classification procedure in accordance with the methodology presented in ASTM D 2488. We supplemented these with a few laboratory classification tests to confirm our classifications in accordance with the Unified Soil Classification System (ASTM D 2487).

3.2 Soil Conditions

Near the surface, conditions differ somewhat when comparing the interior borings with the bores around the outside of the building in that apparent manmade fill consisting of mixed clayey sand with fat clay or silty sand inclusions was found especially in the two north side borings, B-1 and B-2, until about 5' and 2' deep, respectively. On the south side of the building, borings B-3 and B-4 first penetrated brown or tan silty sand until about 3' and 1' deep, respectively. These silty

sands may likewise be manmade fills. On the other hand, each of the four bores inside the building encountered gray or tan silty sand until about 1' below the surface. From the SPT "N-values" obtained from determining the number of blows from a 140-pound rammer to advance the sampling device the last 12" of an 18" drive, or the penetrometer "P-values", these fills are generally in a very loose to loose condition.

The deeper reaches of all eight borings then became somewhat consistent. Loose orange clayey sand was found in all the test bores until 5' deep inside the building and about 7' below the surface outside the building. Next, variable colored clayey sand to lean clay was encountered until boring termination at 15' (inside bores) or 20' (outside bores) deep. These strata were typically found to be in a medium dense to dense condition, and the deeper portions contained some lenses of fat clay (locally referred to as "pipe clay"). This clay is generally considered problematic as it has a propensity to shrink and swell as its moisture condition varies such as at times of drought or prolonged, heavy rain periods. As a result of volume changes in the clays, overlying soils and foundation elements may shift, ultimately causing distress in building components.

The reader should examine the individual boring profiles on Figure 1 for a more detailed description of the subsurface conditions at the locations drilled.

3.3 Groundwater Conditions

A groundwater table was found in all eight of the borings upon completion. The groundwater was typically found to be about 9' to 10' deep in the borings inside the building, but as much as 15' deep in the bores around the outside of the building. The marbled appearance of the clayey sand strata be indicative of "hydric" soil conditions where a past seasonal high groundwater level may have occurred. Therefore we anticipate that a seasonal high groundwater level may be as shallow as 5' below the existing ground within the crawl space of the building.

4.0 LABORATORY TESTING PROGRAM

Laboratory testing was performed on selected samples to aid in soil classification and to further define the engineering properties of the soils. The laboratory tests included Natural Moisture Content (ASTM D 2216), Percent Finer than the U.S. No. 200 Sieve (ASTM D 1140, to assess percent silt and clay), and Atterberg limits tests (ASTM D 4318, to evaluate plasticity characteristics). The test results are presented on Figure 1 adjacent to the soil boring profiles, at the depth from which the samples were recovered.

5.0 ENGINEERING EVALUATION AND RECOMMENDATIONS

5.1 General

In view of our findings, subsurface soil conditions do not appear satisfactory for use of typical shallow spread footings without special reinforcement. The presence of slightly expansive clays within the zone of influence of shallow spread footings could result in some small differential settlement of the structure if not properly remedied. We anticipate that up to ¼" differential settlement could occur over a distance of 15' to 20'. Since we understand that some new loads will be generated in association with the renovations, and because the structure is built "off-grade" on piers, it would be necessary to interconnect such new foundations with grade beams so that differential movement would be "spread" over a greater distance or resisted in smaller instances.

Where new shallow foundations are to be constructed, the surface soils would need to be proof-compacted to improve bearing capacity, reduce anticipated settlements, and to help detect any soft, weak areas not discovered in the borings. Detailed discussion in this regard is included in the following section 5.2.

As an alternative, we have analyzed deep foundation options. Based upon subsurface conditions encountered and limited work space, we recommend the use of **helical screw pipe piles** for support of new building loads or as underpinning for

existing foundations where distress is apparent. Detailed discussion of the capacities and installation of such are included in the following sections 5.4 and 5.5.

5.2 Site Preparation

The following are our recommendations for site soil preparation and foundation design where shallow foundations and slabs may be used. These recommendations should be **incorporated into the project specifications.**

1. The entire structure area "footprints" and planned pavement areas, plus a minimum margin of five feet laterally, should be stripped and grubbed of all surface vegetation, debris and other deleterious material, as encountered. During the clearing and grubbing operation, roots with a diameter greater than one-inch or small roots in high density should be completely removed. These materials should be disposed in areas designated by the Owner.

2. The cleared and/or cut surface in building construction areas must be proof-compacted using appropriate compaction equipment. Adjust the moisture content of the soil, as necessary, to aid compaction. The compaction equipment should be operated such that each compaction lane overlaps the adjacent compaction lane. We recommend 5 passes in one direction, and 5 passes in a perpendicular direction in the building area. More passes could be needed however. The objective is to achieve a minimum 95% percent Modified Proctor maximum dry density (ASTM D 1557) to a depth of at least 12" below the compacted surface. Exercise care when operating within the existing building footprint so as not to cause unwanted settlement of nearby foundations.

   We recommend performance of at least one field density test for each 5,000 square feet of prepared area (but a minimum of three tests, regardless of the size). **It is important to contact the testing laboratory at least a few days prior to proof-rolling, so that they can obtain proctor test samples, and perform the proctor tests in the laboratory, so that the maximum proctor dry density values will be available at the time of proof-rolling and density testing.**

3. If any areas yield during proof-compaction, they must be explored in a few small test pits to evaluate the condition of the soils. Should yielding result from excessive soil moisture, two corrective alternatives may be considered.

   b. If the existing soils are sands or clayey sands (less than 50% clay), dry the soils until the moisture content is 2 to 3 percent below the optimum moisture content as determined from the Modified Proctor test. The soils may be harrowed and air-dried to obtain the desired moisture for compaction.
   c. Replace the wet material with soils conforming to that stated in Item 5, below.

   Replace any materials, if determined to be deleterious, in areas that "yield" during the proof-rolling operation, with suitable fill material conforming to that stated in Item 5, below.

5. After satisfactory proof-rolling of the cleared and/or cut surfaces in accordance with the above, filling with suitable, well-compacted soil may proceed. Fill material should conform to that stated in Item 5 below, and should be placed in level lifts not exceeding 12 inches in uncompacted thickness. Each lift should be compacted by repeated passes with appropriate compaction equipment, to achieve at least 95 percent of the Modified Proctor maximum dry density. The filling and compaction operations should continue until the desired elevation is achieved. Again, at least one field density test for each 5,000 square feet of prepared fill area should be performed (minimum 3 tests).

6. Fill materials required to elevate slab or footing excavation or undercut areas should consist of select fills, which are uniformly graded clean sands to slightly silty or slightly clayey sands, free of organics and other deleterious materials, **with less than 35 percent passing the No. 200 sieve**. These soil types are less sensitive to moisture problems and are less likely to experience time related settlement than more silty or clayey soils, so the use of select fill tends to reduce

earthwork delays caused by seasonal rains and minimize the potential for differential settlement of foundations. Much of the near surface mixed clayey sand soils or the orange clayey sands encountered in our borings **do not comply** with these recommendations; so an off site borrow source should be considered.

5.3 Shallow Foundation Design

For "at grade" construction, we recommend that load bearing footings where expansive clay soils and loose fills were discovered should be stiffened with a top and bottom layer of reinforcing steel so as to resist possible differential movements caused by volume changes in the clays. Grade beams may also be used to interconnect off-grade construction where masonry piers are used to support loads. In such case, each pier must be interconnected to each "neighboring" pier by continuous grade beams. We believe the potential for volume change in the clays to be slight. In no case should lean or fat clays exist within 24" of bottom of concrete footings. If present close to foundations, these problematic soils should be undercut and replaced with well-compacted sandy soils.

Foundation soils prepared in accordance with the above recommendations (natural soils or fills) should be suitable for supporting the proposed structures with a design soil contact pressure of 2,500 pounds per square foot (psf) or less. The weight of the concrete may be neglected when computing the contact pressure. Footings should be embedded at least 18" below surrounding ground. Isolated footings should be at least 18" on each side to prevent punching shear failures.

Based on the information gathered during our exploration and the loading conditions previously estimated, the recommended soil contact pressure will yield a minimum factor of safety greater than 2.0 against bearing capacity failure. The total settlement is estimated to be one inch or less, and load related differential settlement across the slab is estimated to be one-half inch or less in 25 feet.

5.4 Deep Foundations

Typically, helical screw pipe piles rely on ***end bearing*** of the helix plates, and depths can usually be tailored to the column loads. We have utilized design methodologies based on the general bearing capacity formula by Meyerhof (1955) to evaluate end bearing capacities of helix plates on pipe piles.

An embedment elevation of 20' below outside ground level is necessary to position the resistive elements of helical pipe piles below the depth of influence of the clays and to attain a minimal axial capacity of 25 kips with a single 10" diameter disc. Given that a safety factor of at least 2 has been applied to our computations, a load test is not necessary.

All pile installation should be observed by a representative of the Geotechnical consultant. For helical pipe piles, termination should be based on torque resistance during installation but the minimum embedment would still need to be obtained.

Minimum pile spacing must be **three (3) diameters center to center,** except for pile groups with no interior piles (*i.e.* all piles are at the perimeter of the group), in which cases 2.5 diameters, center to center may be used. **If a smaller center to center spacing is needed**, then the piles must be battered

5.5 Pile Installation Requirements

The selected contractor must have a foreman with at least 5 years experience supervising pile installation in subsurface conditions comparable to those at the study site. The piling contractor must cooperate with the inspector at all times.For helical screw pipe piles, all steel (including fasteners) must be hot-dipped galvanized. A calibrated torque gauge must be used to correlate that maximum desired capacity is achieved based on the following empirical formula.

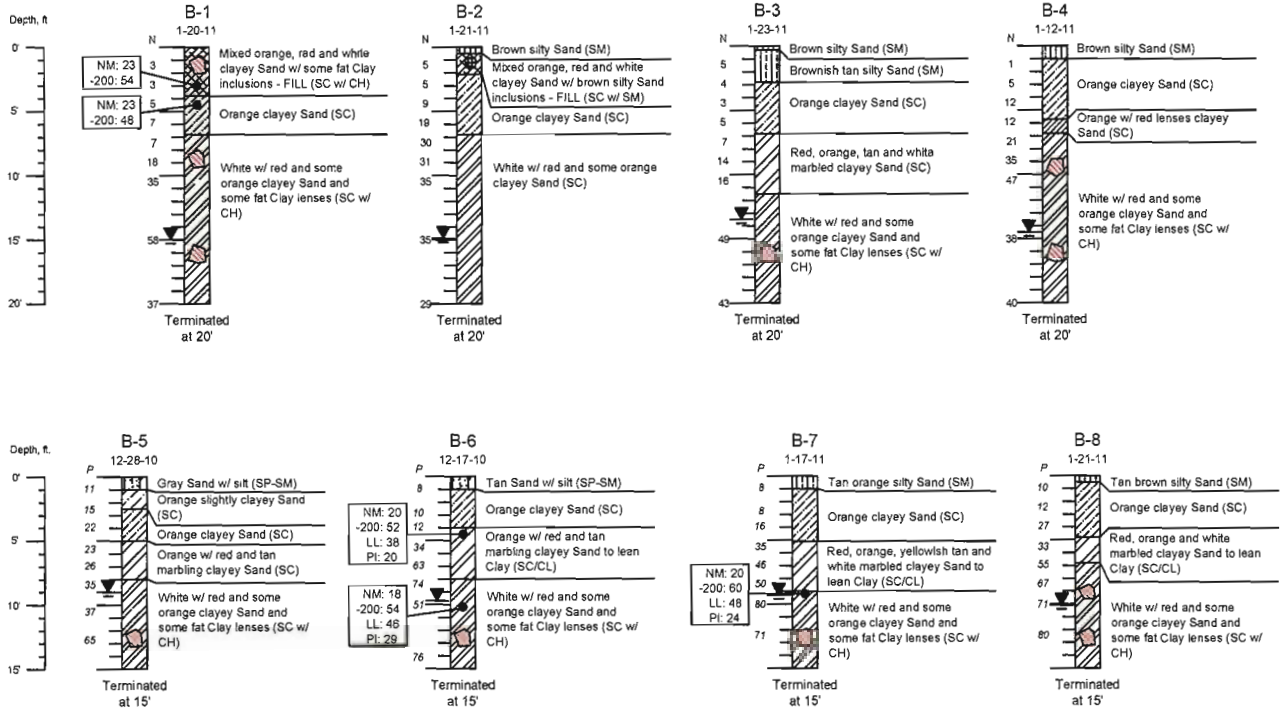
$Q_u = K_t T_e$ where, Q_u = Ultimate pile capacity
K_t = torque factor of 9 for 2.875" pipe and torque factor of 8 for 3.5" pipe
T_e = "effective" torsional resistance

If the torsional resistance during installation reaches the helical pile's allowable torque rating prior to satisfactory minimum embedment depth (20' deep), replace the pile with one having fewer and/or smaller helical plates and then achieve both minimum embedment and required torque as related to the above formula. On the other hand, if the installation fails to meet the effective torsional resistance criterion before the anticipated depth, simply advance the pile deeper until proper resistance is found, or replace the pile with one having added helix plates so that required torque is achieved. In no case should the effective torque exceed 50% of the ultimate yield strength of the pile and related pile components.

It will be essential that inspections be carried out by a Senior Field Technician with demonstrated experience in inspection of installation of deep foundations, and he must be under the direct supervision of a Registered Professional Engineer, with comparable experience.

END OF REPORT

Soil Boring Profiles and Locations



NOTES

1) Although the borings represent the subsurface conditions at their respective locations, it should be understood that significant differences could exist between borings and these may not be discovered until later.

2) Borings B-1 through B-4 were conducted with a Simco Model 2800 drill rig with solid augers in accordance with ASTM D 1586. All other borings were done with hand augers in accord with ASTM D 1452 and were supplemented with readings from a dynamic cone penetrometer device operated in accord with ASTM Special Technical Publication #399.

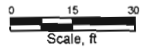
LEGEND

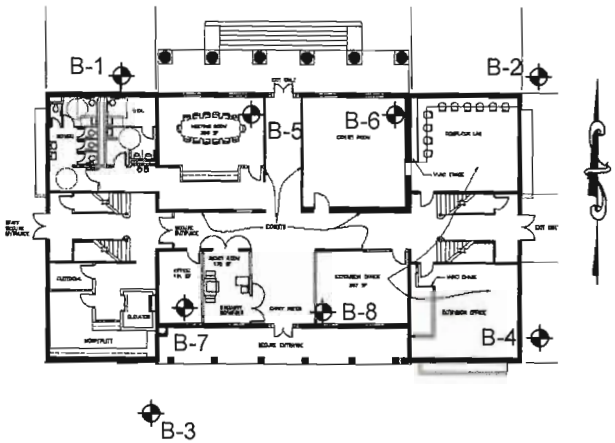
- N - Standard Penetration Test "N-value". Number of blows from 140-pound hammer to advance sampler last 12" of 18" drive.
- P - Dynamic Cone Penetrometer "P-value". Number of blows required to advance cone tip 1.75".
- NM - Natural Moisture Content, %.
- -200 - Finer than # 200 sieve, %.
- OC - Organic Content (weight basis), %.
- LL - Liquid Limit, %.
- PI - Plastic Index (LL - Plastic Limit), %.
- (SC) - Unified Soil Classification System, clayey sand (typical).
- ▼ - Groundwater level, if present.

Penetration Resistance and Soil Properties on Basis of Standard Penetration Test [1]

Sands (Fairly Reliable)		Clays (Rather Unreliable)	
Number of Blows per foot, N	Relative Density	Number of Blows per foot, N	Consistency
		Below 2	Very soft
0-4	Very loose	2-4	Soft
4-10	Loose	4-8	Medium
10-30	Medium	8-15	Stiff
30-50	Dense	15-30	Very stiff
Over 60	Very dense	Over 30	Hard

1- Table 5.3 from Peck, Hanson, Thornburn, Foundation Engineering, 2nd Edition, 1973





Alpha Geotechnical and Testing Services
Certificate of Authorization No. 00007967
4770-B Woodlane Circle
Tallahassee, FL 32303
(850) 514-4171 Fax: 514-4173

Stephen P. Shanley, PE
FL #40653
January 25, 2011

Subsurface Exploration and Foundation Evaluation for
Renovations to Historic Jefferson High School
Washington at Water Street, Monticello, Florida

Figure 1

File: 10-2194 fit Jefferson hi

SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Specifically note that the work of this project is to a Historic 1852 structure and respect to past materials and installation shall be maintained. Any artifacts encountered, found or otherwise uncovered whether underground or within the walls of the building are the property of the Jefferson County Board of Commissions and shall be delivered to the Architect for transfer to the Board. Contractor shall note that whether specifically mentioned or not, the work of this project shall adhere to GAS (U.S. General Services Adminstration) Specifications and NPS (National Park Service) Preservation Briefs.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: **Historic Jefferson County High School Restoration- EMI Project # 65000**.

1. Project Location: **425 West Jefferson St., Monticello, FL 32344**.

B. Owner: **Jefferson County Board of County Commissioners**.

1. Owner's Representative: Kirk Reams, Clerk of Court.

C. Architect: **Elliott, Marshall, Innes, P.A.; Architect of Record – Seth K. Coffin; Project Manager –** Robert M. Peck.

1. 251 East Seventh Avenue, Tallahassee, Fl 32303 850.222.7442

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. **Structural Engineer**: **JGP Structural Group LLC, Engineer of Record: Jeffrey Parzych,** 1221 W. Tharpe St. Tallahassee, FL 32303, (850) 574-2888.

2. **Mechanical, Electrical, & Plumbing Engineer**: **r.e. Walsh Engineering, Inc., Engineer of Record: R.E. Walsh,** 3073 Hickory Wind Road, Tallahassee, FL 32317, (850) 656-3800.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Selective demolition, cmu walls, brick masonry restoration and cleaning, sealants, structural steel & wood beams & columns, modifications to wood floor joists, sub-flooring and wood stud walls, reconstruction of 4 interior wood stairs, handrails, pickets, wainscot, plumbing, interior finishes, window restoration and cleaning, installation of elevator cab/equipment and miscellaneous modifications as described in the Table of Contents in the Project Manual.

B. Type of Contract:

1. Project will be constructed under a hard bid. Note portions of the work may be funded by a State Historic Grant and portions funded by funds from the Owner. Contractor shall provide sufficient break down of the Schedule of Values to differentiate between the two funding sources. Also, should project in portion be funded by State or Federal Grants, Contractor shall provided necessary backup documentation of costs and payments.

1.5 ACCESS TO SITE

A. General: Contractor shall have full use of Project site (defined by “limits of construction) for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project. The building is in close proximity to adjacent Owner occupied structures; Contractor shall take care to avoid disturbing adjacent building functions.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated. Note Limits of Construction will be modified in the area of construction of the exterior stair while it is being completed

1. Limits: Confine construction operations to areas where work is permitted.
2. Limits: Refer to Site Plan – “Limits of Construction” are indicated by location of Construction Fence.
3. Driveways, Walkways and Entrances: Keep driveways and entrances serving adjacent premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Maintain the site in an orderly fashion, including but not limited to maintaining (cutting) the grass areas within the limits of construction. Move stored material inside building as the progress of the work will allow.

1.6 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site (but not the building) and existing adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways and other adjacent occupied or used facilities. Do not close or obstruct walkways or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations. Specifically for the work of construction the exterior stairs and working on brick restoration on west side of building provide Owner with extent of time needed for construction and provide two weeks notice of blockage or necessary re-arrangement of access to adjacent buildings.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7am to 7p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: 8am to 5pm Saturday only, unless otherwise agreed by Owner.
2. Early Morning Hours: Restriction noisy work to occur after 8am and terminate prior to 5pm.
3. Hours for Utility Shutdowns: To be determined on case by case with minimum of 72 hours notice.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Architect and Owner not less than three work days in advance of proposed utility interruptions.
2. Obtain Architect's and Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Architect and Owner not less than three work days in advance of proposed disruptive operations.
2. Obtain Architect's and Owner's written permission before proceeding with disruptive operations.
3. The Owner's Courtroom Annex is directly across the parking lot from the Construction Site. Should the Owner request reduction of noise during Courtroom activities, Contractor shall abide.

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

F. Controlled Substances: Use of tobacco products and other controlled substances within the existing building is not permitted.

G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times. Identification tags shall list the name of the contractor or sub-contractor.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site if required by Owner.

1. Maintain list of approved screened personnel with Owner's representative.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and as scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.9 MISCELLANEOUS PROVISIONS

A. PRECEDENCE

1. In the event that any provisions of the component parts of the Contract Documents conflicts with any provision of any other component part, the provisions of the Contract Agreement shall govern; the Supplementary General Conditions shall take precedence over the General Conditions.

2. Should the Drawings and Specifications conflict on any point the work shall be done according to the Specification; should the details and schedules shown on the Drawings conflict on any point, the details and schedules shall prevail over the small scale plans and elevations. Should the Structural and Architectural Drawings conflict, the work shall be done in accordance with the Structural Drawings.

3. Should the Specification sections conflict, the most stringent shall govern.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use facsimile of CSI Form 13.1A provided in Section 01 60 00 Product Requirements.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size,

durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven calendar days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 15 calendar days of receipt of request, or seven calendar days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 calendar days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution provides sustainable design characteristics that specified product provided for achieving LEED prerequisites and credits.
c. Substitution request is fully documented and properly submitted.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction.
f. Requested substitution is compatible with other portions of the Work.
g. Requested substitution has been coordinated with other portions of the Work.
h. Requested substitution provides specified warranty.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 calendar days after commencement of the Work (Notice to Proceed). Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

1 **PART 2 - PRODUCTS (Not Used)**

2 **PART 3 - EXECUTION (Not Used)**

3 **END OF SECTION 01 25 00**

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on "Architect's Supplemental Instructions Form".

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products and labor required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products and labor required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Work Change Directive: Architect may issue a Construction Work Change Directive on AIA Document G714. Construction Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 26 73 - TIME EXTENSION - WEATHER

PART 1 - GENERAL:

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of the Contract, and Division-1 Specifications, apply to work of this section.
   1. Refer to General and Special Conditions

PART 2 - TIME EXTENSIONS

2.1 EXTENSIONS:

A. Extensions for weather may be granted for weather **in excess** of normal that adversely impacts ongoing activities on the site that have successive following activities that must be completed in a required sequence for completion of the project within the specified performance period. These would be generally labeled as Critical Path Activities when that type of schedule is used.

2.2 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER:

A. In order for an award of a time extension under this clause, the following conditions must be satisfied:
   1. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.
   2. The unusually severe weather must actually cause a delay to the completion of the project. They delay must be beyond the control and without the fault or negligence of the Contractor.

B. The following is a schedule of monthly anticipated adverse weather days. This will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	4	5	3	3	5	7	7	5	3	4	4

C. Upon acknowledgment of the Notice to Proceed and continuing throughout the contract, the Contractor will record on the daily report the occurrence of adverse weather and resultant impact to normally schedule work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.
   1. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph B above, the Architect will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification.

2.3 REQUEST FOR WEATHER EXTENSION:

A. Any request for a time extension for weather must include:
   1. Weather data from Military Installation or National Weather Services for the time period in question.
   2. Impact on ongoing activities.
   3. Relation of those activities to completion of the project.
   3. Other information and documentation as requested by the Architect
   5. **Requests for time extensions as indicated above must be made in writing to the Architect no more than seven days after the of the period of excessive weather. No time extensions will be granted for weather if not requested within seven days as indicated above.**

2.4 HURRICANE PREPAREDNESS PLAN

A. GC is required to take special care and precautions in the event of all severe inclement weather.

B. A normal condition of alertness shall be maintained in the Work area during the hurricane season unless a higher condition of hurricane readiness is prescribed. GC shall develop a Hurricane Readiness Plan for Work areas and insure that the plan provides all necessary precautionary measures and procedures to be employed by their forces prior to the occurrence of a hurricane or destructive wind storm in the area. The plan shall be placed into effect for the hurricane season, designated as beginning on 1 June of each year and ending on 30 November.

C. CONDITIONS OF READINESS

1. Seasonal/Hurricane Condition: — Hurricane Season Readiness:

Condition IV:	Storm may hit this area in 72 hours.
Condition III:	Storm may hit this area in 48 hours.
Condition II:	Storm may hit this area in 24 hours.
Condition I:	Storm will hit this area.

2. Condition III and II - In the event U.S. Weather Bureau sets special weather conditions, GC shall take precautions established when Condition III or Condition II has been set.

   a. GC shall inspect and adequately secure the Work depending on weekday or weekend time period.

D. Condition I - GC shall inspect the site and Work at an appropriate time to insure the area is secure and consistent with the current Condition of Readiness in effect or expected to be placed in effect. If it is likely Condition I will be set during the weekend or after regular working hours, the GC shall secure the Work area in accordance with the expected condition prior to close of regular working hours.

E. Preparations - All loose materials shall be secured. Of utmost concern is the amount of material, equipment, vehicles, storage sheds, state of site drainage, openings/glass areas, roof conditions that can become missiles in heavy winds and cause damage to buildings, personnel and other property.

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 26 73

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

    a. Application for Payment forms with continuation sheets.
    b. Submittal schedule.
    c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work**: Provide following subschedules showing values coordinated with each element.**

    a. Base Bid and each Additive Alternate.
    b. Sales tax items

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one-line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

      1) Labor.
      2) Materials.
      3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site. **Provide digital photographs of off-site material stored showing name of project and evidence of insurance with Owner named as co-insured.**

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be shown as separate line items in the schedule of values.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit one electronic copy, signed and notarized of each Application for Payment to Architect. Include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.

2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Submittal schedule (preliminary if not final).
5. List of Contractor's staff assignments.
6. List of Contractor's principal consultants.
7. Copies of building permits.
8. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
9. Initial progress report.
10. Report of preconstruction conference.
11. Certificates of insurance and insurance policies.
12. Performance and payment bonds.
13. Data needed to acquire Owner's insurance.

H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide

names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Keep list current at all times and provide Architect with any updates.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.

3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."

   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work and Proposal Request, as appropriate.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's and Engineer's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in Auto Cad 2020.
4. Contractor shall execute a data licensing agreement in the form of Agreement furnished by Architect along with separate Agreement furnished by each Consultant to the Architect.

   a. Subcontractors and other parties granted access by Contractor to Architect's and Engineers digital data files shall be held to the same standards and requirements as the Contractor's Licensing Agreement. Retain subparagraph below, and revise list, if limited types of CAD files are to be provided to Contractor. Delete subparagraph if providing BIM models.

5. The following digital data files will be furnished for each appropriate discipline:

   a. Complete set of Construction Bid Documents.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Contractor, Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.
    l. Preparation of record documents.
    m. Use of the premises.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for moisture and mold control.
    s. Procedures for disruptions and shutdowns.
    t. Construction waste management and recycling.
    u. Parking availability.
    v. Office, work, and storage areas.
    w. Equipment deliveries and priorities.
    x. First aid.
    y. Security.
    z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 30 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Preparation of Contractor's punch list.
    e. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    f. Submittal procedures.
    g. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

D. Progress Meetings: Conduct progress meetings at **monthly** intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site utilization.

8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination Meetings: Conduct Project coordination meetings as necessary as progress of the work proceeds.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.
5. Special reports. (Unusual event)

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
2. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period. Type of Schedule: Contractor's Option.

1. Submit a working digital copy of schedule, labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
2. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit with Applications for Payment.

E. Site Condition Reports: Submit at time of discovery of differing conditions.

F. Special (Unusual Event) Reports: Submit at time of unusual event.

1.5 QUALITY ASSURANCE

A. Scheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review content and format for reports.
2. Name personnel needed to develop and update schedule.
3. Discuss constraints, including [phasing] [work stages] [area separations] [interim milestones] [and] [partial Owner occupancy].
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures.

10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Comply with the following:

1. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
2. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
3. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

D. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

E. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

F. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.

G. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events (see special reports).
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Work Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.9 SPECIAL REPORTS (UNUSUAL EVENT)

A. General: Submit special reports directly to Owner and Architect within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 00

SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Concealed Work photographs.
3. Periodic construction photographs.
4. Final Completion construction photographs.

B. Related Requirements:

1. Section 01 77 00 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
3. Section 31 10 00 "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos on CD-ROM or thumb-drive or email. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in file metadata tag:

    a. Name of Project.
    b. Name of Architect and Construction Manager.
    c. Name of Contractor.
    d. Date photograph was taken.
    e. Description of location, vantage point, and direction.
    f. Unique sequential identifier keyed to accompanying key plan.

1.4 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera. Use flash in low light levels or backlit conditions.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

C. Metadata: Record accurate date and time from camera.

D. File Names: Name media files with **date** and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take minimum of 10 photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

C. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

1. Underground utilities.
2. Underslab services.
3. Piping.
4. Electrical conduit.
5. Waterproofing and weather-resistant barriers.

D. Periodic Construction Photographs: Take minimum 20 photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Final Completion Construction Photographs: Take 50 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

F. Additional Photographs: Architect may request photographs in addition to periodic photographs specified as necessary to aid in performance of the Contractors work.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.

1 **PART 2 - PRODUCTS (Not Used)**

2 **PART 3 - EXECUTION (Not Used)**

3 **END OF SECTION 01 32 33**

SECTION 01 33 00 - SUBMITTAL PROCEDURES

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 01 31 00 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 01 32 33 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
5. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Section 01 77 00 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
9. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Construction Manager shall review for compliance; submit items not in compliance to Architect as and RFI. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. Specialty Engineer: A Professional Engineer licensed to practice in the State where the project is located.

D. Engineering Calculations: When required in various sections of this specification or within other locations in the Contract Documents, engineering calculations shall be prepared, and **digitally** (unless other arrangements are agreed to) signed and sealed by a Specialty Engineer as described in section 'C' above. The requirements of this section shall supersede requirements in individual specification sections.

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect[**and Construction Manager**] and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Construction Manager.
5. Name of Contractor.
6. Name of firm or entity that prepared submittal.
7. Names of subcontractor, manufacturer, and supplier.

8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
9. Category and type of submittal.
10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.
15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Paper Submittals:

1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
5. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
6. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Retain "Electronic Submittals" Paragraph below if requiring electronic submittals to be sent to Architect via email.

E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

F. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.

1.6 SUBMITTAL PROCEDURES

A. Mailing Costs: Costs for return of hard paper copies of submittals to the Contractor from the Architect's/Engineer's Offices shall be the Contractor's responsibility and shall be included in the Bid. Architect/Engineer will transmit return submittals to the Contractor's Office via collect unless other arrangements are made by the Contractor.

B. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

    a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

2. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
3. Paper: Prepare submittals in paper form and deliver to Architect.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 <Insert number> days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications, recommendations and Installation Instructions.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.
    i. Manufacturer’s Field Reports.
    j. Material Safety Data Sheets (MSDS).
    k. Maintenance Data.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.

b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.
h. Dimensions.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least [8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).

a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).
b. Three opaque copies of each submittal. Architect will retain two copies; remainder will be returned.

3. At Contractor's written request, one Electronic copy of Architect's/Engineers CAD files will be provided at the beginning of the project to the Contractor or Construction Manager for distribution to subcontractors upon execution of a release for each consultant.

C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
4. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
5. Paper Transmittal: Include paper transmittal, including complete submittal information indicated.
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit **one** full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

7. Test and Inspection Reports: Comply with requirements specified in Division 1 Section “Quality Requirements”.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit **digitally signed PDF file and three** paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp or indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect and Construction Manager will not review submittals received from Contractor that do not have Contractor's review and approval.
2. Transmittal Letter: The contractor shall identify each item being submitted on a letter of transmittal. Provide individual letter of transmittal for each separate item, or each group of related items.

1.10 ARCHITECT'S AND CONSTRUCTION MANAGER'S REVIEW

A. Architect will not review submittals that do not bear Contractor's approval stamp or appear to not have been reviewed due to the quantity of incorrect information and will return them without action.

B. Action Submittals: Architect will review each submittal, indicate corrections or revisions required**[, and return it]**.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

2. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action**.**

3. Submittals by Web-Based Project Software: Architect **and Construction Manager** will indicate, on Project software website, the appropriate action.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed, may be stamped “For Record Only” or may be discarded at the discretion of the Architect.

F. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

G. Architect will **return without review** submittals received from sources other than Contractor.

H. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 35 16 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes special procedures for alteration work.

1.3 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep existing items that are not to be removed or dismantled.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 COORDINATION

A. Alteration Work Subschedule: A construction schedule coordinating the sequencing and scheduling of alteration work for entire Project, including each activity to be performed, and based on Contractor's Construction Schedule. Secure time commitments for performing critical construction activities from separate entities responsible for alteration work.

1. Schedule construction operations in sequence required to obtain best Work results.
2. Coordinate sequence of alteration work activities to accommodate the following:

    a. Owner's continuing occupancy of portions of existing building.
    b. Owner's partial occupancy of completed Work.
    c. Other known work in progress.
    d. Tests and inspections.

3. Detail sequence of alteration work, with start and end dates.
4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.

B. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns and adjacent to restricted areas. Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Access to restricted areas may not be obstructed. Plan and execute the Work accordingly.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor; mayor subcontractors shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Fire-prevention plan.
    c. Governing regulations.
    d. Areas where existing construction is to remain and the required protection.
    e. Hauling routes.
    f. Sequence of alteration work operations.
    g. Storage, protection, and accounting for salvaged and specially fabricated items.
    h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
    i. Qualifications of personnel assigned to alteration work and assigned duties.
    j. Requirements for extent and quality of work, tolerances, and required clearances.
    k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Contractor shall record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at monthly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. Participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.
2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:

1) Interface requirements of alteration work with other Project Work.
2) Status of submittals for alteration work.
3) Access to alteration work locations.
4) Effectiveness of fire-prevention plan.
5) Quality and work standards of alteration work.
6) Change Orders for alteration work.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.

1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.

1.7 INFORMATIONAL SUBMITTALS

A. Alteration Work Subschedule:

1. Submit alteration work subschedule within thirty (**30)** days of date established for.

B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

C. Alteration Work Program: Submit 30 days before work begins.

D. Fire-Prevention Plan: Submit 30 days before work begins.

1.8 QUALITY ASSURANCE

A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.

1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.

    a. Construct new mockups of required work whenever a supervisor is replaced.

B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.

D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

B. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.

E. Storage Space:

1. Salvaged material shall be stored and protected on-site.

1.10 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Owner's Removals: Before beginning alteration work, verify in correspondence with Owner that the following items have been removed:

1. None.

D. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by **12 inches (300 mm)** or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.

2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

    a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. Obtain Owner's approval for operations involving use of welding or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

    a. Train each fire watch in the proper operation of fire-control equipment and alarms.
    b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
    c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
    d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than [**30 minutes**] <**Insert time**> after conclusion of work[**in each area**] to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
    e. Maintain fire-watch personnel at[**each area of**] Project site until [**60 minutes**] [**two hours**] <**Insert time**> after conclusion of daily work.

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 32 33 "Photographic Documentation."

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 01 35 16

SECTION 01 35 91 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general protection and treatment procedures for designated historic spaces, areas, rooms, and surfaces in the entire Project and the following specific work:

1. Historic dismantling, salvaging, restoration/reconstruction, addition of new structural members and removable of selected portions on the work.

1.3 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.

C. Existing to Remain: Existing items that are not to be removed or dismantled.

D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful preservation, rehabilitation, restoration and reconstruction as determined by Architect. The entire building is designated historic; including the concealed areas below the grade and below the basement slab where restorative work is to occur.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

I. Remove: Specifically, for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

M. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.

N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

O. Retain: To keep existing items that are not to be removed or dismantled.

P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

Q. Salvage: To protect removed or dismantled items and deliver them to Owner.

R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

S. Strip: To remove existing finish down to base material unless otherwise indicated.

1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.

B. Coordinate with Architect & Owner who will establish special procedures for dismantling and salvage.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations by the use of photographs before work commences.

B. Fire-Prevention Plan: Submit before work begins.

C. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.

1.6 QUALITY ASSURANCE

A. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.

B. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI/ASSE A10.6.

D. Historic Treatment Preconstruction Conference: Conduct conference at Project site.

1. General: Review methods and procedures related to historic treatment including, but not limited to, the following:

    a. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
    b. Review qualifications of personnel assigned to the work and assign duties.
    c. Review material application, work sequencing, tolerances, and required clearances.
    d. Review areas where existing construction is to remain and requires protection.

2. Removal and Dismantling:

    a. Inspect and discuss condition of construction to be removed or dismantled.
    b. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Salvaged Historic Materials:

1. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers. Refer to and coordinate with Drawing Notes
3. Store items in a secure area.
4. Protect items from damage during storage.

B. Historic Materials for Reinstallation:

1. Repair and clean historic items as indicated and to functional condition for reuse.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and

taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.

D. Storage and Protection: When taken from their existing locations, catalog and store historic items within the building structure away from windows or other wet areas.

1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.

1.8 PROJECT CONDITIONS

A. General Size Limitation in Historic Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Known hazardous materials have been removed from the project.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

a. In the case of asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Re-assign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.

E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use only hand-held tools except as follows or unless otherwise approved by Architect on a case-by-case basis:

1. Light jackhammers are allowed subject to Architect's approval.
2. Large air hammers are not permitted.

B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Architect on a case-by-case basis:

1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
2. Pry bars more than 18 inches (450 mm) long and hammers weighing more than 2 lb (0.9 kg) are not permitted for dismantling work.

3.2 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.

1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."

C. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

3.3 PROTECTION, GENERAL

A. Comply with temporary barrier requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

C. Protect persons, motor vehicles, surrounding surfaces of building, building site, and surrounding buildings from harm resulting from historic treatment procedures.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
3. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
4. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
5. Protect floors and other surfaces along haul routes from damage, wear, and staining.

D. Temporary Protection of Historic Materials:

1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

F. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

G. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.

1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

H. Existing Roofing: Stay off roof except to conduct roof work specific to this Contract.

3.4 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following.

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties entitled "Owner's Responsibility for Fire Protection."
2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.

    a. If combustible material cannot be removed, provide fire blankets to cover such materials.

3. Prohibit smoking by all persons within Project work and staging areas.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated:

1. Obtain Owner's approval for operations involving use of welding or other high-heat equipment. Use of open-flame equipment is not permitted] Notify Owner at least 72 hours before each occurrence, indicating location of such work.
2. As far as practical, restrict heat-generating equipment to shop areas or outside the building.
3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat-generating equipment or highly combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows.

    a. Train each fire watch in the proper operation of fire-control equipment and alarms.
    b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
    c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
    d. Have fire watch perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work at each area of Project site to detect hidden or smoldering fires and to ensure that proper fire-prevention is maintained.
    e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

C. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is completed.

3.5 GENERAL HISTORIC TREATMENT

A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.

B. Halt the process of deterioration and stabilize conditions unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program:

1. Retain as much existing material as possible; repair and consolidate rather than replace.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
3. Use reversible processes wherever possible.

4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
5. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs. Comply with requirements in Section 01 32 33 "Photographic Documentation."

C. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Architect.

D. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

E. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

3.6 HISTORIC REMOVAL AND DISMANTLING

A. Perform work as follows:

1. Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
3. Do not operate air compressors inside building, unless approved by Architect in each case.
4. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
5. Do not use explosives.

B. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.

C. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.

D. Removing and Dismantling Items on or near Historic Surfaces:

1. Use only dismantling tools and procedures within 12 inches (300 mm) of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
2. Unfasten items to be removed, in the opposite order from which they were installed.
3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
4. Dismantle anchorages.

E. Anchorages:

1. Remove anchorages associated with removed items.
2. Dismantle anchorages associated with dismantled items.
3. In non-historic surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.

4. In historic surfaces, patch or repair holes created by anchorage to match surround material and finish.

END OF SECTION 01 35 91

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

2. Design services requiring signing and sealing by a professional Architect or Engineer shall be by licensed Architect and/or Engineer registered the State of Florida.

1.5 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply

with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior or laboratory mockups.

1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, licensed in State of Florida for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
2. Project title and number
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and re-inspecting.

D. Reports may be submitted in electronic format, but hard copies shall also be submitted in triplicate and shall be signed and sealed by the appropriate engineers and / or certifying agency.

1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services; following is list of Quality Control Services which are the Owner's responsibility all other quality control services shall be responsibility of the Contractor.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform. None at this time.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility; responsibility includes but is not limited to coordination and payment. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.

33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.

84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; www.marble-institute.com.
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.

133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI - New Buildings Institute; www.newbuildings.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
141. NEBB - National Environmental Balancing Bureau; www.nebb.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
143. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
145. NETA - InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
147. NFPA - National Fire Protection Association; www.nfpa.org.
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; www.nfrc.org.
150. NHLA - National Hardwood Lumber Association; www.nhla.com.
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
154. NRCA - National Roofing Contractors Association; www.nrca.net.
155. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF - NSF International; www.nsf.org.
157. NSPE - National Society of Professional Engineers; www.nspe.org.
158. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA - National Wood Flooring Association; www.nwfa.org.
161. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
164. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI - Resilient Floor Covering Institute; www.rfci.com.
166. RIS - Redwood Inspection Service; www.redwoodinspection.com.
167. SAE - SAE International; www.sae.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; www.siaonline.org.
174. SJI - Steel Joist Institute; www.steeljoist.org.
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB - Southern Pine Inspection Bureau; www.spib.org.
180. SPRI - Single Ply Roofing Industry; www.spri.org.
181. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA - Specialty Steel Industry of North America; www.ssina.com.
183. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI - Steel Tank Institute; www.steeltank.com.

185. SWI - Steel Window Institute; www.steelwindows.com.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; www.masonrysociety.org.
193. TPI - Truss Plate Institute; www.tpinst.org.
194. TPI - Turfgrass Producers International; www.turfgrasssod.org.
195. TRI - Tile Roofing Institute; www.tileroofing.org.
196. UL - Underwriters Laboratories Inc.; http://www.ul.com.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
199. USGBC - U.S. Green Building Council; www.usgbc.org.
200. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WA - Wallcoverings Association; www.wallcoverings.org
202. WASTEC - Waste Equipment Technology Association; www.wastec.org.
203. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
204. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
205. WDMA - Window & Door Manufacturers Association; www.wdma.com.
206. WI - Woodwork Institute; www.wicnet.org.
207. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
208. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://dodssp.daps.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.

13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS - California Department of Health Services; (See CDPH).
4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.
7. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry; http://txforestservice.tamu.edu.

1 **PART 2 - PRODUCTS (Not Used)**

2 **PART 3 - EXECUTION (Not Used)**

3 **END OF SECTION 01 42 00**

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: N/A. No sewer available.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and construction parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Moisture--Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Existing chain-link fence surrounding the building site shall remain during and after construction. Maintain chain-link fencing in serviceable condition, repairing damages promptly after they occur with matching fencing posts, fabric, gates, etc. At a minimum Chain-Link Temporary Construction Fencing shall be: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts.

2.2 TEMPORARY FACILITIES

A. Field Offices: Contractor shall use an existing vacant room within the existing building for their Field Office.

B. Furnish Field Office as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, chairs, desk, plan racks, and as necessary carry out the administration of the project.
2. Drinking water, toilet, HVAC.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2. Storage buildings shall meet requirements of building code for temporary buildings. Storage buildings on site exceeding the time limit in the code for temporary buildings

shall be treated as permanent buildings as required by the latest edition of the Florida Building Code.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

F. Telephone Service: Provide cellular.

1. In Field Office, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone.

G. Electronic Communication Service: Contractor's Option. Provide a desktop computer in the primary field office adequate for use to access Project electronic documents and maintain electronic communications.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Parking areas for construction personnel shall be within the Limits of Construction; unless otherwise agreed to with Owner.

D. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

E. Project Signs: Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

F. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use. Provide necessary temporary protection for restored wood.

J. Elevator: Elevator may be temporarily prior and after permitted for construction purposes subject to Owner’s approval and full restoration of any damages.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 01 10 00 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

E. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

F. Tree and Plant Protection: Existing; maintain during construction

G. Site Enclosure Fence: Existing; maintain during construction.

1. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

K. Temporary Fire Protection: Maintain existing system and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program. Existing building is protected throughout with a dry pipe sprinkler system.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal. Clean and police construction site on a daily basis and remove debris and other non-essential materials – equipment on a weekly basis.

1. Maintain operation of temporary enclosures, heating, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may

have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 21 00 "Allowances" for products selected under an allowance.
2. Section 01 23 00 "Alternates" for products selected under an alternate
3. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
4. Section 01 42 00 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the

specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

D. Comparable Product Request (Substitutions): Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal (Substitution): Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
    c. Documentation: Show compliance with requirement for substitutions and the following as applicable.
        1) Statement indicating why specified material or product cannot be provided.
        2) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
        3) Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
        4) Product Data, including drawings and descriptions of products and fabrication and installation procedures.
        5) Samples, where applicable or requested.
        6) List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
        7) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
        8) Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
        9) Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
        10) Cost information, including a proposal of change, if any, in the Contract Sum.

11) Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
12) Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.
b. Model and serial number.
c. Capacity.
d. Speed.
e. Ratings.

C. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's, unless indicated otherwise.
6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
7. Acceptable Substitution: For products specified by name and accompanied by the term "Acceptable Substitution" comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
    a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect, whose determination is final.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **will** be considered **unless otherwise indicated**.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

   a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **will** be considered **unless otherwise indicated**.

   a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

   a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

   a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

Advancement of Construction Technology

SUBSTITUTION REQUEST

(After the Bidding Phase)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Installation of the Work.
2. Cutting and patching.
3. Progress cleaning.
4. Protection of installed construction.

B. Related Requirements:

1. Section 01 10 00 "Summary" for limits on use of Project site.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 02 41 19 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other (subsequent) work.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.
b. Trade supervisor responsible for cutting operations.
c. Trade supervisor(s) responsible for patching of each type of substrate.

d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affecting by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. Cutting and Patching Plan: Submit plan describing procedures at least **10** days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.6 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

a. Primary operational systems and equipment.
b. Fire separation assemblies.
c. Air or smoke barriers.
d. Fire-suppression systems.
e. Plumbing piping systems.

f. Mechanical systems piping and ducts.
g. Control systems.
h. Communication systems.
i. Fire-detection and -alarm systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Exterior wall construction.
b. Water, moisture, or vapor barriers.
c. Membranes and flashings.
d. Equipment supports.
e. Piping, ductwork, vessels, and equipment.
f. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic or historic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

2. Use salvaged wood products for patching in as much as possible to maintain historic nature of building.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Do not use materials that are considered hazardous.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

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

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by repairing, closing up, and similar operations following performance of other work. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls." And Section 01 74 19 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 02 41 19 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, and receipts.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Provide handling, containers, storage, signage, transportation, and other items as required to implement waste removal during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."

B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

C. Waste Management in Historic Zones or Areas: Hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, by 12 inches (300 mm) or more.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed to in building.
3. Store items in a secure area.
4. Protect items from damage during storage.

3.3 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

END OF SECTION 01 74 19

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 01 32 33 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 01 73 00 "Execution" for progress cleaning of Project site.
3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list).

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 15 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, final completion construction photographic documentation, damage or settlement surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 15 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete start up testing of systems and equipment
4. Instruct Owner's personnel in operation, and adjustment, and maintenance of products
5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
6. Complete final cleaning requirements.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 15 days prior to date the work will be completed. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. If re-inspection of the above referenced items are required by the Architect/Engineers due to failure of any of the Work to comply with the Contract Documents, the Owner will deduct the costs incurred by the Architect/Engineers by such re-inspections from the Contract amount. If necessary, re-inspection will be repeated until completed.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected. If re-inspection of the above referenced items are required by the Architect/Engineers due to failure of any of the Work to comply with the Contract Documents, the Owner will deduct the costs incurred by the Architect/Engineers by such re-inspections from the Contract amount. If necessary, re-inspection will be repeated until completed.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. Spreadsheet electronic file. Architect will return annotated file. OR
    b. PDF electronic file. Architect will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty. Warranties shall commence on the date of Substantial Completion of the Project.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or

installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

PART 2 - PRODUCTS N/A

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

   a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
   b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
   c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
   d. Remove tools, construction equipment, machinery, and surplus material from Project site.
   e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition.

B. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls" and Section 01 74 19 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion. Repair or remove and replace defective construction.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:

1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect & Engineer will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect by email to Architect. Enable reviewer comments on draft submittals.
2. Submit in PDF Format.

C. Initial Manual Submittal: Submit draft copy of each manual at least **30** days before commencing demonstration and training. Architect and Engineers will comment on whether general scope and content of manual are acceptable.

1. Correct or revise each manual to comply with Architect's and Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Engineer's comments and prior to commencing demonstration and training.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least **15** days before commencing demonstration and training.

E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:

1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.8 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.

8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.11 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and

telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:
1. Section 01 73 00 "Execution" for final property survey.
2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Final Submittal:

1) Submit one paper-copy set(s) of marked-up record prints.
2) Submit PDF electronic files of scanned record prints.
3) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Specifications: Submit an annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit an annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit an annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written construction log report indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Work Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG Version 2017. Microsoft Windows system.

3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to Architect for resolution.
6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 78 39

SECTION 01 78 46 – ATTIC STOCK MATERIALS

1.1 GENERAL

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

B. Summary: This section includes:

1. Attic Stock Materials.

C. Action Submittals: Submit the following:

1. At substantial completion provide 3 copies of Attic Stock Material Inventories. Inventory List shall contain:
   a. Material Name.
   b. Spec section.
   c. Quantity/number of packages, etc.
   d. Manufacturer's name.
   e. Subcontractor's name.
   f. Supplier's name.
   g. All materials shall be in original container, packaging, etc. unless otherwise acceptable to Owner.

1.2 PRODUCTS

A. Schedule of Attic Stock:

1. Carpet: 2%.
2. VCT and LVT: 2%.
3. Acoustical panels: 2%.
4. Hard tile: 2% floor, 30 pieces of base.
5. HVAC filters: 2%
6. Paint: Accent Colors – 1 gal. of each color and type.
7. Paint: Non-accent Colors – 5 gals of each color and type in one gal containers.
8. Rubber Base: 50 feet.
9. Acoustical Wall Panel Fabric: 5%.
10. Lamps: Lighting – 1 dozen of each type of bulb.
11. Wood flooring: 1%
12. Wood ceiling: 1%
13. Wood Base: 1%

B. Provide attic stock materials as indicated above. Quantities listed above shall include that amount of material for each color, type, model, shape, type, size, etc of the listed material.

1.3 EXECUTION

A. Store Attic Stock in a climate controlled environment, location as directed by Architect/Owner.

B. Attic Stock Inventory shall be signed by contractor supplying the material, Construction Manager and Owner attesting to having received the material.

C. Attic Stock Room shall remain secure at all times and be inaccessible to other than the Owner. Note: This means the room must be 100% complete with all punch list items completed prior to storing the attic stock.

D. Attic stock shall not be used for general construction without approval of Owner and Architect; if

approval replacement stock shall immediately be ordered and delivered.

END OF SECTION 01 78 46

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.

c. Operating standards.
d. Regulatory requirements.
e. Equipment function.
f. Operating characteristics.
g. Limiting conditions.
h. Performance curves.

2. Documentation: Review the following items in detail:

a. Emergency manuals.
b. Systems and equipment operation manuals.
c. Systems and equipment maintenance manuals.
d. Product maintenance manuals.
e. Project Record Documents.
f. Identification systems.
g. Warranties and bonds.
h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning.
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.

8. Repairs: Include the following:

   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect, or through Construction Manager, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral and a demonstration performance-based test.

F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of **12** megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings **on CD-ROM or thumb drive**.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 79 00

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building and structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.
4. Temporary shoring of structure.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 01 35 91 "Historic Treatment Procedures" for historic removal and dismantling.
3. Section 01 73 00 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. **[store]**.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site (425 West Jefferson St., Monticello, FL 32344.)

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.
6. Review proposed shoring.

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's other adjacent tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Predemolition Photographs: Submit before Work begins.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 FIELD CONDITIONS

A. Owner will occupy buildings immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will have been removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Comply with requirements specified in Section 01 32 33 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 01 10 00 "Summary."

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

2. Note: Existing unused 4x4 supports are available for use as shoring as necessary. Contractor shall determine integrity of each before using.

3. Coordinate with structural requirement and Structural Engineer.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 "Construction Waste Management and Disposal."

B. Work in Historic Areas: The terms "demolish" or "remove" shall mean historic "removal" or "dismantling" as specified in Section 01 35 91 "Historic Treatment Procedures."

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area on-site.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from

reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 00 - CONCRETE WORK

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of concrete work is shown on drawings.

Concrete paving and walks are specified specification for non-building concrete work.

Precast concrete is specified in other Division-3 sections.

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

ACI 301	"Specifications for Structural Concrete for Buildings."
ACI 302.1	“Guide for Concrete Floor and Slab Construction.”
ACI 315	"Details and Detailing of Concrete Reinforcing.”
ACI 318	"Building Code Requirements for Reinforced Concrete."
ACI 347	"Recommended Practice for Concrete Formwork."

Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

Concrete Testing Service: Engage an independent testing laboratory acceptable to the Architect to perform material evaluation tests. Cost of testing to be paid by Contractor.

SUBMITTALS:

Shop Drawings: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

Laboratory Test Reports: Submit laboratory test reports for concrete compressive strength tests as specified.

Mix Designs: Submit design mix for each strength of concrete and each variation as specified.

Manufacturer’s Literature: Submit manufacturer’s descriptive data for sealing, curing, admixtures, etc.

PART 2 - PRODUCTS

FORM MATERIALS:

Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.

Cylindrical Columns and Supports: Form round-section members with metal, fiberglass reinforced plastic, or paper or fiber tubes. Construct paper or fiber tubes of laminated plies using water-resistant adhesive with wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist loads imposed by wet concrete without deformation.

Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

REINFORCING MATERIALS:

Reinforcing Bars: ASTM A 615, Grade 60, deformed.

Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.

CONCRETE MATERIALS:

Portland Cement: ASTM C 150, Type I, unless otherwise acceptable to Architect/Engineer.

Use one brand of cement throughout project, unless otherwise acceptable to Architect/Engineer.

Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to Architect.

The aggregate shall not exceed 1" in its maximum dimensions for foundation and slab work nor 3/8" (per gravel) for concrete block lintels and filled cells.

Lightweight Aggregates: ASTM C 330.

Water: Drinkable.

Air-Entraining Admixture: ASTM C 260.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Sika Aer"; Sika Corp
"MB-VR or MB-AE"; Master Builders
"Dorex AEA"; W.R. Grace
"Edoco 2001 or 2002"; Edoco Technical Product

Color Additive: See architectural plans for color and location. Additives shall be from approved manufacturer's.

RELATED MATERIALS:

Submit any product not specifically listed in this specification to Architect for approval.

Vapor Retarder: Provide vapor retarder cover over prepared base material where indicated that is resistant to deterioration when tested according to ASTM E154 as follows:

Polyethylene Sheet: Not less than 8 mils thick reinforced for durability and tear resistance. Laps are to be a minimum of 6" and tape sealed.

Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

Non-metallic

"Masterflow 928"; Master Builders
"Euco-NS"; Euclid Chemical Co.

Liquid Membrane Forming Curing Compound: Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss not more than 0.055 gr./sp. cm. when applied at 200 sq. ft./gal.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

"Masterseal"; Master Builders
"Ecocure"; Euclid Chemical Co.
"Clear Seal"; A. C. Horn
"Kure-N-Seal"; Sonneborn-Contech

Sealer: Acrylic based, meeting the requirements of ASTM C 309 and compatible with subsequent floor finishes.

Hardner: Chemical floor hardner to be placed where required by Architect. Subject to compliance with requirements, manufacturer's which may be incorporated into the work include, but are not limited to, the following:

Master Builders, Inc.
Seal Tight, W.R. Meadows - Pena-Lith

PROPORTIONING AND DESIGN OF MIXES:

Prepare design mix for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Engineer/Architect.

Design mixes to yield normal weight concrete with the following properties, as indicated on drawings and schedules:

Concrete shall have a minimum compressive strength of:

4000 PSI	Slabs and Grade Beams
5000 PSI	Footings

at 28-days; the W/C ratio for non-air-entrained concrete shall be between 0.45 and 0.50, 0.45 maximum (air-entrained). In addition, the minimum cement content shall be 5 1/2 bags per cu. yd. of concrete.

Lightweight Concrete: Proportion mix as herein specified. Design mix to produce strength and modules of elasticity as noted on drawings, with a split- cylinder strength factor (Fct) of not less than 5.5 and a dry weight of not less than 95 lbs. or more than 110 lbs. after 28 days. Limit shrinkage to 0.03% at 28 days.

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

Admixtures:

Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2% within following limits:

Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or subjected to hydraulic pressure:

4.5% (moderate exposure); 5.5% (severe exposure) 1-1/2" max. aggregate.

5.0% (moderate exposure); 6.0% (severe exposure) 3/4" max. aggregate.

Other Concrete: 2% to 4% air.

Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

Ramps, slabs, and sloping surfaces: Not more than 4".

Reinforced foundation systems: 4" +/- 1".

Pea gravel pump mix for filled masonry cells (3000 psi): 5 ½" to 8".
Grout fill for cells: 8" to 11"

Other concrete: 4" +/- 1".

CONCRETE MIXES:

Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

When air temperature is between 85°F (30°C) and 90°F (32°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

FORMS:

Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use properly selected materials to obtain required finishes. At locations where concrete is exposed provide a high quality finish. Verify the required finish with the Architect. If exposed tie holes are required per architectural requirements, verify hole locations with Architect's drawings. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set time to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

Chamfer exposed corners and edges if indicated, using wood, metal, PVC or rubber chamfer strips fabricated to product uniform smooth lines and tight edge joints.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

PLACING REINFORCEMENT:

Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

Place reinforcement to obtain at least minimum coverages for concrete protection and lap as specified by ACI. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Steel reinforcing is to be free of kinks and non-shop bends, all bends are to be approved by the Architect/Engineer. FBC Section 1907.3.2

Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

JOINTS:

Construction Joints: Locate and install keyed construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect. The surface of the construction joints shall be cleaned and laitance free and should be constructed per FBC Sections 1906.4.1 and 1906.4.2. Immediately before new concrete is placed, all construction joints shall be wetted and standing water removed.

Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints.

Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.

Joint filler and sealant materials are specified in Division-7 sections of these specifications.

Contraction (Control) Joints in Slabs-on-Ground: Construct contraction joints in slabs-on- ground to form panels of patterns as shown. Use inserts 1/8" to 1/4" wide x 1/4 of slab depth, unless otherwise indicated.

Form contraction joints by inserting premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

Contraction joints may be formed by saw cuts as soon as possible after slab finishing and without dislodging aggregate. Depth of saw cut to be 1/4 of slab thickness.

Joint sealant material is specified in Division-7 sections of these specifications.

INSTALLATION OF EMBEDDED ITEMS:

General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in- place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

PREPARATION OF FORM SURFACES:

Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

CONCRETE PLACEMENT:

Pre-placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast- in. Notify other crafts to permit installation of their work, cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation. Concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into spaces between the reinforcing.

Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic, to avoid cold joints.

Consolidate placed concrete by mechanical vibrating equipment supplemented by hand- spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

Maintain reinforcing in proper position during concrete placement operations.

Cold Weather Placing: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305.

Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

Types of concrete that shall be prohibited are as follows:

1. Partially hardened concrete.
2. Contaminated concrete.
3. Re-tempered concrete.
4. Concrete that has been re-mixed after it has taken its initial set.

FINISH OF FORMED SURFACES:

Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly, to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

Grout Cleaned Finish: Provide grout cleaned finish to cylindrical column surfaces which have received smooth form finish treatment.

Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will match adjacent surfaces.

Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

MONOLITHIC SLAB FINISHES:

Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system.

After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand- troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface plane so that depressions between high spots do not exceed 1/8" under a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete sidewalks, steps and ramps, and elsewhere as indicated.

Burnished Floor Finish (Polished Concrete): If noted on architectural plans, apply burnished floor finish at locations shown on plans. The contractor shall produce a burnished floor finish by repeated steel troweling with a power trowel until trowel blades make a ringing sound and floor surface has a glossy appearance. Contractor shall have sufficient experience and also build a mock-up of floor section prior to construction to demonstrate ability to produce desired finish. Finish must be acceptable to architect.

CONCRETE CURING AND PROTECTION:

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days at 50^{o}F. minimum temperature.

Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

Provide moisture curing by following methods.

Keep concrete surface continuously wet by covering with water.
Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

Provide moisture-cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

Provide curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks, and curbs, as follows:

Applied specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

Apply second coat of curing/sealing compound per manufacturer's recommendations to areas to be left exposed.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp-proofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

REMOVAL OF FORMS AND SHORING:

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50^{o} F (10^{o} C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork or shoring supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in place concrete by testing field-cured specimens representative of concrete location or members.
Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

RE-USE OF FORMS:

Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged from facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

MISCELLANEOUS CONCRETE ITEMS:

Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

Grout base plates and foundations as indicated, using specified non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and finish concrete surfaces as scheduled.

Reinforced Masonry: Provide concrete for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

CONCRETE SURFACE REPAIRS:

Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush- coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.

For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning; flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement of completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets and other objectionable conditions.

Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finish concrete. Cure in same manner as adjacent concrete.

Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

Perform structural repairs with prior approval of Architect or method and procedure, using specified epoxy adhesive and mortar.

Repair methods not specified above may be used, subject to acceptance of Architect.

QUALITY CONTROL TESTING DURING CONSTRUCTION:

The Contractor will employ a testing laboratory to perform tests and to submit test reports.

Sampling and testing for quality control during placement of concrete includes the following, as directed by Architect.

Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.

Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

Air Content: ASTM C 173; volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air- entrained concrete.

Concrete Temperature: Test hourly when air temperature is 40^{o}F (4^{o}C) and below, and when 80^{o}F (27^{o}C) and above; and each time a set of compression test specimens made.

Satisfactory Concrete: The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

1. Every arithmetic average of any three consecutive strength tests equals or Exceeds f'c.
2. No individual strength test (average of two cylinders) falls below f'c by more than 500 psi.

Compression Test Specimen: ASTM C31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens.

Compressive Strength Tests: ASTM C39; one set for each day's pour exceeding 5 cu. yds. plus additional sets for each 25 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

When frequency of testing will provide less than 2 strength tests for a given class of concrete, conduct testing from each batch.

Test results will be reported in writing to Architect. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, compressive breaking strength and type of break for both 7-day tests and 28-day tests.

Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION 03 30 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:

1. Concrete masonry units (CMUs) where indicated.

B. Also, refer to Structural Contract Documents for interior bearing walls, in addition to requirements specified herein.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.

1.5 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Qualification Data: For testing agency.

C. Material Certificates: For each type and size of the following:

1. Masonry units.

    a. Include data on material properties material test reports substantiating compliance with requirements.
    b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Integral water repellent used in CMUs.
3. Cementitious materials. Include name of manufacturer, brand name, and type.
4. Mortar admixtures.
5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
6. Grout mixes. Include description of type and proportions of ingredients.
7. Reinforcing bars.
8. Joint reinforcement.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following installed compressive strength (f'm) at 28 days.

1. For Concrete Unit Masonry: Based on net area – f'm = 1900 psi min., unless otherwise specified in structural Contract Documents.

1.7 REFERENCES

A. American Concrete Institute (ACI):
1. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 530 – Building code Requirements for Masonry Structures.
3. ACI 530.1 – Specification for Masonry Structures.

B. American Society for Testing and Materials (ASTM):
1. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.
2. ASTM C 90 – Specification for Load-Bearing Concrete Masonry Units.
3. ASTM C 140 – Methods of Sampling and Testing Concrete Masonry Units.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

B. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

C. Pre-Construction Tests by Unit Test Methods: Test the following materials by methods indicated:

1. Concrete Masonry Units: Test each type, class and grade of concrete masonry unit per ASTM C 140.

2. Mortar Tests: Test each mortar type per ASTM C 780.

D. Construction: Construct masonry in accordance with requirements of ACI 530 and 530.1.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

F. Cover masonry sand.

1.9 FIELD CONDITIONS

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

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.

2.4 COLORS, TEXTURES, AND PATTERNS

A. Exposed Masonry Units: As indicated by manufacturer's designations.

2.5 CONCRETE MASONRY UNITS (CMUs)

A. Shapes: Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. Concrete Masonry Units: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa); Type II, unless otherwise specified in Contract Documents.

2. Weight Classification: Normal weight.
3. 8”x8”x16”, 8”x8”x8”.

2.6 CONCRETE AND MASONRY LINTELS

A. General: Provide either concrete or masonry lintels, at Contractor's option, complying with requirements below.

B. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Division 03 Section and Division 04 Structural specifications.

C. Masonry Lintels: Made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

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

C. Mortar Cement: ASTM C 1329/C 1329M.

D. Masonry Cement: ASTM C 91/C 91M.

1. Available Products:

a. Capital Materials Corporation; Flamingo Color Masonry Cement.
b. Lafarge North America Inc.
c. Lehigh Cement Company.
d. National Cement Company, Inc.

E. Aggregate for Mortar: ASTM C 144.

1. For joints, less than 1/4-inch (6.5 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C 404.

G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Available Products:

a. Addiment Incorporated; Mortar Kick.
b. Euclid Chemical Company (The); Accelguard 80.
c. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.

d. Sonneborn, Div. of ChemRex; Trimix-NCA.

H. Water: Potable.

I. Mortar Color: As selected by Architect from manufacturer's range of gray colors.

2.7 REINFORCEMENT

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

B. Masonry Joint Reinforcement: ASTM A 951; mill galvanized, carbon-steel wire for interior walls and hot-dip galvanized, carbon-steel wire for exterior walls.

1. Wire Size for Side Rods: W2.8 or 0.188-inch (4.8-mm) diameter.
2. Wire Size for Cross Rods: W2.8 or 0.188-inch (4.8-mm) diameter.
3. Wire Size for Veneer Ties: W2.8 or 0.188-inch (4.8-mm) diameter.
4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
5. Single-Wythe Masonry: Ladder type with single pair of side rods.

2.8 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
3. Steel Plates, Shapes, and Bars: ASTM A 36A/A 36M.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

1. Wire: Fabricate from **3/16-inch- (4.8-mm-)** diameter, hot-dip galvanized steel wire.

D. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Tie Section: Triangular-shaped wire tie, sized to extend within 1-inch (25 mm) of masonry face, made from 0.188-inch- (4.8-mm-) diameter, hot-dip galvanized steel wire.

2.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing**,** where flashing is exposed or partly exposed and where indicated, complying with Division 07 Section "Sheet Metal Flashing and Trim" where indicated.

1. Metal Drip Edges: Basis of Design – Hohmann & Barnard Foam-Tite Seal Drip Plates (FTS Drip Plate), stainless steel to have continuous 1/8" strip of factory installed compressible foam to act as a bond-break and help prevent air and moisture infiltration with an adhesive strip on the topside of the drip plate to aid in precise and permanent placement of the flashing.
2. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.

B. Flexible Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:

1. Copper- Laminated Flashing: 5-oz./sq. ft. (1.5-kg/sq. m) copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.

a. Available Products:

1) Advanced Building Products Inc.; Copper Fabric Flashing.
2) AFCO Products Inc.; Copper Fabric.
3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
5) Polytite Manufacturing Corp.; Copper Fabric Flashing.
6) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
7) York Manufacturing, Inc.; York Copper Fabric Flashing.

C. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

C. Weep/Vent Products: Use the following, unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe, in color, gray selected from manufacturer's standard.

b. Available Products:

1) Advanced Building Products Inc.; Mortar Maze weep vent.
2) Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
3) Heckmann Building Products Inc.; No. 85 Cell Vent.
4) Hohmann & Barnard, Inc.; Quadro-Vent.
5) Wire-Bond; Cell Vent.

D. Termination Bars: Stainless steel, surface mounted.

2.11 MASONRY CLEANERS

A. Manufacturer's standard-strength cleaner designed for removing mortar/grout stains from new masonry without damaging masonry. Use product approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement and lime.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Mortar for Unit Masonry: Comply with ASTM C 270 and BIA Technical Notes 8A, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type S.
4. Mortar selected by Architect from manufacturer’s range of standard greys.

C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C 143/C 143M.

D. Brick mortar: Type N; where brick repairs required.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

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

D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 1/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).[**Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).**]
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

D. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

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

G. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and concrete masonry units as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.5 CAVITY WALLS (if specified)

A. Bond wythes of cavity walls together using one of the following methods:

1. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

    a. Where use adjustable (two-piece) type reinforcement with continuous horizontal wire in facing wythe attached to ties to allow for differential movement regardless of whether bed joints align.

3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1/2 inch (13 mm) in width between masonry and structural member, unless otherwise indicated.
2. Anchor masonry to structural members with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.8 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows, unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing as recommended by flashing manufacturer.
2. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
5. Seal horizontal lap joints in thru-wall cavity installation and provide end dams at all vertical discontinuities.

C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.

D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.

E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.

1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.9 REINFORCED UNIT MASONRY INSTALLATION

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

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than **60 inches (1520 mm)**.

3.10 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Protect adjacent surfaces from contact with cleaner.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.11 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
2. Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 04 21 13 - BRICK MASONRY REPAIR (Evaluating, Testing, Architectural Approval, Cleaning, Removal, Salvage, Rebuild) and REPOINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Refer to NPS (National Park Service) Preservation Brief No. 2.

1.2 SUMMARY

A. Section Includes:

1. Evaluating existing brick and joints, testing cleaning methods and joint repair, cleaning brick, re-pointing joints, filling voids, removing, salvaging and/or rebuilding brick masonry. The Intent is not to remove any brick in this Contract with the exception of the existing brick wall at East and West entries. Should the condition arise that other existing brick needs to be removed and salvaged or rebuilt than the brick shall be carefully dismantled, cleaned, salvaged, and rebuilt; unless otherwise indicated. Prior to disposing of any excess brick Architect shall be consulted to determine suitability for salvage. The requirements of this section shall be adhered to. Intent of this section is to clean brick, joints and restore the existing brick walls (including repoint joints) to as new condition as possible with no voids and tight joints to provide a weather tight brick wall.

2. Re-pointing joints with mortar.

3. In addition, the intent is to use the gentlest methods testing, cleaning, replacement, repair and re-pointing.

1.3 DEFINITIONS

A. Low-Pressure Spray: **100 to 150 psi**.

B. Non-ionic detergent: Detergent based on polyoxyethene or glycoside. Common examples include Tween, Triton and the Brij Series. These materials are also know as ethoxylates or PEGlyates and their metabolites, nonylphenol. Glycosides have a sugar as their uncharged hydrophilic headgroup.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review evaluation of existing brick and joints, methods and procedures related to cleaning brick and joints, pointing, dismantling and rebuilding existing brick masonry including, but not limited to, the following:

a. Verify brick masonry repair and re-pointing specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Materials, material application, sequencing, tolerances, and required clearances.
c. Quality-Control Program.
d. Architect being available during testing for cleaning procedure and approval of final tests after 7 days drying.

1.5 SEQUENCING AND SCHEDULING

A. Order sand and portland cement mortar immediately after approval. Take delivery of and store at Project site enough quantity to complete Project. Sand shall be covered at end of each day's work and prior to change of inclement weather; minerals in rain water can compromise the color of the sand and when mixed with mortar, the color of the mortar. Replace sand which has been contaminated with rain water.

B. Work Sequence: Perform brick masonry cleaning and dismantling work in the following sequence, which includes work specified in this and other Sections:

1. Cleaning
   a. Evaluate the condition of the existing brick and joint (including tightness of joints), including voids and missing or damaged brick. Provide verification of extent (%) of masonry repair work to confirm or disagree with the percentage of repair work indicated in the Building Elevations.
   b. Meet with Architect on-site to resolve extent and percentage.
   c. Select cleaning testing areas.
   d. Propose non-ionic detergent if other than specified material.
   e. Perform one 2'x2' test of low pressure cleaning with scrubbing.
   f. Perform one separate 2'x2' test of low pressure cleaning with non-ionic detergent with scrubbing.
   g. Let dry for 7 non-rain or fog event days.
   h. Meet with Architect to determine the gentlest most effective and least harmful manner of cleaning the brick.
   i. Remove plant growth.
   j. Remove paint. Coordinate with Section 09 97 23.
   k. Remove miscellaneous electrical boxes, conduits, protruding wires and other abandoned equipment.
   l. Remove any screws, nails, old masonry insert anchors, concrete splatters and other debris, etc. from brick and joints.
   m. Proceed with cleaning.
   n. Provide in-place samples of match joint mortar.
   o. Race out mortar joints to be repointed.
   p. Proceed with Brick and joint restoration, including filling of voids in brick joints.
   q. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.

3. Provide product data for mortar materials.

4. Provide sample mortar to match existing, then in-place sample for approval.

5. Provide product date for non-ionic detergent.

B. Shop Drawings:

1. Include plans, elevation, section, and locations of repointing work on the structure.

2. Show provisions for expansion joints or other sealant joints.

3. If scaffolding is used: Do not connect to existing masonry.

C. Testing: Provide testing of existing brick mortar composition to confirm Portland cement based or lime based and submit results to Architect before commencing restoration.

D. Samples for Initial Selection: For the following:

1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches (150 mm) long by **1/4 inch (6 mm)** wide, set in aluminum or plastic channels.

   a. Have each set contain a close color range of at least **six** Samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.
   b. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.

2. Sand Type Used for Pointing Mortar: Minimum 8 oz. (240 mL) of each in plastic screw-top jars.
3. Sealant materials (coordinate with Section 07 90 10 Exterior Joint Sealants). Include similar Samples of accessories involving color selection.

B. Samples for Verification: For the following:

1. Each type, color, and texture of pointing mortar in the form of sample mortar strips, 6 inches (150 mm) long by **1/4 inch (6 mm)** wide, set in aluminum or plastic channels.

   a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.

2. Sealant materials.

3. Accessories: Each type of accessory and miscellaneous support.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For brick masonry repair specialist.

B. Preconstruction Test Reports: For existing masonry units and mortar.

C. Quality-control program.

1.8 QUALITY ASSURANCE

A. Brick Masonry Repair and Repointing Specialist Qualifications: Engage an experienced brick masonry repair and repointing firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repointing work.

1. Field Supervision: Brick masonry repair specialist firm shall maintain experienced full-time supervisors on Project site during times that brick masonry repair work is in progress.

B. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage.

C. Mockups: Prepare mockups of brick masonry repointing to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Temporary Patch: As directed by Architect, provide temporary materials followed by permanent repairs at locations from which existing samples were taken.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified Testing agency to perform preconstruction testing on masonry units as follows.

1. Provide test specimens as indicated and representative of proposed materials and existing construction.

2. Existing Brick: Test each type of existing brick indicated for repointing according to testing methods in ASTM C 67 for compressive strength, 24-hour cold-water absorption, five-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove **five** existing units from locations designated by Architect. Take testing samples from these units.

3. Existing Mortar: Test according to ASTM C 295/C 295M, modified as agreed by testing service and Architect for Project requirements, to determine proportional composition of original ingredients, sizes and colors of aggregates, and approximate strength.

4. Temporary Patch: As directed by Architect, provide temporary materials followed by permanent repairs at locations from which existing samples were taken.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store sand where grading and other required characteristics can be maintained and contamination avoided. Cover sand at the end of each work day or upon inclement weather.

E. Handle masonry units to prevent overstressing, chipping, defacement, and other damage. Cover sand at all times not being used and upon inclement weather.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit brick masonry repair work to be performed according to product manufacturers' written instructions and specified requirements.

B. Temperature Limits, General: Repair masonry units only when air temperature is between 40 and 90 deg F (4 and 32 deg C) and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair unless otherwise indicated:

1. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
2. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for seven days after repair.

D. Hot-Weather Requirements: Protect masonry repairs when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each type of material for brick masonry (brick, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 MASONRY MATERIALS

A. Face Brick: As required to complete brick masonry repair work. There is available on site some existing salvage brick that can be used; coordinate with Architect.

1. Brick Matching Existing: Units with colors, color variation within units, surface texture, size, and shape that match existing brickwork and with physical properties

a. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.

b. Intent of the brick for the new retaining wall is to match size and general color. Currently there are minimal amounts of existing stored brick which shall not be used in the new brick retaining wall, but remain stored for future use in the building brick walls.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray where required for color matching of mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

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

C. Masonry Cement: ASTM C 91/C 91M.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cemex S.A.B. de C.V..
b. Essroc Italcementi Group.
c. Holcim (US) Inc.
d. Lafarge North America Inc.
e. Lehigh Hanson, Inc.
f. Quikrete Companies, Inc. (The).

D. Mortar Cement: ASTM C 1329/C 1329M.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Lafarge North America Inc.

E. Mortar Sand: ASTM C 144.

1. Exposed Mortar: Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

F. Water: Potable.

2.4 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

B. Do not use admixtures in mortar unless otherwise indicated.

C. Mixes: Mix mortar materials in the following proportions:

1. Rebuilding (Setting) Mortar by Type: ASTM C 270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to portland cement and lime, masonry cement or mortar cement.

2.5 ACCESSORY MATERIALS

A. Sealant Materials: Provide per Section 07 90 10 Exterior Joint Sealants

B. Joint-Sealant Backing: Provide per Section 07 90 10 Exterior Joint Sealants.

C. Masking Tape: Provide per Section 07 90 10 Exterior Joint Sealants.

D. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.

2. Minimal possibility of damaging exposed surfaces.

3. Consistency of each application.

4. Uniformity of the resulting overall appearance.

5. Do not use products or tools that could leave residue on surfaces.

2.6. MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again, adding only enough water to produce a damp, unworkable mix that retains its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until

mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

2. Do not use admixtures in mortar unless otherwise indicated.

3. Pointing Mortar by Type: ASTM C 270, Proportion Specification, **Type N** otherwise indicated; with cementitious material limited to portland cement and lime.

PART 3 - EXECUTION

3.1 BRICK CLEANING

A. Clean with the gentlest possible means to produce the most effective, yet least harmful manner of cleaning.

B. Do not use any acid materials.

C. Cleaning methods and materials:

1. Potable water. Rinse the wall starting at the bottom and proceeding up to the top to rinse the surface deposits from the wall. Soak the wall starting at bottom, then clean with low pressure (100-150 psi max.) proceeding to the top of the building; then lightly scrub the brick with a natural bristle or synthetic bristle brush; always keeping surfaces wet below the area being cleaned. Then rinse cleaned area from bottom to top of wall.
2. Subject to the decision to use the next level of cleaning, using potable water. Rinse the wall starting at the bottom and proceeding up to the top to rinse the surface deposits form the wall. Soak the wall starting at the bottom with a mixture of non-ionic detergent with the low pressure (100-150 psi max.) proceeding to the top of the building; then lightly scrub the brick with a natural bristle or synthetic bristle brush; always keeping surface wet below the area being cleaned. Then rinse cleaned areas from bottom to top of wall.
3. Proceed around the building in an organized manner.

3.2 PROTECTION

D. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.

3.3 POINTING SPECIALIST

A. Brick Masonry Repointing Specialist Firms: Subject to compliance with requirements, masonry repointing shall be performed by a Repointing Specialist.

4.

3.4 BRICK REMOVAL AND REPLACMENT

A. At locations indicated, remove bricks that to be reused. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Notify Architect of unforeseen detrimental conditions.

C. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, natural or synthetic brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
3. Store brick for reuse. Store off ground, on skids, and protected from weather.
4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.

D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for brick replacement.

E. Replace removed damaged brick with other removed brick in good condition, or with new brick matching existing brick there are not sufficient quantity of salvaged brick. Do not use broken units unless they can be cut to usable size.

F. Install replacement brick into bonding and coursing pattern of existing brick.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

G. Lay replacement brick with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with enough mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.) Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in to match joints of surrounding existing brickwork.

H. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

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

3.5 MASONRY REPOINTING, GENERAL

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.
2. Joints indicated as sealant-filled joints.
3. Joints at locations of the following defects:

a. Holes and missing mortar.

b. Cracks that can be penetrated 1/4 inch (6 mm) or more by a knife blade 0.027 inch (0.7 mm) thick.
c. Cracks **1/16 inch (1.6 mm)** or more in width and of any depth.
d. Hollow-sounding joints when tapped by metal object.
e. Eroded surfaces 1/4 inch (6 mm) or more deep.
f. Deterioration to point that mortar can be easily removed by hand, without tools.
g. Joints filled with substances other than mortar.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of joint width plus 1/8 inch (3 mm), but not less than 1/2 inch (13 mm) not less than that required to expose sound, unweathered mortar. Do not remove unsound mortar more than 2 inches (50 mm) deep; consult Architect for direction.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than **3/8 inch (9 mm)** until a uniform depth is formed. Fully compact each layer, and allow it to become thumbprint hard before applying next layer.
3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than **3/8 inch (9 mm).** Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

3.2 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water applied by low-pressure spray.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

B. Clean adjacent nonmasonry surfaces. Use detergent and soft brushes or cloths.

C. Remove masking materials, leaving no residues that could trap dirt.

3.3 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives access as needed, to observe progress and quality of portion of the Work completed.

3.4 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Excess brick salvaged are the Owner’s property and shall be stored in accordance with Architect’s direction; other non-historic materials are Contractor's property.

B. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 04 01 20.63

SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.

Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.

Miscellaneous Metal Fabrications are specified elsewhere in Division 05.

QUALITY ASSURANCE:

Codes and Standards: Comply with provisions of following, except as otherwise indicated:

AISC "Code of Standard Practice for Steel Buildings and Bridges"

Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the owner's acceptance of all responsibility for the decision adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings."

AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings," including "Commentary" and Supplements thereto as issued.

AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

AWS D1.1 "Structural Welding Code"

ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use"

Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests. Certification must be current.

If recertification of welders is required, retesting will be Contractor's responsibility.

SUBMITTALS:

Product Data: Submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

Structural steel (each type).

High-strength bolts (each type), including nuts and washers.

Structural steel primer paint.

Shrinkage-resistant grout.

Shop Drawings: Submit signed and sealed shop drawing prepared under supervision of a registered professional engineer in the state of Florida, including complete details and schedules for fabrication and assembly of structural steel members procedures and diagrams.

Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.

Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

DELIVERY, STORAGE AND HANDLING:

Deliver materials to site at such intervals to insure uninterrupted progress of work.

Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

MATERIALS:

Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

Structural Steel Shapes, Plates and Bars: ASTM A 36.

Cold-Formed Steel Tubing: ASTM A 500, Grade B.

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

Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.

High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:

Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A 325.

Direct tension indicator washers may be used at Contractor's option.

Electrodes for Welding: Comply with AWS Code.

Structural Steel Primer Paint: Structural steel to receive fireproofing shall not be primed unless primer is compatible with fireproofing and approved by the fireproofing manufacturer.

Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica, sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C621.

Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

Euco N.S.; Euclid Chemical Co.
Masterflow 713; Master Builders
Five Star Grout; U.S. Grout Corp.

FABRICATION:

Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

Connections: Weld or bolt shop connections, as indicated.

Bolt field connections, except where welded connections or other connections are indicated.

Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts, and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.

High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug weld steel bar stops to frames, except where shown removable. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10" o.c., unless otherwise indicated.

Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for

passage of other work through steel framing members, as shown on final shop drawings.

Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

SHOP PAINTING:

General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar or those receiving fireproofing. Paint embedded steel that is partially exposed on exposed portions and initial 2" of embedded areas only.

Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.

Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

SP-2 "Hand Tool Cleaning"

SP-3 "Power Tool Cleaning"

Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use painting methods that result in full coverage of joints, corners, edges and exposed surfaces. Note that if structural steel receives fireproofing it shall not be primed unless primer is compatible with fireproofing and approved by the fireproofing manufacturer. Exterior steel shall be primed with a Tnemec approved primer. See Painting section and architectural requirements.

PART 3 - EXECUTION

ERECTION:

Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignments of structures as erection proceeds.

Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.

Refer to Division 03 of these Specifications for anchor bolt installation requirements in concrete, and Division 04 for masonry installation.

Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to backing with grout.

Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

For proprietary grout materials, comply with manufacturer's instructions.

Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

Level and plumb individual members of structure within specified AISC tolerances.

Splice members only where indicated and accepted on shop drawings.

Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas except those members to receive fireproofing using same material as used for shop painting.

Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

QUALITY CONTROL:

Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.
Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

Shop Bolted Connections: Inspect in accordance with AISC specifications.

Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

Perform visual inspection of all welds.

Field Bolted Connections: Inspect in accordance with AISC specifications.

Field Welding: Inspect and test during erection of structural steel as follows:

Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

END OF SECTION 05 12 00

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Elevator **hoist beams**
2. Elevator Pit ladder.
3. Light Well metal safety grate.
4. Elevator pit sump covers.

B. Related Requirements:
1. Section 04 20 00 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. **Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.**

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Paint products.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Elevator hoist beams
2. Elevator Pit ladder
3. Light well safety grate
4. Elevator pit sump covers.

C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Welding certificates.

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

D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design ladders.

B. Structural Performance of Metal Ladders: Metal ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3 and Florida Building Codes.

2.2 METALS

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

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

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

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

E. Zinc-Coated Steel Wire Rope: ASTM A 741.

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

2.3 FASTENERS

A. General: Unless otherwise indicated, provide [**Type 304**] [**Type 316**] stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, with hex nuts, ASTM A 563, Grade C3; and, where indicated, flat washers.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09 91 00 Painting**.**

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with **zinc-rich primer** where indicated.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, except for elevator pit ladders.
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

1. Space siderails 16 inches apart unless otherwise indicated.
2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
3. Rungs: 3/4-inch diameter steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

5. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.
6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.

7. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than **1/2 inch** in least dimension.
8. Support each ladder **at top and bottom and not more than 60 inches o.c.** with welded or bolted steel brackets.
9. Galvanize ladders, including brackets.

2.8 ELEVATOR PIT SUMP COVERS AND LIGHT WELL SAFETY GRATE

A. Fabricate from welded or pressure-locked steel bar grating. Limit openings in gratings to no more than **1/2 inch** in least dimension. (hot-dip galvanize)

B. Provide steel angle supports as indicated.

2.9 STEEL WELD PLATES AND ANGLES

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

2.10 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.11 STEEL AND IRON FINISHES

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

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless other primers are indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning." SSPC-SP 3, "Power Tool Cleaning." requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 90 00 “Painting”.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 05 50 00

SECTION 05 73 60 ALUMINUM RAILING AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Railing

1.2 RELATED SECTIONS

A. Section 09 90 00 – Painting: Paint Finish

1.3 REFERENCES

A. ASTM A 276 - Standard Specification for Stainless Steel Bars and Shapes.

B. ASTM B 221 - Specification for Aluminum Alloy Extruded Bars, Rods, Wire Shapes and Tubes.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:
   a. Uniform load of 50/lbf/ft (0.73 kN/m) applied in any direction
   b.Concentrated load of 200 lbf (0.89 kN) applied in any direction
   c.Uniform and concentrated loads need not be assumed to act concurrently

2. Infill of Guards

   a.Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq ft (0.093 sq in)

   b.Infill load and other loads need not be assumed to act concurrently

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size

6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section with minimum five years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Transport, handle, store, and protect products so that they are in undamaged condition when installed.

B. Store products in manufacturer's unopened packaging to protect prefinished aluminum surfaces until ready for installation.

C. Store components off the ground in a dry covered area, protected from adverse weather conditions.

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

A. Manufacturer's Warranty:

1. Provide manufacturer's 30 year warranty against defects in workmanship. The manufacturer also warrants that the Super Armor-Guard powder coat finish will not chip crack or flake.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alumi-Guard, Inc.
   2401 Corporate Blvd, Brooksville, FL 34604. ASD.
   Toll Free: (877) 258-6448.
   Phone: (352) 754-8555.
   Fax: (354) 544-8442.
   Email: info@alumi-guard.com.
   Web: www.alumi-guard.com

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States

2.2 MATERIALS

A. Components:

1. Posts: Aluminum extrusions of 6005-T5 alloy in accordance with ASTM B 221.

2. Pickets: Aluminum extrusions of 6063-T52 alloy in accordance with ASTM B 221.
3. Rail & Channel: Aluminum extrusions of 6005-T5 alloy in accordance with ASTM B 221.

B. Fasteners:
1. Screws of 410 and 18-8 stainless steel zinc coated conforming to ASTM A276, with self-drilling head.
2. Screws painted to match the finish of fence.

C. Accessories:
1. Post caps, brackets, rings, flanges and other miscellaneous hardware fabricated of aluminum or other non-ferrous metal castings.

D. Concrete: Type specified in Section 03300.

E. Concrete: ASTM C94/C94M, Option A; Portland Cement, minimum 2,500 psi (17 MPa) strength at 28 days.

2.3 ORNAMENTAL FENCING

A. Railing General:
1. Commercial Grade:
   a. Aluminum Top Rail Sections: 1.82 inch high and 1.94 inch wide with 0.062 inch wall thickness.
   b. Pickets 3/4 inch by 3/4 inch with a 0.050 inch wall thickness.
2. Post Length:
   a. As required to allow setting of post into the ground, flanged or core drilled with approximately 1-3/4 inches (305 mm) between bottom of panel and ground.

B. Railing:
1. Grade:
   a. Commercial.
2. Channels:
   a. 2 Channel.
   b. 3 Channel.
3. Railing Picket Spacing:
   a. Standard: 3.875 inches.
4. Railing Length: Inside posts.
   a. Commercial Nominal 73.33 inches.
5. Posts:
   a. Intermediate: 2 inch by 2 inch. (.125 inch wall thickness.)
   b. End & Corner: 2-1/2 inches by 2-1/2 inches. (125 inch wall thickness)

6. Railing Height:
   a. To match height of existing adjacent fence

2.4 FINISH

A. Railing and Accessory Finish:
1. TGIC Polyester Powder Coating: Polyester enamel, medium gloss, applied to over 2 mils thickness and complying with AAMA 2604.
2. Super Armor-Guard: High performance polyester power coating, medium gloss, applied to 3-4 mils thickness and complying with AAMA 2604.

B. Color:
1. Black.

C. Performance:
1. Meet or exceed a 4000 hour salt spray test.
2. TGIC Polyester Powder Coating meets or exceeds an H-2H pencil hardness in accordance to ASTM D 3363.
3. Fluoropolymers meets or exceeds a 4H pencil hardness in accordance to ASTM D 3363.
4. Meets or exceeds ASTM D 3359 adhesion test.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Connection: Fabricate railings with non -welded connections unless otherwise indicated.

C. Mechanical Connections: Connect members with mechanical fasteners and fittings.

D. Form changes in direction by bending or by inserting prefabricated elbow fittings.

E. Close exposed ends of hollow railing members with prefabricated end fittings.

F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Provide wall brackets, flanges, fittings, to interconnect railing members.

PART 3 EXECUTION

3.1 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.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare the grade and remove surface irregularities, if any, which may cause interference with the installation of aluminum railing.

C. If preparation and condition is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Excavate holes for posts to diameter and spacing indicated on Drawings without disturbing underlying materials.

C. Provide excavation for post length to suit local conditions for proper anchorage and stability.

D. Center and align posts in excavated holes to required depth. Place concrete around posts, and vibrate or tamp for consolidation. Re-check vertical and top alignment of posts, verify they are plumb and level. Make necessary corrections if needed before concrete hardens.

E. If railing is deck mounted on existing hard surfaces. Set posts plumb, to tolerances specified. Locate mounting locations prior to start of work. Avoid mounting over expansion or control joints. Use non-corrosive fasteners suitable for the material to which it is to be mounted.

F. Support gates from gate posts. Do not attach hinged side of gate from building wall.

G. Provide concrete center drop for drop rod retainers at center of double gate openings.

H. Install gates plumb, level and secure for full opening without interference. For double gates, install drop rod. Adjust all hardware for smooth operation.

3.4 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From Indicated Position: 1 inch.

C. Minimum distance from property line: 6 inches.

3.5 CLEANING

A. Leave immediate work area neat at end of each work day.

B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

C. Clean aluminum fence with mild household detergent and clean water rinse well. Mortar should be removed from exposed posts and other fencing material using a 10% solution of muriatic acid followed immediately by several rinses with clean water.

D. Touch up scratched surfaces using materials recommended by manufacturer. Match touchup paint color to fence finish.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 05 73 60

SECTION 06 01 10.91 – WOOD RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Restoration of existing wood stairs (risers, treads, railings, pickets, newel posts, etc.), existing wood wainscot, existing wood doors, existing wood door frames, trim, etc. as indicated.
2. Extent of restoration includes but is not limited to:
   a. Cleaning (note existing wood has already been stripped to remove paint layers of paint down to original wood).
   b. Dis-assembling and re-assembling existing wood materials and systems (wainscot doors, etc.). Note, existing wood wainscot will require some adjustment to properly fit in it's original location due to minor dimension changes after the stairs, load-bearing and non-load-bearing walls have been constructed.
   b. Testing soundness of the existing wood and restore deteriorated portions with epoxy or other wood preservatives indicated or replacement as agreed to with Architect.
   c. Sanding wood stair and wood wainscot to a finish level for future coatings. The extent of existing paint is sufficiently adhered to the wood, feather edges to allow for recoating.
3. Restoration Contractor shall visit site prior to bidding restoration work to become familiar with specific conditions of the existing stairs and wainscot to be restored and the extent of Class I, II, and or III restoration required.
4. Stair, doors, door frames and wainscot full Class I repair (refer to Reference Publications). Portions of each unit may require Class II stabilization with minimum Class III splices and parts replacement.
5. Intent is for stair to be dismantled, restored and reinstalled after completion of structural work.
6. Intent is for wainscot to be left in sections as much as possible, restored and reinstalled after completion of structural work; should Restoration Contractor shall determine this is not possible they shall notify Architect prior to commencing restoration work.
7. Intent is for door and door frames to be left in sections as much as possible, restored and reinstalled; should Restoration Contractor shall determine this is not possible they shall notify Architect prior to commencing restoration work.

1.3 EXISTING CONDITIONS

A. Existing building was abated for asbestos and Lead Based Paint in 2003; based on completion of that project asbestos and lead based paint was removed. Note, some paint was left of the existing wood wainscot, doors and door frames; the remained was previously abated of Lead.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for restoration products, including product instructions and recommendations.
2. Provide statement of restoration process for restoring doors, frames, sidelites, and transoms.
3. Photographs (digital) of weekly progress of the restoration.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each restoration product.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Product material shall be delivered, stored and handled in accordance with manufacturer's recommendations and instructions and in accordance with MSDS Sheets.

PART 2 - PRODUCTS

2.1 RESTORATION PRODUCTS, GENERAL

A. Restoration products are listed at the end of the Project Manual under "Reference Publications. Materials used other than those listed shall be submitted to Architect for acceptance prior to commencement.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate blocking, **grounds,** and similar supports to comply with requirements for attaching other construction. Alignment adjustments will be need to allow proper fit and operation of the doors and transom windows.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

D. Securely attach rough carpentry work to substrate.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

3.3 RESTORATION

A. The existing field conditions identified in the Construction Documents are based on observations made in the recent past. The contractor shall note that actual field conditions at the time of bidding and construction may vary. Any significant variations shall be brought to the attention of the Architect.

B. It is intended that historic elements be reused except where missing, rotted or otherwise unrepairable. Where required to be replaced, contractor shall duplicate the wood profiles of the historic molding, casings, stiles, rails, munitions, and other miscellaneous components.

C. It is not the intention of the project to return wood components to 'like new' condition. Knicks, gouges, notches and similar type of items that do not affect the overall operation or stability or tightness of the door, frame, sidelite, and transom or wainscot unit do not require repair.

D. The interior restored items shall upon completion be ready for final paint or stained finishes.

E. Where contractor encounters concealed conditions where deterioration has occurred, specific restoration recommendations shall be provide to the Architect.

F. Contractor upon removal of units for restoration shall provide a temporary weather tight enclosure; mechanical fasteners to the existing building shall not be used.

G. If using chemicals during process the contractor shall secure such products from potential contact with unauthorized personnel. **Do not store flammable products in building.**

H. Contractor shall use care in working with historic wood components to minimize damage by causing gouges, scrapes, and other deleterious effects.

I. Bondo and similar products not intended for use with wood is not acceptable for use on this project.

J. If wood is found to be dry following stripping, apply a mix containing 50% linseed oil, 50% turpentine, and mildewcide to the wood. Apply coats as necessary to reintroduce moisture into the wood. Allow minimum of 24 hours before applying new paint.

K. When stripping wood components use non-caustic products. Products such as "peel away" and similar items are not acceptable.

3.4 PROTECTION

A. Protect from the elements wood that has been stripped prior to painting and until final finishes are installed.

B. Protect finish product from damage through end of project.

END OF SECTION 06 01 10.91

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood framing as indicated in Architectural and Structural documents of the project; coordinate with Structural.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product indicated.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.

C. Research/Evaluation Reports: For the following:

1. Treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.
4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent of lumber and 15 percent for plywood.

C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
2. Wood framing members less than 18 inches (460 mm) above grade.
3. Wood floor plates that are installed over concrete slabs directly in contact with earth

2.3 DIMENSION LUMBER

A. General: Of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. Non-Load-Bearing Interior Partitions: Construction, Stud of No.2 grade and any of the following species:

1. Mixed southern pine; SPIB.
2. Eastern softwoods; NELMA.
3. Northern species; NLGA.
4. Western woods; WCLIB or WWPA.

C. Framing Other Than Non-Load-Bearing Partitions: No. 2 grade and any of the following species:

1. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Southern pine; SPIB.
4. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2.4 MISCELLANEIOUS MATERIALS

A. Fasteners:

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
2. Power-Driven Fasteners: CABO NER-272.
3. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

B. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Manufacturers:

a. Alpine Engineered Products, Inc.
b. Cleveland Steel Specialty Co.
c. Harlen Metal Products, Inc.
d. KC Metals Products, Inc.
e. Silver Metal Products, Inc.
f. Simpson Strong-Tie Company, Inc.

g. Southeastern Metals Manufacturing Co., Inc.
h. United Steel Products Company, Inc.

2. Research/Evaluation Reports: Provide products acceptable to authorities having jurisdiction and for which model code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with building code in effect for Project.
3. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.5 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:

1. Plywood backing panels.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring nailers, blocking, grounds and similar supports to comply with requirements for attaching other construction.

D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber.

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

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in the Uniform Building Code.
4. Table 2305.2, "Fastening Schedule," in the BOCA National Building Code.
5. Table 2306.1, "Fastening Schedule," in the Standard Building Code.
6. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in the International One- and Two-Family Dwelling Code.

F. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

G. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

H. Do not splice structural members between supports unless otherwise indicated.

I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.

K. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

L. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following Florida Building Code.

M. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

N. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

O. Wood Furring Installation: Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.2 WALL AND PARTITION FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. For interior partitions and walls match existing wood stud dimensions and spaced 16 inches o.c. unless otherwise indicated in structural documents.

2. Provide continuous horizontal blocking at mid-height of partitions more than 96 inches (2438 mm) high, using members of same width as wall or partitions.

B. Construct corners and intersections with three or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width, 6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000

mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.

2. For load-bearing walls, provide double-jamb studs for openings 60 inches (1500 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated in structural documents.

3.3 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists as follows:

1. Where supported on wood members, by[toe nailing or by] using metal framing anchors.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).

C. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.

D. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.

E. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

F. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6.4-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c., extending over and fastening to three joists. Embed anchors at least 4 inches (102 mm) into grouted masonry with ends bent at right angles and extending 4 inches (102 mm) beyond bend.

G. Provide solid blocking between joists under jamb studs for openings.

H. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

I. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.

1. As indicated on Structural Documents.

3.4 CEILING JOIST FRAMING INSTALLATION

A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

B. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any. Match existing framing being replaced.

END OF SECTION 06 10 00

SECTION 06 10 63 - EXTERIOR ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Wood trim
2. Wood soffits.
3. Ornamental wood pilaster.
4. Ornamental wood cornice.

B. Related Requirements:

1. Section 06 10 00 Rough Carpentry
2. Section 07 90 00 Joint Sealants
3. Section 09 90 00 Painting

1.3 DEFINITIONS

A. Boards: Lumber of less than 2 inches nominal (38 mm actual) in thickness and 2 inches nominal (38 mm actual) or greater in width.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

D. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates:

1. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.

C. Evaluation Reports: For preservative-treated wood products, from ICC-ES.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.

1. Factory mark each item with grade stamp of grading agency.
2. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
4. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content:

1. Boards: 15-19 percent.
2. Dimension Lumber: 15-19 percent
3. Timber. No limit.

2.2 LUMBER

A. Hand select wood to be visible for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

B. Dimension Lumber: [**No. 2**] grade of the following species:

1. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
2. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.
3. Mixed southern pine; SPIB.
4. Redwood; RIS.

C. Dimension Lumber: Construction Common

D. Boards:

1. Douglas fir, C & Btr finish or C Select; NLGA, WCLIB, or WWPA.
2. Hem-fir, C & Btr finish or C Select; NLGA, WCLIB, or WWPA.
3. Redwood,
4. Southern pine, B & B finish; SPIB.
5. Western red cedar, NLGA, WCLIB, or WWPA.

E. Boards:

1. Eastern white pine; NeLMA, NLGA, or WCLIB
2. Mixed southern pine; SPIB.
3. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
4. Northern white cedar, NeLMA or NLGA.
5. Spruce-pine-fir (South) or spruce-pine-fir;; NeLMA, NLGA, WCLIB, or WWPA.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. Use stainless steel fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or ASTM F 2329 unless otherwise indicated.

B. Nails: ASTM F 1667.

C. Power-Driven Fasteners: ICC-ES AC70.

D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prime wood **indicated to be painted**, including both faces and edges. Cut to required lengths and prime ends. Comply with requirements in Section 09 90 00 "Exterior Painting."

3.2 INSTALLATION, GENERAL

A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.

B. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.

C. Install metal framing anchors to comply with manufacturer's written instructions.

D. Do not splice structural members between supports unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

F. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

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

1. ICC-ES AC70 for power-driven fasteners.
2. "Fastening Schedule" in ICC's International Building Code.
3. "Fastener Schedule for Structural Members" and "Alternate Attachments" in ICC's International Residential Code for One- and Two-Family Dwellings.

H. Use common wire nails unless otherwise indicated. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

END OF SECTION 06 10 63

SECTION 06 20 13 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior wood trim.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for framing exposed to view.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

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

C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

D. Samples for Verification:

1. For each species and cut of lumber and panel products, with half of exposed surface finished; 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.

1.4 INFORMATIONAL SUBMITTALS

A. Compliance Certificates:

1. For lumber that is not marked with grade stamp.

2. For preservative-treated wood that is not marked with treatment-quality mark.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.

C. Sample Warranties: For manufacturer's warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.7 WARRANTY

A. Manufacturer's Warranty for Hardboard Siding [**Soffits**] [**and**] [**Trim**]: Manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, deformation or deterioration beyond normal weathering.
2. Warranty Period for Factory-Applied Finish: [**Five**] <**Insert number**> years from date of Substantial Completion.
3. Warranty Period for Siding [**Soffits**] [**and**] [**Trim**] (Excluding Finish): [**25**] <**Insert number**> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American

Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
2. For exposed lumber, mark grade stamp on end or back of each piece.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Water-Repellent Preservative Treatment by Nonpressure Process: AWPA N1; dip, spray, flood, or vacuum-pressure treatment.

1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC), combined with an insecticide containing chloropyrifos (CPF)
2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.

B. Preservative Treatment by Pressure Process: AWPA U1; Use Category [**UC3a**] [**UC3b**].

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent, respectively.
2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
3. For exposed items indicated to receive transparent finish, do not use chemical formulations that contain colorants or that bleed through or otherwise adversely affect finishes.
4. Do not use material that is warped or does not comply with requirements for untreated material.
5. Mark lumber with treatment-quality mark of an inspection agency approved by the ALSC's Board of Review.

6. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

7. Application: Where indicated on Drawings, or newly observed damaged areas needed for repairs.

2.3 EXTERIOR TRIM

A. Lumber Trim for Painted Finish:
1. Species and Grade: Eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NeLMA, NLGA, WCLIB, or WWPA
2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
3. Finger Jointing: Not allowed
4. Face Surface: Surfaced (smooth)
5. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

B. Moldings for **Painted** Finish: MMPA WM 4, P-grade wood moldings, made from kiln-dried stock to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine
2. Finger Jointing: Not allowed

3. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

2.4 LUMBER SOFFITS

A. Provide kiln-dried lumber siding complying with DOC PS 20

2.5 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails unless otherwise indicated.
2. For prefinished items, provide matching prefinished aluminum fasteners where face fastening is required.
3. For pressure-preservative-treated wood, provide hot-dip galvanized-steel fasteners.
4. For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners.

B. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.

C. Flashing: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

D. Sealants: Latex, complying with ASTM C 834 and applicable requirements in Section 07 90 00 "Joint Sealants," and recommended by sealant and substrate manufacturers for intended application.

2.6 FABRICATION

A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.

B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.

1. Cut to required lengths and prime ends.
2. Comply with requirements in Section 09 90 00 "Painting."

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.

1. Do not use manufactured units with defective surfaces, sizes, or patterns.

B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut exterior finish carpentry to fit adjoining work.
3. Refinish and seal cuts as recommended by manufacturer.
4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

A. Install flat-grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water.

1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 ADJUSTING

A. Replace exterior finish carpentry that is damaged or does not comply with requirements.

1. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

B. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean exterior finish carpentry on exposed and semiexposed surfaces.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 13

SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior standing and running trim.
2. Interior frames and jambs.
3. Interior stairs and railings.
4. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
5. Shop priming of interior architectural woodwork.
6. Shop finishing of interior architectural woodwork.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
2. Section 06 01 10.91 "Wood Restoration" for interior carpentry exposed to view.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Anchors.
2. Adhesives.
3. Shop finishing materials.
4. Wood-Preservative Treatment:

a. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
b. Indicate type of preservative used and net amount of preservative retained.
c. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.

B. Shop Drawings:

1. Include the following:

a. Dimensioned plans, elevations, and sections.
b. Attachment details.

2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.

C. Samples: For each exposed product and for each shop-applied color and finish specified.

1. Size:

a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
b. Lumber Products: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long for each species and cut, finished on one side and one edge.

D. Samples for Initial Selection: For each type of shop-applied exposed finish.

1. Size:

a. Panel Products: 12 inches by 12 inches (300 mm by 300 mm).
b. Lumber Products: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long for each species and cut, finished on one side and one edge.

E. Samples for Verification: For the following:

1. Lumber for Transparent Finish: Not less than 5 inches (125 mm) wide by 12 inches (300 mm) long for each species and cut, finished on one side and one edge.
2. Veneer Leaves: Representative of and selected from flitches to be used for transparent-finished interior architectural woodwork.
3. Lumber Shop-Applied Opaque Finish: 5 inches (125 mm) wide by 12 inches (300 mm) long for lumber for each finish system and color.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For architectural woodwork Installer.

B. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. Adhesives.

C. Evaluation Reports: For preservative-treated wood materials, from ICC-ES.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups of typical interior architectural woodwork as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Architectural Woodwork Standards, Section 2.

B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.

C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.

B. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

A. Refer to Color and Finish Schedule for finish.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

A. Refer to Color and Finish Schedule for finish.

2.3 INTERIOR FRAMES AND JAMBS FOR TRANSPARENT FINISH

A. Refer to Color and Finish Schedule for finish.

2.4 INTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

A. Refer to Color and Finish Schedule for finish.

2.5 INTERIOR WOOD STAIRS AND RAILINGS

A. Refer to Color and Finish Schedule for finish.

2.6 PRESERVATIVE-TREATED-WOOD MATERIALS

A. Preservative-Treated-Wood Materials: Provide with water-repellent preservative treatment complying with AWPA N1 (dip, spray, flood, or vacuum-pressure treatment).

1. Preservative Chemicals: 3-iodo-2-propynyl butyl carbamate (IPBC), combined with a compatible EPA-registered insecticide.
2. Use chemical formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated material from untreated material.

B. Extent of Preservative-Treated Wood Materials: Treat interior architectural woodwork in contact with concrete or masonry.

1. Items fabricated from the following wood species need not be treated:

    a. Redwood.
    b. Western red cedar.
    c. White oak.
    d. African mahogany.
    e. Honduras mahogany.
    f. Ipe.
    g. Dark red meranti.
    h. Teak.

2.7 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Nailers: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

1. Preservative Treatment: Provide softwood lumber treated by pressure process, AWPA U1; Use Category UC3b.

a. Provide where in contact with concrete or masonry.
b. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
c. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
d. Mark lumber with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee's (ALSC) Board of Review.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

2.8 FABRICATION

A. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.

B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.

B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.

C. Install interior architectural woodwork level, plumb, true in line, and without distortion.

1. Shim as required with concealed shims.
2. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Preservative-Treated Wood: Where cut or drilled in field, treat cut ends and drilled holes according to AWPA M4.

F. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.

1. Secure with countersunk, concealed fasteners and blind nailing.
2. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with interior architectural woodwork.
3. For shop-finished items, use filler matching finish of items being installed.

G. Standing and Running Trim:

1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
2. Do not use pieces less than **36 inches (900 mm)**, except where shorter single-length pieces are necessary.
3. Scarf running joints and stagger in adjacent and related members.
4. Fill gaps, if any, between top of base and wall with **latex sealant, painted to match wall**.
5. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

H. Stairs: Securely anchor carriages to supporting substrates.

1. Install stairs with treads and risers no more than 1/8 inch (3 mm) from indicated position.
2. Secure with countersunk, concealed fasteners and blind nailing.
3. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with wood surface.

I. Railings:

1. Install rails with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) variation from a straight line.
2. Stair Rails: Glue and dowel or pin balusters to treads and railings, and railings to newel posts.

    a. Secure with countersunk, concealed fasteners and blind nailing.
    b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with wood surface.

3. Wall Rails: Support rails on wall brackets securely fastened to wall framing.

    a. Space rail brackets not more than required to support loads per Florida Building Code – Building.

3.3 REPAIR

A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects.

B. Where not possible to repair, replace defective woodwork.

C. Field Finish: See Section 09 91 10 "Painting" for final finishing of installed interior architectural woodwork.

3.4 CLEANING

A. Clean interior architectural woodwork on exposed and semi-exposed surfaces.

END OF SECTION 06 40 23

SECTION 07 16 13 - POLYMER MODIFIED CEMENT WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES:

A) Surface preparation prior to application of Polymer Modified Cement Waterproofing.

B) Application of cementitious waterproof coating system to interior masonry wall surfaces, as indicated.

1.02 DESCRIPTION OF WORK

A) The work under this section shall include furnishing labor, materials, equipment and incidentals, and performing all operations necessary to complete the work required to provide a cementitious waterproof coating to interior CMU as described in this specification.

1.03 ACTION SUBMITTALS

A) Manufacturers Literature: Copy of manufacturer's literature for products furnished including Material Safety Data Sheets.

1.04 QUALITY ASSURANCE

A) Contractors should be technically trained and accepted by the manufacturer. Applicator shall use mixing equipment and tools approved by the manufacturer and shall have manufacturer's installation instructions available while work is in progress.

B) Surfaces and surrounding air temperatures should not be below 40 degrees Fahrenheit or 5 degrees Centigrade for a minimum period of 48 hours before, during and after application of material.

C) Job Mock Up

1. Prior to the application of MasterSeal 581 cementitious coating apply a sample using materials and details required for final work. Apply sample at the site, where directed, of approximately 4' x 4' indicating the proposed color, texture and workmanship to be expected in the completed work. Obtain Architect's acceptance of visual qualities of the sample before start of work. Retain sample during construction as a standard for judging completed work. Do not alter, move or destroy sample until work is completed.

D) Surfaces shall be protected to prevent rapid drying where heavy wind or hot sun exist.

1.05 DELIVERY, STORAGE, AND HANDLING

A) Deliver materials to the jobsite in their original, unopened and sealed containers. Store materials off the ground under watertight cover and away from sweating walls and other damp surfaces until ready for use. Damaged or deteriorated materials must be removed from premise immediately.

1.06 PROJECT SITE/PROTECTION

A) In cold and/or inclement weather, no work shall be started until area is adequately covered temporarily so that a temperature range of not less than 40 degrees Fahrenheit can be maintained during and up to completion of the drying process for all applications. Temporary heat shall be provided for as set forth in the General Services, and when necessary in opinion of Architect or Manufacturer’s Representative.

B) Surfaces to receive material shall be free of laitance, dirt, dust, grease, form release treatments, efflorescence, curing compounds, paint, and any other foreign material.

C) Do no apply materials to frozen or frost-filled surfaces or during snow or rain.

1.09 WARRANTY

A) 5-year Waterproof Warranty from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 BASIS OF DESIGN MANUFACTURER

A) All materials must be **manufactured by BASF; <u>No substitutions</u>**.

2.02 BASIS OF DESIGN MATERIALS

A) MasterEmaco A 660: Liquid admixture for cement-based mixes to improve adhesion.

B) MasterSeal 581: Heavy-duty cement base, waterproof coating.

C) MasterEmaco N425: Fast setting cement based repair mortar.

2.03 MIXING – MasterEmco A660

A) Prepare a mixing solution of one part Mastemaco A660 and three parts water. ½ gallon MasterEmaco A660 to 1½ gallons of water. Enough solution should be prepared to perform several days work. The solution shall be kept in tightly sealed containers.

2.04 MIXING – MasterSeal 581

A) Mix in strict accord with printed instructions of manufacturer. Mechanical mixers of an approved type shall be used for mixing MasterSeal 581. Frozen, caked or lumped materials shall not be used. Mechanical mixers and containers shall be cleaned after mixing; each batch kept free of MasterSeal 581 from previous mixes.

B) MasterSeal 581 shall be thoroughly mixed using proper amounts of mixing solution, 7 to 8 quarts, until uniform in color and consistency.

C) A pancake batter consistency is to be achieved.

D) Let material set for 15 minutes, then temper back with mixing solution.

E) The material may be tempered one more time.

PART 3 EXECUTION

3.01 INSPECTION

A) Examine substrate materials, and observe temperature and humidity conditions.

B) Report in writing any conditions or surfaces which have adversely affected the installation.

C) Do not proceed with this work until all unsatisfactory conditions are corrected. Commencement of work implies acceptance of surfaces and environmental conditions.

3.02 APPLICATION – MasterSeal 581

A) Complete necessary masonry repair, as well as floor to wall fillet cove ("2") using MasterEmaco N425

B) Apply cementitious coating by spray or brush techniques to achieve prescribed surface texture and finish.

C) Water Prime Coats: Dampen substrates to receive cementitious coating before application with clean potable water. Surfaces shall be damp, but surface dry at time of application as recommended by coating manufacturer.

D) Apply cementitious coating at maximum coverage not to exceed 112 sq. ft. per sack net.

E) For first coat, apply a heavy brush coat of MasterSeal 581 to the surface at a rate of 225 sq. ft. per 50 #sx.

F) Let the first coat sit for a 24 hour period to cure.

G) Apply the second coat in the same manner as the first.

END OF SECTION 07 16 13

SECTION 07 21 00 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building insulation in batt form.
2. Sound attenuation batts.

1.3 DEFINITIONS

A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "R-values," ("RSI-values,") they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivity's are expressed by the temperature difference in degrees F (Kelvins) between the two exposed faces required to cause one BTU (one Watt) to flow through one square foot (one sq. m) per hour at mean temperatures indicated.

1.4 INFORMATIONAL SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of insulation product specified.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristic: ASTM E 84.
2. Fire Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:

B. Manufacturers of Glass Fiber Insulation:

1. CertainTeed Corp.
2. Knauf Fiber Glass GmbH.
3. Manville: Building Insulations Div., Manville Sales Corp.
4. **Owens/Corning Fiberglas Corp., R19 EcoTough Basis of Design**

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.

C. Unfaced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); and as follows:

1. Mineral Fiber Type: Fibers manufactured from glass or slag.
2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
3. Thickness: 6 1/4" (R-38) (Roof) and 3 1/2” (R-19) (Exterior Walls) as indicated on drawings.
4. Application in stud walls where height is greater than 8 feet or where stud depth is greater than insulations thickness use wire or metal straps to hold insulation in place.
5. Application at roof deck between rafters, use string wire (or similar) to hold insulation in place.

D. Sound Attenuation Batts: Basis of Design – Owens Corning Sound Attenuation Fire/MW Batts.

1. Material: Mineral Wool.
2. Thickness: 6 inches.
3. Flamespread: 5.
4. Smoke Developed: 0.
5. Thermal Performance per 1 inch: 3.8.
6. Density (pcf): 2.5.
7. Noise Reduction: Min 2.0 NCR for 6 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements of the

Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's instructions applicable to products and application indicated. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.

B. Extend insulation full thickness as indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections that interfere with placement.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.3 PROTECTION

A. General: Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 90 10 - EXTERIOR JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes joint sealants for the following locations:

1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:

   a. Joints between different materials.
   b. Perimeter joints between finishes and frames of doors and windows.
   c. Other joints as indicated.

2. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   d. Perimeter joints of toilet fixtures.
   e. Other joints as indicated.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 7 Section "Flashing and Sheet Metal" for sealing joints related to flashing and sheet metal for roofing.
2. Division 9 Section "Gypsum Drywall" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.4 INFORMATION SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data from manufacturers for each joint sealant product required.

1. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

C. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

D. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.

E. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.

F. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

G. Warrant sealed joints against adhesive or cohesive failure of sealant and water-tightness of sealed joint for a period of five (5) years for labor and material. Provide material warranty of five (5) years for polyurethane and 10 years for silicone. Submit copies of warranty.

1.5 ACTION SUBMITTALS

A. Samples for selection purposes in form of custom colors, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

B. Submit sealant schedule indicating type of sealant and application location for each building component.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance for ten years.

1. Applicator and foreman shall have minimum five years experience on equivalent projects.
2. Use personnel specifically trained in proper application procedures who are thoroughly familiar with joint details indicated and installation requirements as herein specified.

B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required, of highest quality material.

C. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.

1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.
2. Test for Adhesion: Perform test in accordance with ASTM C 719.
3. Test for Bleed Out: Perform test in accordance with ASTM C 510.

D. Compatibility with Substrate and Coatings: Applicator shall be responsible for verifying with sealant manufacturer that sealants used are compatible with joint substrates and coatings to which sealants will come in contact.

E. Joint Design Criteria: Applicator shall be responsible for verifying with sealant manufacturer that installed joint dimensions are adequate for movement capabilities for extreme and significant moving joint sealants.

F. Applicator shall be responsible for providing a completely sealed building and ensure that all exterior joints between surfaces are properly sealed.

G. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 1 Section covering this activity.

1.7 MOCKUPS

A. Fabricate sample full sized joints at site illustrating each type of joints (precast panels, brick and window framing) glazing and sealants. Show all finishes and shapes in accordance with accepted sample. Coordinate with other trades.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.9 PROJECT CONDITIONS

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

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer.
2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide color of exposed joint sealants to comply with the following:
1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated. Provide custom color for sealant specified at exposed brick expansion joints (match brick color) and exposed to view precast concrete panel joints (match color of precast concrete) and at perimeter of windows and doors.

C. Products:
1. Type 1: ASTM C 920; low modulus, one component, non sag, neutral cure silicone.
   a. Elongation Capability: Plus 100% to minus 50%.
   b. Service Temperature Range: Minus 20 to 160 degrees F.
   c. Shore A Hardness Range: 15-20; ASTM D 2240.

d. Manufacturer:
1) Dow Corning Corp. 790.

2. Type 2: ASTM C 920; medium modulus, one component, non sag, neutral cure silicone.
a. Elongation Capability: Plus or minus 50%.
b. Service Temperature Range: Minus 20 to 120 degrees F.
c. Shore A Hardness Range: 25-30: ASTM D 2240.
d. Manufacturers:
1) Dow Corning Corp. 795.
2) General Electric Co. GE Silicones Silpruf 2000.
3) Rhone-Poulenc Inc., Rhodorsil 5C.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements herein indicated.

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, non-outgassing in un-ruptured state.
2.. Manufacturers: (Open-Cell)
a. Denver Foam
b. ITP
c. Applied Extrusion Technologies
d. Backer Rods.

3. Manufacturers: (Reticulated Closed-Cell)
a. Applied Extrusion Technologies
b. SofRod

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
1. Manufacturer: Pecora Corp.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

B. Verify joint dimensions are within manufacturer's acceptable tolerances.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

1. Backer rods shall be sized to properly fit in the joint for their full length, not just sized to hold the backer rod in the joint at certain locations.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

   a. Do not leave gaps between ends of joint fillers.
   b. Do not stretch, twist, puncture, or tear joint fillers.
   c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints to prevent 3-sided sealant adhesion.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

E. Tooling of Non-sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

F. Do not install sealants on surfaces which are cooler or hotter than that recommended by manufacturer.

G. Bent plates or other structural steel components penetrating CMU, install sealant in strict accordance with manufacturer's instructions. Sealant shall be installed prior to the application of bituminous dampproofing, and shall be allowed to fully cure prior to the application of Damproofing.

3.4 CLEANING

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

3.5 PROTECTION

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

3.6 SCHEDULE

EXTERIOR JOINT SCHEDULE

Sealant Joint Type	Exterior Joint Type
1	Concrete to concrete joints.

1	
2	Concrete or plaster to painted wood
3	
4	Masonry to masonry joints.
5	
6	Perimeter joints at steel door bucks in contact with concrete.
7	
8	
9	Glazing sealants - nonstructural.
10	
11	Perimeter joints at window or door sections in contact with masonry and concrete.
12	
13	
14	**END OF SECTION 07 90 10**

SECTION 07 90 20 - INTERIOR JOINT CAULKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes interior joint caulking for the following locations:

1. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:

a. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
b. Perimeter joints of toilet fixtures, joints in walls in toilet or bath areas.
c. Other joints as indicated.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 9 Section "Gypsum Drywall" for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.

1.3 INFORMATION SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data from manufacturers for each interior joint caulking product required.

1. Certification by interior joint caulking manufacturer, that caulking, plus the primers and cleaners required for installation comply with local regulations controlling use of volatile organic compounds.

C. Certificates from manufacturers of caulking attesting that their products comply with specification requirements and are suitable for the use indicated.

D. Compatibility and adhesion test reports from manufacturer indicating that materials forming joint substrates and joint caulking backings have been tested for compatibility and adhesion with caulking. Include caulking manufacturer's interpretation of test results relative to performance and recommendations for primers and substrate preparation needed to obtain adhesion.

E. Product test reports for each type of caulking indicated, evidencing compliance with requirements specified.

F. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

1.4 ACTION SUBMITTALS

A. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

B. Submit caulking schedule indicating type of sealant and application location for each building component.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed caulking applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

B. Single Source Responsibility for Joint Caulking Materials: Obtain joint caulking materials from a single manufacturer for each different product required, of the highest quality material.

C. Product Testing: Provide comprehensive test data for each type of joint caulking based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.

D. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 1 Section covering this activity.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint caulking under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint caulking manufacturer.
2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint caulking where joint widths are less than allowed by joint caulking manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint caulking until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint caulking, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by caulking manufacturer based on testing and field experience.

B. Colors: Provide color of exposed joint caulking to comply with the following:
1. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated and/or provide paintable materials.

C. Products:
1. Type 1: One component non sag acrylic latex; ASTM C736 and ASTM C834.
   a. Maximum Joint Movement: Plus or minus 7.5 percent.
   b. Minimum Recovery: 90 %.
   c. Manufacturers: **Basis of Design: Pecora Corp. AC-20**; Tremco, Inc. 834.

2. Type 2: One component, non sag, mildew resistant silicone; ASTM C920.

a. Shore A Hardness: 25-30.
b. Maximum Joint Movement: Plus or minus 25 %.
c. Manufacturers: **Basis of Design: Down Corning Corp. 786**; General Electric Co., GE Silicones Sanitary 1700; Rhone-Poulenc, Inc. Rhodorsil 6B.

3. Type 3: One component butyl rubber, FS TT-S-1657, Type I.
   a. Maximum Joint Movement: Plus or minus 5%.
   b. Manufacturers: **Basis of Design: Pecora Corp. BC-158 Butyl Rubber Sealant**; Tremco Inc. Butyl Sealant.
4. Type 4: One component butyl rubber, nondrying, nonharding, nonpaintable; ASTM C919.
   a. Manufacturers: **Basis of Design: Pecora Corp. Acoustical Sealant BA-98**; Tremco Inc. Acoustical Sealant.

2.2 JOINT CAULKING BACKING

A. General: Provide caulking backings of material and type that are nonstaining; are compatible with joint substrates, caulkings, primers and other joint fillers; and are approved for applications indicated by caulking manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, non-staining, non-waxing, non-extruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control caulking depth and otherwise contribute to producing optimum performance:

1. Open-cell polyurethane foam.
2. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, non-outgassing in un-ruptured state.
3. Any material indicated above.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by caulking manufacturer for preventing caulking from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in caulking failure. Provide self-adhesive tape where applicable.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint caulking manufacturer where required for adhesion of caulking to joint substrates indicated, as determined from preconstruction joint caulking -substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of caulkings and backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of caulking with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint caulkings and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint caulking with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting caulking performance. Do not proceed with installation of joint caulking until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint caulking to comply with recommendations of joint caulking manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion, including dust, paints (except for permanent, protective coatings tested and approved for adhesion and compatibility by caulking manufacturer), oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint caulking. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint caulking.

B. Joint Priming: Prime joint substrates where recommended by caulking manufacturer.

C. Masking Tape: Use masking tape where required to prevent contact of caulking with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove caulking smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT CAULKING

A. General: Comply with joint CAULKING manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Caulking Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint caulking as applicable to materials, applications, and conditions indicated.

C. Acoustical Caulking Application Standard: Comply with recommendations of ASTM C 919 for use of joint caulking in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Installation of Caulking Backings: Install backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of caulking during application and at position required to produce the cross-sectional shapes and depths of installed caulking relative to joint widths that allow optimum movement capability.

    a. Do not leave gaps between ends of joint fillers.
    b. Do not stretch, twist, puncture, or tear joint fillers.
    c. Remove absorbent joint fillers that have become wet prior to caulking application and replace with dry material.

2. Install bond breaker tape between caulkings where backer rods are not used between caulkings and joint fillers or back of joints.

E. Installation of Caulkings: Install as recommended by manufacturer using standard hand guns or mechanical guns. Install caulkings by proven techniques that result in caulking directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum movement capability. Install caulkings at the same time backings are installed.

F. Finished bead shall be smooth, free from wrinkling, air pockets and foreign matter.

3.4 CLEANING

A. Clean off excess caulking or caulking smears adjacent to joints as work progresses by methods and

with cleaning materials approved by manufacturers of joint caulkings and of products in which joints occur.

3.5 PROTECTION

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

3.6 SCHEDULE

INTERIOR JOINT CAULKING SCHEDULE

Caulking Joint Type	Interior Joint Type
1	Joints between door frames and wall.
1	Joints between window frames and wall.
1	Joints between casework and wall.
2	Wall joints in Toilet, Kitchen and Bath areas.
2	Joint between toilet fixtures and wall.
3	Exposed acoustical joints.
4	Non-Exposed acoustical joints.

END OF SECTION 07 90 20

SECTION 08 11 13 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes steel doors and frames.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 8 Section "Door Hardware" for door hardware and weatherstripping.
2. Division 9 Section "Painting" for field painting primed doors and frames.

1.3 INFORMATION SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

1.4 ACTION SUBMITTALS

A. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

B. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

1. Indicate coordination of glazing frames and stops with glass and glazing requirements.

1.5 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

B. For wind loads in door assembly design, comply with governing code ASCE 7-10, Florida Building Code 2010 for Monticello Florida and provide Florida Product Approval Number.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Steel Doors and Frames:

a. Amweld InternationalBuilding Products, Inc.
b. Ceco Doors.
c. Curries
d. Republic Doors
e. Steelcraft.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM A 569M).

B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366 (ASTM A 366M), commercial quality, or ASTM A 620 (ASTM A 620M), drawing quality, special killed.

C. Galvanized Steel Sheets: Zinc-coated carbon steel complying with ASTM A 526 (ASTM A 526M), commercial quality, or ASTM A 642 (ASTM A 642M), drawing quality, hot-dip galvanized according to ASTM A 525, with A 60 or G 60 (ASTM A 525M, with Z 180 or ZF 180) coating designation, mill phosphatized.

D. Supports and Anchors: Fabricated from not less than 0.0478-inch- (1.2-mm-) thick steel sheet; 0.0516-inch- (1.3-mm-) thick galvanized steel where used with galvanized steel frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

F. Provide epoxy anchors for frames anchored into existing brick construction.

2.3 DOORS

A. Steel Doors: Provide 1-3/4-inch- (44-mm-) thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:

1. Exterior Door: 14 ga. uncoated steel thickness (16 ga.) full flush design, thick cold-rolled steel sheet faces.
2. Exterior Doors: Shall be galvanized steel sheet faces.

2.4 FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules.

B. Exterior Door Frames, and frames set in CMU walls shall be galvanized.

1. Fabricate frames with mitered or coped corners, continuously welded construction for exterior and interior applications.
2. Form exterior frames from 14 ga (uncoated thickness) galvanized steel sheet.
3. Provide 1-3/4-inch wide doors for frames.

2.5 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

1. Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:

   a. Rigid polyurethane conforming to ASTM C 591.

2. Clearances: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel sheet.

C. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

E. Galvanized Steel Doors, Panels, and Frames: For the following locations, fabricate doors, panels, and frames from galvanized steel sheet according to SDI 112. Close top and bottom edges of doors flush as an integral part of door construction or by addition of minimum 0.0635-inch- (1.6-mm-) thick galvanized steel channels, with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.

4. At exterior locations, and in locations where frames are set in CMU walls.

F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

G. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.

1. Unless otherwise indicated, provide thermal-rated assemblies with U-value rating of 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) or better.

H. Hardware Preparation: Prepare doors and frames to receive hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

1. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions

for fastening in top rail of doors or head of frames, as applicable.

I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

J. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.

C. Apply primers and organic finishes to doors and frames after fabrication.

2.7 GALVANIZED STEEL SHEET FINISHES

A. Surface Preparation: Clean surfaces with nonpetroleum solvent so that surfaces are free of oil or other contaminants. After cleaning, apply a conversion coating of the type suited to the organic coating applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply air-dried primer specified below immediately after cleaning and pretreatment.

1. Shop Primer: Zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II.

2.8 STEEL SHEET FINISHES

A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

B. Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.

C. Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 PREPARATION

A. **Prior to installation, of door frames at concrete masonry units and at exterior door frame locations, clean and then back-prime door frames with one coat of primer and provide an**

additional coat of primer to exposed to view surfaces (note, this is in addition to the primer that is painted on at the factory); refer to Section 09900 - Painting for primer. Allow sufficient time for primer to dry before installing adjacent construction.

3.2 INSTALLATION

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. Place frames before constructing enclosing walls and ceilings.
2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
3. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
4. Install fire-rated frames according to NFPA 80.

C. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.

3.3 ADJUSTING AND CLEANING

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

B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08 11 13

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes access doors and frames for walls and ceilings.

B. Related Requirements:

1. Section Divisions 21, 22, 23, 26 & 27 coordination of access doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details**,** fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors and frames for entire Project from one source and by a single manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

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

a. Acudor Products, Inc.

b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Larsens Manufacturing Company.
d. Milcor; Commercial Products Group of Hart & Cooley, Inc.
e. Nystrom, Inc.

2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As necessary for access to the equipment behind the door for servicing.
5. Uncoated Steel Sheet for Door: Nominal 0.060 inch (1.52 mm), 16 gage, factory primed.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, screwdriver operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES – Only in Fire Rated Walls

A. Fire-Rated, Flush Access Doors with Exposed Flanges:

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

a. Acudor Products, Inc.
b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Larsens Manufacturing Company.
d. Milcor; Commercial Products Group of Hart & Cooley, Inc.
e. Nystrom, Inc.

2. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal exposed flange, self-closing door, and concealed hinge.
3. Locations: Wall and ceiling.
4. Door Size: As necessary for access to the equipment behind the door for servicing.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Temperature-Rise Rating: 450 deg F (250 deg C) at the end of 30 minutes.
7. Uncoated Steel Sheet for Door: Nominal 0.036 inch (0.91 mm), 20 gage factory primed.
8. Frame Material: Same material, thickness, and finish as door.
9. Latch and Lock: Self-latching door hardware, operated by knurled-knob.

2.4 MATERIALS

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

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Frame Anchors: Same material as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 08 31 13

SECTION 08 80 00 – GLAZING (Historic Glass)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Replacement glass for windows.
2. Replacement glass for doors.

1.2 DEFINITIONS

A. Full Restoration Glass: Glass with pronounced distortion. Produced by authentic, antique mouth blown practice by skilled craftsmen. Each sheet handmade utilizing centuries old techniques and hand selected at factory. Glass shall exhibit surface distortions, an occasional air bubble or pit and other imperfections found in original mouth blown and antique glass types.

B. Manufacturer shall have been in business of producing Restoration Glass for a minimum of 50 years.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide replacement glass to match existing historic glass thickness and dimensions for only those sections of glass that are cracked or broken in the process of restoring the existing door, sidelights and transom units. Intent of restoring these units is to protect and retain existing glass.

B. Existing Glass: Existing glass in doors, sidelights and transoms currently is intact. Contractor shall photograph existing units and immediately notify Architect of any broke glass conditions prior to commencing restoration.

C. Performance: At conclusion of restoration glass installation in the completed units, installation shall be sealed water tight.

1.4 INFORMATION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

1.5 ACTION SUBMITTALS

A. Submit sample of Full Restoration Glass in 12” square sample.

B. Submit certificate from manufacturer attesting that glass material furnished for project complies with specified requirements.

1.6 WARRANTY

A. Manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: As follows:

1. Bendheim Restoration Glass, Class Full Restoration Glass. Telephone 800-221-7379 or 973-471-1733; Fax 973-471-1640; Email – info@bendheim.com.

2. No Substitutions: This is based on providing glass by same manufacture who produced the replacement glass for previous glass restoration project in 2004.

2.2 GLASS PRODUCTS

A. Full Restoraton Glass produced by above Basis of Design.:

2.3 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation and matching existing installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

2.4 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 GLAZING

A. General: Examine glass framing, with glazier present for compliance with the following:

1. Historic restoration requirements reference in this manual, installation tolerances, including those for size, squareness and offsets at corners. Adjust as required by Project conditions during installation.
2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass

with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

3.2 CLEANING AND PROTECTION

A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 08 80 00

SECTION 08 87 00 – GLAZING SURFACE FILMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior/Exterior Window Film

B. Decorative Window Film

C. Privacy Window Film

1.2 RELATED SECTIONS

A. Section 08 80 00 – Glazing: Windows to receive architectural window film

1.3 REFERENCES

A. ASTM International (ASTM)

1. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
2. ASTM E 308 - Standard Recommended Practice for Spectophotometry and Description of Color in CIE 1931 System.

1.4 ACTION SUBMITTALS

A. Manufacturer's Product Data for specified products.

B. Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.

C. Samples: 4 inch by 4 inch Samples of specified texture, color and/or pattern for verification.

D. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.

E. Mock ups: In place required, one window pane approximately 12” by 16”.

1.5 QUALITY ASSURANCE

A. Obtain all products in this section from a single Manufacturer with a minimum of 10 years’ experience.

B. Installer: Installation shall be performed by a trained and qualified installer, specialized and experienced in work required for this project.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.

C. Product must remain in original plastic bag and boxes and have storage conditions as follows:

1. 40 °F – 90 °F (4 °C – 32 °C)
2. Out of direct sunlight
3. Clean dry area
4. Original container
5. Do not stack boxes over six (6) units high. Excessive weight can damage the film

6. Products are not recommended for interior applications where condensation consistently occurs.
7. Handle products in accordance with manufacturer's instructions.
8. Shelf life: 1 year

1.7 PROJECT/SITE CONDITIONS

A. Confirm appropriate substrate is suitable for mounting of glass finish components prior to start of installation.

B. Apply materials when environmental conditions are within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits. Application temperature range is 60 °F – 100 °F (16 °C – 38 °C).

C. Environmental Limitations: Do not install until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Manufacturer's Standard Warranty: Submit manufacturer's standard warranty document by authorized manufacturer.

1.9 EXTRA MATERIALS

A. Furnish 2 percent extra material at time of installation. Deliver in protective packaging for storage and label contents appropriately.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design h: 3M Company – Commercial Solutions Division [CSD]

3M Center, Building 0220-12-E-04
St. Paul, MN 55144-1000, USA
1-888-650-3497

2.2 MATERIAL STANDARD

A. Basis of Design based upon 3M™ FASARA™ Glass Finishes

2.3 MATERIAL PROPERTIES

A. General: Glass and plastic finishes field-applied application to glass or plastic material as visual opaque or decorative film.

B. Film: Polyester

C. Decorative Pattern: Printed

D. Adhesive: Acrylic, Pressure Sensitive, Permanent

E. Liner: Silicone-coated Polyester

F. Thickness Film and Adhesive without Liner: 3.2 mils (80 microns).

G. Fire Performance: Surface burning characteristics when tested in accordance with ASTM E84: Class A

1. Flame Spread: 25 maximum.
2. Smoke Developed: 450 maximum.

2.4 OPTICAL PERFORMANCE

Frost/Matte and Mirror

A. FASARA – ESSEN Decorative / Privacy Glazing Film applied to 3mm thick clear glass (ASTM E 903, ASTM E 308):
   1. Ultraviolet Transmittance: 0.1 percent.
   2. Visible Light Transmittance: 55 percent.
   3. Visible Light Reflectance - Interior: 26 percent.
   4. Solar Heat Transmittance: 50 percent.
   5. Solar Heat Reflectance: 23 percent.
   6. Shading Coefficient at 90 Degrees (Normal Incidence): 0.67.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate(s) for compliance. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Refer to the applicable Technical Data Sheet to determine compatibility of finish to substrate.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

D. Responsibility for state of surfaces prior to installation to be pre-determined by installation specialist.

E. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation per the recommendations of the installation specialist.

F. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 SURFACE PREPARATION

A. Comply with all manufacturer's instructions for surface preparation.

B. Thoroughly clean substrate of substances that could impair the overlay's bond, including mold, mildew, oil, grease.

C. Re-clean surfaces with appropriate surface prep solvent and remove any haze or surface contamination.

3.3 APPLICATION

A. Refer to the applicable Installation Guide for application instructions.

B. Application must be performed by qualified installer.

C. Do not proceed with installation until all finishing work has been completed in and around the work area.

D. Verify pattern prior to material acquisition.

E. Comply with manufacturer's installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

F. Remove the liner and wet the adhesive prior to installation.

G. Form smooth, wrinkle-free, bubble-free surface for finished installation.

H. Remove air bubbles, wrinkles, blisters and other defects. Use approved procedures to prevent the formation of air bubbles, wrinkles, blisters and other defects.

I. Residual water phenomenon may cause small water bubbles or clouding in the film that disappears as the water evaporates.

3.4 CLEANING AND PROTECTION

A. Use cleaning methods recommended by architectural surfacing manufacturer for applicable environment.

B. Protect completed glass finish during remainder of construction period.

END OF SECTION 08 87 00

SECTION 09 21 00 – GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.

B. Related Requirements:

1. Section 01 23 13 "Gypsum Veneer Plaster" for plaster veneer over gypsum board.

1.2 INFORMATION SUBMITTALS

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

1.3 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Gypsum Co.
b. G-P Gypsum.
c. USG Corporation.

B. Type X: (throughout project, even for non-rated wall construction)

1. Thickness: 5/8 inch.
2. Long Edges: Tapered for pre-filling.

2.2 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Pre-filling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.

2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.

2.3 AUXILIARY MATERIALS

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

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Screws: ASTM C 1002, unless otherwise indicated.

1. For fastening gypsum units to wood studs, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

3.2 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Throughout and where required for fire-resistance-rated assembly.

3.3 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Pre-fill open joints**,** rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below:

1. Level 1: Gypsum panels installed under this contract will be for backing of existing wood wainscot and wall backing for veneer plaster above wainscot; tape joints and prime side against the wainscot and prime the side against the wood stud.

3.4 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Immediately remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 21 00

SECTION 09 26 13 - GYPSUM VENEER PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Gypsum veneer plaster and gypsum base for interior veneer plaster.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Show locations, fabrication, and installation of control joints, reveals, and trim; include plans, elevations, sections, details of components, and attachments to other work.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 10-inch length for each trim accessory.
2. Textured Finishes: 2’-0” X 2’-0” for each textured finish and on rigid backing.

1.4 QUALITY ASSURANCE

A. Mockups: Provide a full-thickness finish mockup for each type and finish of gypsum veneer plaster and substrate to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select representative surfaces and conditions for application of each type of gypsum veneer plaster and substrate.
2. Provide mockups of **partitions** in sizes of at least 100 sq. ft.
3. Apply gypsum veneer plaster, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

C. Stack panels flat on leveled supports off floor or slab to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 843 requirements or gypsum veneer plaster manufacturer's written recommendations, whichever are more stringent.

B. Room Temperatures: Maintain not less than 55 deg F or more than 80 deg F for seven days before application of gypsum veneer plaster, continuously during application, and after application until veneer plaster is dry.

C. Avoid conditions that result in gypsum veneer plaster drying too rapidly.

1. Distribute heat evenly; prevent concentrated or uneven heat on veneer plaster.
2. Maintain relative humidity levels, for prevailing ambient temperature, that produce normal drying conditions.
3. Ventilate building spaces in a manner that prevents drafts of air from contacting surfaces during veneer plaster application until it is dry.

D. Do not install panels that are wet, moisture damaged, mold damaged, or faded from overexposure to sunlight.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain gypsum veneer plaster products, including gypsum base for veneer plaster, joint reinforcing tape, and embedding material, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.3 GYPSUM VENEER PLASTER

A. Two-Component Gypsum Veneer Plaster: ASTM C 587, with separate formulations; one for base-coat application and one for finish-coat application over substrates.

1. Base Coat: Architect to select

2. Smooth Finish Coat: architect to select

B. Gypsum Base for Veneer Plaster: ASTM C 1396/C 1396M. Refer to Section 09 21 00 Gypsum Board.

2.4 TRIM ACCESSORIES

A. Standard Trim: ASTM C 1047, provided or approved by manufacturer for use in gypsum veneer plaster applications indicated.

1. Material: Galvanized-steel sheet or aluminum-coated steel sheet; rolled zinc, or paper-faced galvanized-steel sheet
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives veneer plaster.
    c. L-Bead: L-shaped; exposed long flange receives veneer plaster.
    d. U-Bead: J-shaped; exposed short flange does not receive veneer plaster.
    e. Control joints.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
2. Finish: Corrosion-resistant primer compatible with veneer plaster

2.5 JOINT-REINFORCING MATERIALS

A. General: Comply with joint strength requirements in ASTM C 587 and with gypsum veneer plaster manufacturer's written recommendations for each application indicated.

B. Joint Tape:

1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for applications indicated
2. Cementitious Backer Units: As recommended by cementitious backer unit manufacturer.

C. Embedding Material for Joint Tape:

1. Gypsum Base for Veneer Plaster: As recommended by gypsum veneer plaster manufacturer for use with joint-tape material and gypsum veneer plaster applications indicated.
2. Cementitious Backer Units: As recommended by cementitious backer unit manufacturer for applications indicated.

2.6 AUXILIARY MATERIALS

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

B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2.

C. Patching Mortar: Dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING PANELS, GENERAL

A. Gypsum Base for Veneer Plaster: Apply according to ASTM C 844 unless manufacturer's written recommendations are more stringent.

1. Do not allow gypsum base to degrade from exposure to sunlight, as evidenced by fading of paper facing.
2. Erection Tolerance: No more than 1/16-inch offsets between planes of gypsum base panels, and 1/8 inch in 8 feet noncumulative, for level, plumb, warp, and bow.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not locate joints, other than control joints, at corners of framed openings.

E. Attach panels to steel studs, so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

F. Attach panels to framing provided at openings and cutouts.

G. Form control joints with space between edges of adjoining panels.

H. Cover both sides of partition framing with panels in concealed spaces, including above ceilings, except in internally braced chases.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.74 sq. m) in area.
2. Fit panels around ducts, pipes, and conduits.
3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints; seal joints with acoustical sealant.

I. Wood Framing: Install panels over wood framing, with "floating" internal corner construction. Do not attach panels across the flat grain of wide-dimension lumber, including floor joists and headers. "Float" panels over these members or provide control joints to counteract wood shrinkage.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

K. Fastener Spacing: Comply with ASTM C 844, manufacturer's written recommendations, and fire-resistance-rating requirements.

1. Space screws a maximum of 12 inches (305 mm) o.c. along framing members for wall or ceiling application.
2. Space fasteners in cementitious backer units a maximum of 8 inches (200 mm) o.c. along framing members for wall applications and 6 inches (150 mm) o.c. along framing members for ceiling applications.

3.3 INSTALLING PANELS

A. Install panels for veneer plaster in locations indicated on Drawings and in accordance with Section 09 21 00 Gypsum Board.

3.4 INSTALLING TRIM ACCESSORIES

A. General: Install trim with back flanges intended for fasteners, and attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install according to ASTM C 844 and in specific locations approved by Architect.

C. Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. Bullnose Bead: Use where indicated

3. LC-Bead: Use at exposed panel edges
4. L-Bead: Use where indicated
5. U-Bead: Use where indicated
6. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim:

1. Apply and embed joint tape over flanges of aluminum trim accessories if recommended by trim manufacturer.

3.5 GYPSUM VENEER PLASTERING

A. Gypsum Veneer Plaster Mixing: Mechanically mix gypsum veneer plaster materials to comply with ASTM C 843 and with gypsum veneer plaster manufacturer's written recommendations.

B. Gypsum Veneer Plaster Application: Comply with ASTM C 843 and with veneer plaster manufacturer's written recommendations.
1. Two-Component Gypsum Veneer Plaster:

a. Base Coat: Hand trowel or machine apply base coat over substrate to a uniform thickness of 1/16 to 3/32 inch (1.6 to 2.4 mm). Fill voids and imperfections.
b. Finish Coat: Trowel apply finish-coat plaster over base-coat plaster to a uniform thickness of 1/16 to 3/32 inch (1.6 to 2.4 mm).

2. Where gypsum veneer plaster abuts metal, including doorframes, windows and other units, groove finish coat to eliminate spalling.
3. Do not apply veneer plaster to gypsum base if paper facing has degraded from exposure to sunlight. Before applying veneer plaster, use remedial methods to restore bonding capability to degraded paper facing according to manufacturer's written recommendations and as approved by Architect.

C. Concealed Surfaces: Do not omit gypsum veneer plaster behind cabinets, furniture, furnishings, and similar removable items. Omit veneer plaster in the following areas where it will be concealed from view in the completed Work unless otherwise indicated or required to maintain fire-resistance and STC ratings:
1. Behind wood wainscot.

D. Gypsum Veneer Plaster Finish: Smooth-troweled finish unless otherwise indicated

3.6 PROTECTION

A. Protect installed gypsum veneer plaster from damage from weather, condensation, construction, and other causes during remainder of the construction period.

B. Remove and replace gypsum veneer plaster and gypsum base panels that are wet, moisture damaged, or mold damaged.

1. Indications that gypsum base panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that gypsum base panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1 **END OF SECTION 09 26 13**

SECTION 09 30 13 - PORCELAIN TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Stone thresholds.
3. Waterproof and Crack Isolation membrane.

B. Related Requirements:

1. Section 07 91 10 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 09 29 00 "Gypsum Board" for Tile Backing Panels.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

E. TCNA: Tile Council of North America.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

D. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch (150-mm) lengths.
4. Metal edge strips in 6-inch (150-mm) lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
2. Obtain waterproof membrane / crack isolation membrane from Basis of Design Manufacturer.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

A. Porcelain Tile Type Basis of Design porcelain tile.

1. Basis of Design:

    a. PT-1, PB-1:
        1) Trinity Surfaces Urban (see schedule for polished vs matte) – Color body: Rectified.
        2) Face Size: 11-13/16” x 23-5/8”
        3) Dynamic Coefficient of Friction: >0.6
        4) Colors: Refer to Finish Schedule
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: Refer to each type of tile.
4. Thickness: 3/8 inch (9.5 mm).
5. Dynamic Coefficient of Friction: Refer to each type of tile.
6. Grout Color: To match color of tile as selected by Architect.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. External Corners: Surface bullnose.
    b. Internal Corners: Field-butted square corners.
    c. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.4 mm) across nominal 4-inch (100-mm) dimension.

2.4 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 10 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.

1. Description: Architect to select from manufacturer’s full range of colors.

2.5 WATERPROOF / CRACK MEMBRANE

A. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Basis of Design: Vulkem® Under Tile Waterproofing System; Vulkem 350NF and related materials.

2.6 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Bonsal American, an Oldcastle company.
   b. Bostik, Inc.
   c. LATICRETE SUPERCAP, LLC.
   d. MAPEI Corporation.
   e. Southern Grouts & Mortars, Inc.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.4.

2.7 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.

B. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Bonsal American, an Oldcastle company.
   b. Bostik, Inc.
   c. LATICRETE SUPERCAP, LLC.
   d. MAPEI Corporation.
   e. Southern Grouts & Mortars, Inc.

2. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

C. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Schluter Systems L.P.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Bonsal American, an Oldcastle company.
   b. Southern Grouts & Mortars, Inc.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer. Coordinate with Paragraph 2.5 above.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Tile floors in wet areas.
    b. Tile floors consisting of tiles 8 by 8 inches (200 by 200 mm) or larger.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Porcelain Tile: 1/4 inch (6.4 mm).

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

I. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in modified dry-set mortar (thinset).
2. Do not extend waterproofing or crack isolation membrane under thresholds set in modified dry-set mortar. Fill joints between such thresholds and adjoining tile set on waterproofing or crack isolation membrane with elastomeric sealant.

J. Metal Edge Strips: Install in sequence with tile installation where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

K. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING / CRACT ISOLATION INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 09 30 13

SECTION 09 54 26 – TONGUE AND GROOVE WOOD CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following ceiling system:
   1. Linear Wood tongue and groove planks.

1.2 SUBMITTALS

A. Product Data: Product data, product specifications, and installation instruction.

B. Shop Drawings: Show penetration details, perimeter treatment and other details deemed pertinent to proper installation.

C. Samples: A 12” wide x 12” long wood ceiling sample. The sample shall be made of the wood species selected, with the selected finish applied.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: The installer must be a firm with a minimum of two (2) years of successful experience in installation of tongue and groove wood ceilings of similar requirements to this project. The installer must be acceptable to the architect, manufacturer and owner’s representative.

1.4 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be delivered to the project site in the original, labeled, unopened packages.

B. Materials shall be stored flat and level in a fully enclosed space. For a minimum of seventy-two (72) hours immediately prior to ceiling installation, the tongue and groove wood ceiling planks shall be stored in the room in which they will be installed. The temperature and humidity of the room shall closely approximate those conditions that will exist when the building is occupied. Linear Wood Planks shall be stored off the floor.

1.5 PROJECT CONDITIONS

A. Install shall be done only when the temperature and humidity closely approximate the interior conditions that will exist when the building is occupied. The heating and cooling systems shall be operating before, during and after installation.

B. Insulation at roof deck shall be installed prior to installation of tongue and groove wood ceiling. There shall be no excessive building up of heat in the ceiling areas.

C. Prior to the start of installation, all exterior windows and doors are to be in place, glazed and weather-stripped. The roof is to be watertight, and all wet trades’ work is to be completed, and thoroughly dry.

D. Mechanical, electrical, and other utility service installations above the ceiling plane shall have been completed. No materials should rest against, or wrap around, the ceiling suspension components or connecting hangers.

1.6 WARRANTY

A. Manufacturer: All materials supplied by the ceiling manufacturer shall be guaranteed against manufacturing defects for one (1) year.

B. Contractor: All work shall be guaranteed for one (1) years from final acceptance of completed work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cracker Saw Mill
Phone: 352-529-2070
20253 NE 20th Street
Williston, FL 32696

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual.

2.2 LINEAR WOOD TONGUE AND GROOVE PLANKS

A. Linear wood tongue and groove planks: Kiln dried to 6 to 9 percent maximum moisture content; tongue and groove and end matched; with backs channeled.

1. Grade and Species: Paint grade
2. Cut: Plain Sawn
3. Thickness: 3/4 inch
4. Face Width: 2-1/4 inches
5. Lengths: Manufacturer's standard

B. Wood Filler: Compatible with finish system components and recommended by filler and finish manufacturers for use indicated.

C. Factory Finish:
   1) Unfinished paint grade
   2) Primed on both faces and sides

2.3 EDGES, BORDERS AND PERIMETER TRIMS

A. Edges, borders, and perimeter trims shall be designated by Architect in accordance with standard design details available.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ceiling Layout: The contractor shall measure ceiling areas and establish the layout in accordance with the contract documents.

B. Coordination: The contractor shall coordinate with other trades the location of devices which will penetrate the ceiling or interfere with installation.

3.2 INSTALLATION

A. General: The contractor shall install materials in accordance the Contract Documents and with applicable regulations and industry standards.

B. Layout and installation of tongue and groove wood ceiling shall be coordinated with other work penetrating through the ceiling. This includes light fixtures, HVAC equipment, and fire suppression systems components.

C. Planks should be primed on **both faces and sides** prior to installation.

3.3 INSPECTION

A. Upon completion of ceiling installation, the owner's representative shall review finished surfaces to determine if the work has been competed in a manner satisfactory to the owner. Any deficiencies in the installed ceiling shall be corrected by the contractor at no additional cost to the owner, or to the ceiling manufacturer.

3.4 ADJUSTMENT, CLEANING, and REPAIR

A. Upon completion of ceiling installation, tongue and groove wood ceiling shall be cleaned, free of dirt, dust, grease, oils, and fingerprints.

B. Work that cannot be successfully cleaned or repaired shall be removed and replaced.

END OF SECTION 09 54 26

SECTION 09 64 00 - WOOD FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Factory-finished wood flooring.
2. Field-finished wood flooring.
3. Sound control underlayment.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of floor assembly and accessory. Include plans, sections, and attachment details. Include expansion provisions and trim details.

C. Samples: For each exposed product and for each color and texture specified, approximately 12 inches long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and finishes available for wood flooring.

1. Include Samples of accessories involving color and finish selection.

E. Samples for Verification: For each type of wood flooring and accessory, with stain color and finish required, approximately 12 inches long and of same thickness and material indicated for the Work and showing the full range of normal color and texture variations expected.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wood Flooring: 50 sf in color and finish of wood flooring installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver wood flooring materials in unopened cartons or bundles.

B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.

C. Store wood flooring materials in a dry, warm, ventilated, weathertight location.

1.7 FIELD CONDITIONS

A. Conditioning period begins not less than seven days before wood flooring installation, is continuous through installation, and continues not less than seven days after wood flooring installation.

1. Environmental Conditioning: Maintain ambient temperature between 65 and 75 deg F (18 and 24 deg C) and relative humidity planned for building occupants in spaces to receive wood flooring during the conditioning period.
2. Wood Flooring Conditioning: Move wood flooring into spaces where it will be installed, no later than the beginning of the conditioning period.

    a. Do not install flooring until it adjusts to relative humidity of, and is at same temperature as, space where it is to be installed.
    b. Open sealed packages to allow wood flooring to acclimatize immediately on moving flooring into spaces in which it will be installed.

B. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.

C. Install factory-finished wood flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Softwood Flooring: Comply with WCLIB No. 17 grading rules for species, grade, and cut.

2.2 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Goodwin Company
   Goodwin Heart Pine
   Phone: 352-466-0339
   106 SW 109th Place, Micanopy, FL 32667

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States

2.3 FIELD-FINISHED WOOD FLOORING

A. Solid-Wood Flooring: Kiln dried to 6 to 9 percent maximum moisture content; tongue and groove and end matched; with backs channeled.

1. Grade and Species: Heart Pine
2. Cut: Plain Sawn
3. Thickness: 3/4 inch (19 mm)
4. Face Width: 2-1/4 inches (57 mm)
5. Lengths: Manufacturer's standard

B. Wood Filler: Compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved Samples, provide pigmented filler.

2.4 SOUND CONTROL UNDERLAYMENT

A. Sound Control Underlayment: Sound reducing underlayment consisting of impact-absorbing materials. Minimum Impact Insulation Class (IIC) of 55 when tested according to ASTM E 492.

1. Material: As per manufacturer recommendation
2. Thickness: 1/8”

2.5 ACCESSORY MATERIALS

A. Wood Sleepers and Subfloor: **As specified in Section 061000 "Rough Carpentry" and Section 06 16 00 "Sheathing.**

B. Wood Underlayment: **As specified in Section 06 16 00 "Sheathing”.**

C. Asphalt-Saturated Felt: ASTM D 4869/D 4869M, Type II.

D. Wood Flooring Adhesive: Mastic recommended by flooring and adhesive manufacturers for application indicated.

E. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by wood flooring manufacturer.

F. Fasteners: As recommended by manufacturer, but not less than that recommended in NWFA's "Installation Guidelines."

G. Thresholds and Saddles: To match wood flooring. Tapered on each side.

H. Reducer Strips: To match wood flooring. **2 inches** wide, tapered, and in thickness required to match height of flooring.

I. Cork Expansion Strip: Composition cork strip.

J. Wood Air Vents and Grilles: To match wood flooring and in sizes and design indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of wood flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Broom or vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Comply with flooring manufacturer's written installation instructions, but not less than applicable recommendations in NWFA's "Installation Guidelines."

B. Wood Sleepers and Subfloor: **Install according to requirements in Section 06 10 00 "Rough Carpentry" and Section 06 16 00 "Sheathing."**

C. Wood Underlayment: **Install according to requirements in Section 06 16 00 "Sheathing."**

D. Provide expansion space at walls and other obstructions and terminations of flooring of not less than 3/4 inch.

E. Vapor Retarder: Comply with the following for vapor retarder installation:

1. Wood Flooring Nailed to Wood Subfloor: Install flooring over a layer of asphalt-saturated felt.

F. Sound Control Underlayment: Install according to manufacturer's written instructions.

G. Solid-Wood Flooring: Blind nail flooring to substrate.

1. Plank Flooring: For flooring of face width more than 3 inches:

a. Hardwood: Install countersunk screws at each end of each piece in addition to blind nailing. Cover screw heads with wood plugs glued flush with flooring.
b. Softwood: Install no fewer than two countersunk nails at each end of each piece, spaced not more than 16 inches (406 mm) along length of each piece, in addition to blind nailing. Fill holes with matching wood filler.

3.4 FIELD FINISHING

A. Machine-sand flooring to remove offsets, ridges, cups, and sanding-machine marks that are noticeable after finishing. Vacuum and tack with a clean cloth immediately before applying finish.

1. Comply with applicable recommendations in NWFA's "Installation Guidelines."

B. Fill **open-grained hardwood**

C. Fill and repair wood flooring defects.

D. Apply floor-finish materials in number of coats recommended by finish manufacturer for application indicated, but not less than one coat of floor sealer and **three** finish coats.

1. Apply stains to achieve an even color distribution matching approved Samples.
2. For water-based finishes, use finishing methods recommended by finish manufacturer to minimize grain raise.

E. Cover wood flooring before finishing.

F. Do not cover wood flooring after finishing until finish reaches full cure, and not before seven days after applying last finish coat.

3.5 PROTECTION

A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.

1. Do not move heavy and sharp objects directly over kraft-paper-covered wood flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION 09 64 00

SECTION 09 83 10 – ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Acoustical panels.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical panel required.

B. Shop Drawings: Submit shop drawings showing how panels are to be laid out on walls and ceilings. Width of panels and location of vertical seams.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and installation components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical wall components with appropriate markings of applicable testing and inspecting organization.
   1. Surface Burning Characteristics: Class A, tested per ASTM E 84.
      a. Flame Spread: 25 or less.
      b. Smoke Developed: 200 or less.

C. Coordination of Work: Coordinate acoustical panel work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaged units in any way.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Acoustical Panels:

1. Microperf Acousticore by Acoustical Surfaces, Inc.
   a. 123 Columbia Court North, Suite 201, Chaska, MN 55318.
   b. 952-448-5300, Fax: 952-448-2613.
   c. Toll Free: 1-800-448-3134.

2.2 ACOUSTICAL PANELS

A. Basis of Design Product: Microperf Acousticore 519.

1. Maximum Size: 1549 mm x 3683 mm (61” x 145”).
2. Thickness: 19 mm (3/4”) Available up to 51 mm (2”).
3. Weight: 5.86 kg / m2 (1.2 lbs / sq.ft.), @ 19 mm thickness.
4. Core: Sintered Resin-reinforced Glass Wool Soundply™.
5. Face: Wood Veneer.
6. Perforation:
   a. Surface Diameter: 0.5mm.
   b. Passage Diameter: 0.5mm
   c. Passage Depth: 1.7mm
7. Pattern: Offset.
8. Acoustics:
   a. NRC Score: .70.
9. Fire Rating: Class A per ASTM-E84.

B. Z-Clips: Manufacturer’s standard horizontal continuous 3” z-clip mounted at manufacture’s specified spacing.

PART 3 - EXECUTION

3.1 PREPARATION

A. Measure each area and establish layout of acoustical units to balance border widths at opposite edges of each area. Coordinate metal panel layout with mechanical and electrical fixtures.

3.2 INSTALLATION

A. Install panels, z-clips and anchors per the manufacturer’s written instructions.

3.3 CLEANING

A. Clean exposed panel surfaces. Comply with manufacturer's written instructions for cleaning, and minor finish damage repairs. Remove and replace panel components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including deformed panels.

END OF SECTION 09 83 10

SECTION 09 90 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation, painting, and finishing of exposed interior and exterior items and surfaces.

a. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.

B. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

C. Painting is not required any other surfaces other than the interior and exterior restored wood doors, frames, trim, sidelites, and transoms.

1.3 ACTION SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each paint system specified, including block fillers and primers.

a. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.
b. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
   a. If submittal is by a manufacturer different than the Basis of Design, list the Basis of Design material and then list the substituted material showing how each component of the substituted material matches each component of the specified material.
c. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

C. Samples for Verification Purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

a. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
b. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.
c. Submit samples on the following substrates for the Architect's review of color and texture only:
   a. Painted Wood: Provide two 12-inch (300-mm) square samples of each color and material on hardboard.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.

B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

a. Product name or title of material.
b. Product description (generic classification or binder type).
c. Manufacturer's stock number and date of manufacture.
d. Contents by volume, for pigment and vehicle constituents.
e. Thinning instructions.
f. Application instructions.
g. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

a. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.6 JOB CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F (10 deg C) and 90 deg F (32 deg C).

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 F deg (3 C deg) above the dew point; or to damp or wet surfaces.

a. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

a. The Glidden Company (Glidden).
b. Benjamin Moore and Co. (Moore) Basis of Design.
c. PPG Industries, Pittsburgh Paints (PPG).
d. The Sherwin-Williams Company (S-W).

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and

application, as demonstrated by the manufacturer based on testing and field experience.

B. Material Quality: Provide the manufacturer's **best-quality** trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

a. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: White range to match existing paint color.

2.3 MASONRY BLOCK FILLER

A. Filler Coat Materials: Provide the manufacturer's recommended factory-formulated, latex-type concrete masonry block fillers that are compatible with the finish materials indicated.

2.4 PRIMERS

A. Primers: Provide the manufacturer's recommended factory-formulated primers that are compatible with the substrate and finish coats indicated.

2.5 UNDERCOAT MATERIALS

A. Undercoat Materials: Provide the manufacturer's recommended factory-formulated undercoat materials that are compatible with the substrate and finish coats indicated.

2.6 EXTERIOR FINISH PAINT MATERIAL

A. Finish Paint: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.

2.7 INTERIOR FINISH PAINT MATERIAL

A. Finish Paint: Provide the manufacturer's recommended factory-formulated finish-coat materials that are compatible with the substrate and undercoats indicated.

2.8 MISCELLANEOUS WOOD-FINISHING MATERIALS

A. Wood-Finishing Materials: Provide the manufacturer's recommended factory-formulated, wood-finishing materials that are compatible with the substrate and undercoats indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.

a. Do not begin to apply paint until unsatisfactory conditions have been corrected.
b. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

a. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to the manufacturer's instructions for each particular substrate condition and as specified.

a. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing about anticipated problems using the specified finish-coat material with substrates primed by others.

b. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

a. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

c. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

b. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood.

D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.

a. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

b. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

c. Use only thinners approved by the paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

a. Paint colors, surface treatments, and finishes are indicated in the schedules.
b. Provide finish coats that are compatible with primers used.
c. The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.
d. Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
e. The term exposed surfaces includes areas visible when permanent or built-in components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
f. Finish exterior doors on tops, bottoms, and side edges same as exterior faces.
g. Sand lightly between each succeeding enamel or varnish coat.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

a. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.

a. Brushes: Use brushes best suited for the material applied.
b. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
c. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

F. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

H. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

I. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform

finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

3.4 CLEANING

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

a. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

a. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates indicated.

B. Ferrous Metal: (Door & Frames) Primer is not required on shop-primed items.

a. High Gloss superior quality, Long-Oil Alkyd: Two finish coats over primer; total 2.0 mils dry film thickness not including primer.

1. Primer: Rust-inhibiting primer.

1) Moore: IronClad Retardo-X Rust-Inhibitive Paint 163; 1.9 mils dry film thickness.

2. First and Second Coats: Long-Oil Alkyd.

1) Moore: Exterior Finish Coatings - Moore House Paint 110; 2.0 mils dry film thickness per coat.

C. Woodwork:

a. Painted Woodwork (Base, Window Sills, Trim, Doors, Sidelites, Transoms) specified to be restored.

1. Acrylic Latex (High Gloss)

i. Primer (one coat) — Moore: Fresh Start All Purpose 100% acrylic latex (for interior and exterior applications. Min. dry film thickness of 1.1 mils per coat.

ii. Second & Third Coats: — Moore: Impervex Enamel (309). Min. dry film thickness of 1.2 mils per coat.

iii. In addition to other finishes provide Sikkens Cetrol 23 Plus on all portions of restored wood work on exterior portions of the building.

3.7 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated.

B. Woodwork:

a. Painted Woodwork (Base, Window Sills, Trim, Doors, Sidelites, Transoms specified to be restored.

1. Acrylic Latex (High Gloss)

i. Primer (one coat) — Moore: Fresh Start All Purpose 100% acrylic latex (for interior and exterior applications. Min. dry film thickness of 1.1 mils per coat.

ii. Second & Third Coats: — Moore: Impervex Enamel (309). Min. dry film thickness of 1.2 mils per coat.

C. Ferrous Metal: (Door & Frames) Primer is not required on shop-primed items.

a. High Gloss superior quality, Long-Oil Alkyd: Two finish coats over primer; total 2.0 mils dry film thickness not including primer.

1. Primer: Rust-inhibiting primer.

1) Moore: IronClad Retardo-X Rust-Inhibitive Paint 163; 1.9 mils dry film thickness.

2. First and Second Coats: Long-Oil Alkyd.

1) Moore: Exterior Finish Coatings - Moore House Paint 110; 2.0 mils dry film thickness per coat.

D. Concrete Masonry Units: (Concrete & Masonry on Elevator Shaft)

a. Pearl Finish: Two finish coats over filled surface. Total 2.8 mils dry film thickness.

1. Block Filler: latex block filler; 8.6 mils dry film thickness.

1) Moore: Super Spec Latex Block Filler #160.

2. First and Second Coats: Pearl finish latex-based paint.

1) Moore: Interior Finish Coatings - Regal Pearl Finish N310. Pearl finish.

END OF SECTION 09 90 00

SECTION 09 96 56 – EPOXY COATINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes applying special coating systems to items and surfaces scheduled, including surface preparation, prime coats, and topcoats.

B. Types of special coating systems required for the Project include the following:
   1. Special coatings for interior use include the following:
      a. Two-component, high-performance, acrylic Epoxy.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. General painting is specified in Division 9 Section "Painting."

1.03 ACTION SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each coating system specified, including block fillers and primers.
   1. Provide the manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material proposed for use.
   2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
   3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

C. Samples for Verification Purposes: Provide samples of each color and material to be applied with texture to simulate actual conditions on representative samples of the actual substrate.
   1. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until the required sheen, color, and texture are achieved.
   2. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.
   3. Submit samples on the following substrates for the Architect's review of color and texture only.
      a. Concrete: Provide two 4-inch (100-mm) square samples for each color and finish.
      b. Concrete Masonry: Provide two 8-inch (200-mm) square samples of masonry, with mortar joint in the center, for each finish and color.
      c. Gypsum board: Provide two 4-inch (100-mm) square samples for each color and finish.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has successfully completed coating system applications similar in material and extent to those indicated for the Project.

B. Single-Source Responsibility: Provide primers and undercoat material produced by the same manufacturer as the finish coats for each type of coating. Use only thinners recommended by the manufacturer and only within recommended limits.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, new, unopened packages, and containers bearing manufacturer's name and label, and the following information:
   1. Name or title of material.
   2. Product description (generic classification or binder type).
   3. Manufacturer's name, stock number and date of manufacture.
   4. Contents by volume, for major pigment and vehicle constituents.
   5. Thinning instructions.
   6. Application instructions.
   7. Color name and number.
   8. Handling instructions and precautions.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.
   1. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying the coatings.

1.06 PROJECT CONDITIONS

A. Apply coatings only when the temperature of surfaces to be coated and surrounding air temperatures are between 45 deg F (7 deg C) and 95 deg F (35 deg C).

B. Do not apply coatings in snow, rain, fog, or mist; when the relative humidity exceeds 85 percent; at temperatures less than 5 F deg (3 C deg) above the dew point; or to damp or wet surfaces.
   1. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation.
   2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and the temperature within the area can be maintained within limits specified by the manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
   1. Devoe and Raynolds Company (Devoe).
   2. The Glidden Company (Glidden).
   3. Benjamin Moore and Company (Moore) Basis of Design (Epoxy).
   4. Porter International (Porter).
   5. PPG Industries, Pittsburgh Paints (PPG).
   6. Sherwin-Williams Company (S-W).
   7. Tnemec Company, Inc. (Tnemec).

2.02 SPECIAL COATING MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, finish coat material, and related materials that are compatible with one another and the substrates indicated under conditions of service and application as demonstrated by the manufacturer based on testing and field experience.

B. Material Quality: Provide the **highest grade** of the various coatings as regularly manufactured by acceptable coating manufacturers. Materials not displaying manufacturer's identification as a best-grade product will not be

acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials are not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: In accordance with Color Schedule. Match colors indicated by reference to the manufacturer's standard color designations.

2.03 MASONRY-BLOCK FILLERS

A. Masonry Block Fillers: Provide the manufacturer's recommended factory-formulated concrete masonry block fillers that are compatible with the finish materials indicated.

2.04 BOND COAT MATERIALS

A. Bond Coat Materials: Provide the manufacturer's recommended factory-formulated bond coat materials that are compatible with the finish materials indicated.

2.05 PRIMERS AND SEALERS

A. Primer/Sealers: Provide the manufacturer's recommended factory-formulated primer/sealers that are compatible with the substrate and finish materials indicated.

2.06 INTERMEDIATE COAT MATERIALS

A. Intermediate Coat Materials: Provide the manufacturer's recommended, factory-formulated, intermediate coat materials that are compatible with the substrate, primers or base coat materials, and the finish materials indicated.

2.07 INTERIOR FINISH-COAT MATERIALS

A. Interior Finish-Coat Materials: Provide the manufacturer's recommended factory-formulated, interior, finish-coat materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which coatings will be applied for compliance with requirements on applying coatings. Surfaces to receive coatings must be thoroughly dry before coatings are applied.

1. Do not proceed with coating application until unsatisfactory conditions have been corrected.
2. Start of application will be construed as the Applicator's acceptance of surfaces within that particular area.

B. Coordinating Work: Review sections in which other coatings are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on the characteristics of specified finish materials to ensure compatible primers.

1. Notify the Architect of problems anticipated using the coatings specified over substrates primed by others.

3.02 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already in place that are not to be coated, or provide surface-applied protection prior to surface preparation and coating. Remove these items, if necessary, to completely coat the items and adjacent surfaces. Following the coating operations in each space or area, have removed items reinstalled by workers skilled in

the trades involved.

B. Consult with Architect before using cleaning methods that may damage existing historic elements of building.

C. Cleaning: Before applying coatings or other surface treatments, clean the substrates of substances that could impair bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and coating application so dust and other contaminates from the cleaning process will not fall on wet, newly coated surfaces.

D. Surface Preparation: Clean and prepare surfaces to be coated according to the manufacturer's instructions for each particular substrate condition and as specified.
1. Provide barrier coats over incompatible primers, or remove and reprime. Notify the Architect in writing of problems anticipated when using the specified finish-coat material with substrates primed by others.

E. Cementitious Surfaces: Prepare concrete, concrete masonry block and similar surfaces to receive special coatings. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove glaze. If hardeners or sealers have been used to improve concrete curing, use mechanical methods to prepare surface.
1. Use abrasive blast-cleaning methods if recommended by the coating system manufacturer.
2. Determine alkalinity and moisture content of surfaces to be coated by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish coats to blister and burn, correct this condition before application. Do not apply coatings over surfaces where the moisture content exceeds that permitted in the manufacturer's printed directions.

F. Material Preparation: Carefully mix and prepare materials according to the coating manufacturer's directions.
1. Maintain containers used in mixing and application of coatings according to the manufacturer's directions.
2. Stir materials before applying to produce a mixture of uniform density; stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain the coating material before using.
3. Use only the type of thinners approved by the manufacturer and only within recommended limits.

G. Tinting: Tint each undercoat a lighter shade to facilitate identifying each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply special coatings by brush, roller, spray, squeegee, or other applicators according to the manufacturer's directions. Use brushes best suited for the material being applied. Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
1. Do not apply coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
2. Coating colors, surface treatments, and finishes are indicated in the Schedules.
3. Provide finish coats compatible with the primers used.
4. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Where sanding is required, according to the manufacturer's directions, sand between applications to produce a smooth, even surface.
5. When undercoats or other conditions show through the final coat, apply additional coats until the cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
6. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
a. Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces.

b. Coat the back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
1. Allow sufficient drying time between successive coats. Do not recoat until the coating has dried so it feels firm and does not deform or feel sticky under moderate thumb pressure and where applying another coat does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.
1. Brushes: Use brushes best suited for the material applied.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply each material no thinner than the manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by the manufacturer and as specified herein.

E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to the material required to be coated or finished that has not been prime-coated by others.
1. Recoat primed and sealed substrates where there is evidence of suction spots or unsealed areas in the first coat to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.

G. Brush Application: Brush-out and work brush coats into surfaces in an even film. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.
1. Apply primers and first coats by brush unless the manufacturer's instructions permit using mechanical applicators.

H. Mechanical Applications: Use mechanical methods to apply coating when permitted by the manufacturer's recommendations and governing regulations.
1. Wherever using spray application, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double-back with spray equipment building-up film thickness of two coats in one pass, unless recommended by the manufacturer.

I. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish, or recoat work not complying with specified requirements.

3.04 CLEANING

A. Cleanup: At the end of each work day, remove rubbish, empty cans, rags, and other discarded materials from the site.
1. After completing work, clean glass and spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.05 PROTECTION

A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as acceptable to the Architect. Leave in an undamaged condition.
1. Provide "Wet Paint" signs to protect newly coated finishes. Remove temporary protective wrappings

provided by others to protect their work after completing coating operations.

2. At completion of other trades' construction activities, touch up and restore damaged or defaced coated surfaces.

3.06 INTERIOR SPECIAL COATING SCHEDULE

A. Provide the following coating systems for substrates indicated:
   1. Where undercoats or other conditions show through final coat, apply additional coats until the cured film is of uniform coating finish, color, and appearance.

B. Concrete Masonry Units:
   1. High-Performance, Polyamide-Epoxy Coating System: Provide two finish coats with total dry film thickness not less than 4 mils over concrete masonry block filler.
      a. Filler Coat: Concrete masonry block filler.
         1) Moore: CM36-00/M37 Polyamide Epoxy Block, 10 mils dry film thickness.
      b. First and Second Coats: Polyamide-epoxy coating.
         1) Moore: Industrial Maintenance Coatings M36/M37, 2 mils dry film thickness each coat.

B. Gypsum Wall Board:
   1. High-Performance, Polyamide-Epoxy Coating System: Provide two finish coats with total dry film thickness not less than 4 mils over primer.
      a. Primer: Waterborne Acrylic.
         1) Moore: M08/M09 Waterborne Acrylic Epoxy 2 mils dry film thickness.
      b. First and Second Coats: Waterborne Acrylic Epoxy coating.
         1) Moore: Industrial Maintenance Coatings M36/M37, 2 mils dry film thickness each coat.

END OF SECTION 09 96 56

SECTION 10 00 01 - MISCELLANEOUS SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Extent of miscellaneous specialties is indicated in the drawings and by the requirements of this section.

1.2 QUALITY ASSURANCE:

A. Contractor shall coordinate miscellaneous specialties with other related components of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS:

A. Submit product data on each type of miscellaneous specialty item.

1.4 ACTION SUBMITTALS:

A. Submit product data .

B. Submit shop drawings.

PART 2 - PRODUCTS

2.1 STANCHIONS

A. Basis of Design: Queue Solutions; a PRM Group Company

1. Post: Steel tubing, Architect to select finish.
   a. Post Diameter: 2”
   b. Post Top Style: Crown Top
2. Base: Cold rolled steel stamped and covers 17lb-20lb base weight. Finish to match post.
   a. Base Diameter: 14”
   b. Base Style: Sloped Base
3. Stanchion Assembly height: 39”
4. Rope Ends: 1” snap end, Architect to select finish.
5. Rope: Black Velour Rope
   a. Length, as per manufacturer’s reccomendation

2.2 FIRE DEPARTMENT EMERGENCY ACCESS SYSTEM

A. Basis of Design: 3200 Series Knox-Box

1. UL Listed.
2. Surface mounted with hinged door.
3.. Provide UL Listed alarm tamper switches that can be connect to building’s security system.
4. Color: Architect to Select.
5. Location: Location to be determined and located by Architect and Owner.

6. Quantity = 1.

2.3 RARE EARTH MAGNETS

A. Basis of Design: Magcraft Model Number: NSN0802

1. Model number: NSN0802
2. Dimemsions: ½" diameter x ¼" thick
3. Material: Sintered Neodymium-Iron-Boron
4. Plating: Nickel
5. Recessed mounted as indicated in drawings.

2.4 ADA PAD

A. Basis of Design: Ultra Tech International, Inc

1. Model number: 0759
2. Dimemsions: 2'-0" x 3'-0"
3. Material: Urethane
4. Color: Black
5. Surfaced mounted.
6. Must meet ADA Acessibilty Guidelines for Building and Facilities (ADAAG)
   a. They shall consist of raised truncated domes with a diameter of nominal 0.9 in (23 mm), a height of nominal 0.2 in (5 mm) and a center-to-center spacing of nominal 2.35 in (60 mm).
   b. They shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light. The material used to provide contrast should contrast by at least 70%.
   c. The material used to provide contrast shall be an integral part of the walking surface.
   d. Detectable warnings used on interior surfaces shall differ from adjoining walking surfaces in resiliency or sound-on-cane contact.

2.5 OUTDOOR PARK BENCH

A. Basis of Design: The Park Catalog

1. Model number: 398-9010-99-s6 Durham Slat Bench with back
2. Seats:
   a. Seat dimensions are 30" x 72".
   b. 12 gauge sheet steel is precision punched create the slat pattern.
   c. End plates are made of 7 gauge flat steel plate.
   d. Reinforced with 3/16 x 1-1/2" flat strip.
   e. Electrically MIG welded.
3. Frame: Legs are cast aluminum.
4. Frame Coating:
   a. Metal is sandblasted to near white condition.
   b. Coated with zinc rich epoxy primer and top coated with electrostatic powdercoat, oven cured.
5. Hardware: All fasteners are stainless steel.
6. Dimensions:
   a. 6' portable/surface mount bench with back.
   b. Seats are 30" wide x 72" long.
   c. Seat height is 18-1/2" from the ground to the top of the seat.

d. The overall dimensions are 30-1/4” x 75” x 37-1/2” tall.

2.6 ACCESS PANEL

A. Basis of Design: Windlock Stealth Accesss Panel

1. Model number: AP-DR3636
2. Access panel:
   a. Door/access opening: 36in x 36in
   b. Rough/frame opening: 42in x 42in .
   c. Description: Standard, Drop in
   d. Corner style: Radius

2.7 ATTIC LADDER

A. Basis of Design: Louisville Ladder

1. Model number: AL258P
2. Attic Ladder:
   a. Material: Aluminum
   b. Load capacity: 350lb
   c. ANSI Type: IA
   d. Seris: Everest
   e. Rough Opening: 25 ½”x 63”
   f. Attic Ladder Closure: Spring Assist
3. Step:
   a. Width: 17”
   b. Depth: 3 ¾”

2.8 SOUNDPROOFING FLOOR UNDERLAYMENT

A. Basis of Design: All Noise Control, LLC, Soundproofing floors.

1. Model number: anc-ff12
2. Footfall underlayment system:
   a. Material: Styrene-butadiene ruber
   b. Nominal thickness: 12mm
   c. Density: ASTM D-792
   d. Width: 48” wide

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Installation shall be in accordance with manufacturer's instructions and recommendations.

END OF SECTION 10 00 01

SECTION 10 14 16 - PLAQUE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes metal plaques.

B. Related Requirements:

1. Section 10 14 23.16 "Room-Identification Panel Signage" for room identification signage.
2. Division 22 for labels, tags, and nameplates for plumbing systems and equipment.
3. Division 23 for labels, tags, and nameplates for HVAC systems and equipment.
4. Division 26 for labels, tags, and nameplates for electrical equipment.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plaques.

1. Include fabrication and installation details and attachments to other work.
2. Show plaque mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters, and layout for each plaque.

C. Samples for Initial Selection: For each type of plaque, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plaques to include in maintenance manuals.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.

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

PART 2 - PRODUCTS

2.1 PLAQUES

A. Cast Plaque: Cast-metal plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. A.R.K. Ramos.
b. Gemini Incorporated.
c. Metal Arts.
d. Metallic Arts.

2. Plaque Material: Cast bronze.
3. Plaque Thickness: 0.50 inch (12.7 mm).
4. Plaque Size: 18” x 24”.
5. Finishes:

a. Integral Metal Finish: As selected by Architect from full range of industry finishes.

6. Background Texture: Pebble.
7. Integrally Cast Border Style: Square single line, polished.
8. Mounting: Concealed studs or Rosette-head through fasteners as selected by Architect.
9. Text and Typeface: Raised characters. Typeface as selected by Architect from manufacturer's full range. Finish raised characters to contrast with background color.
10. Text Content: To be furnished by Architect and approved by Owner.

2.2 MATERIALS

A. Bronze Castings: ASTM B 584, lead-free alloy recommended by manufacturer and finisher for finish indicated.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors.
2. For exterior exposure, furnish **nonferrous-metal** devices unless otherwise indicated.
3. Plaque Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque unless otherwise indicated.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.4 FABRICATION

A. General: Provide manufacturer's standard plaques according to requirements indicated.

1. Preassemble plaques in the shop to greatest extent possible. Disassemble plaques only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.
6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.5 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that plaque-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
2. Install plaques so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.

    a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as plaques are installed.

C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 16

SECTION 10 14 23 – ROOM IDENIFICATION PANEL SIGNS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide interior and exterior signage as herein specified and as indicated on drawings.

1.2 SUBMITTALS

A. Submittals: Submit the following:

1. Shop Drawings: Provide typical layout of each type of sign.
   a. Message list for each sign with wording and letter layout.
   b. Samples: For initial selection of color, pattern, and surface texture, and for verification of compliance with requirements indicated.
   c. Manufacturer's full range of color sample rings. Printed color charts are not acceptable.

PART 2 - PRODUCTS

A. Acrylic Sheet: Cast methyl methacrylate monomer plastic sheet with 16,000-psi minimum flexural strength, and minimum allowable continuous service temperature of 176 deg F (80 deg C).

1. Opaque Sheet: Colored opaque acrylic sheet in colors and finishes indicated.
   a. Basis of Design: Kroy Sign Systems LLC, 8221 E. Gelding Rd., Scottsdale, AZ 85260, Phone: 800-950-5769, Fax: 480-483-0235. Fla Representative: Carol Barlabas 480-619-6074.

B. Panel Signs: Comply with requirements for materials, thicknesses, finishes, colors, designs, shapes, sizes, and construction details. Produce smooth, even, level sign panel surfaces.

1. Unframed Panel Signs: Fabricate edges mechanically and smoothly finished.
   a. Edge Condition: Square cut.
   b. Edge Color for Plastic Laminate: Same as background.
   c. Corner Condition: Corners rounded to radius indicated.

C. Graphic Content and Style: Provide sign copy that complies with size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
   1. Letter Style: Sans Serif or Simple Serif.
   2. Letter Size: 1" (raised copy with braille).
   3. Sign Size: All signs same size, largest size needed for copy.

D. Raised Copy: Machine-cut copy characters from matte-finished opaque acrylic sheet and chemically weld onto the acrylic sheet forming sign panel face.

1. Panel Material: Matte-finished opaque acrylic sheet.
2. Raised Copy Thickness: Not less than 1/32 inch.

E. Exterior signs shall be UV resistant.

PART 3 - EXECUTION

A. Installation: Locate signs in accordance with the requirements of the Florida Building Code - Building, Accessibility chapter and as directed by the Architect, and with sign surfaces free from distortion or other defects in appearance.

B. Wall-Mounted Panel Signs: Attach using methods indicated below:

1. Mechanical Fasteners.

C. Cleaning: After installation, clean soiled surfaces. Protect units from damage until acceptance by the Owner.

D. Sign Schedule: Provide signs and room numbering for all rooms within the work area. Coordinate with Architect.

END OF SECTION 10 14 23

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Compact Laminate (CL/Solid Phenolic), Moisture Resistant Substrate:

1. Toilet Partitions
2. Urinal Privacy Screens

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications.

B. Section 06 10 00 - Rough Carpentry.

C. Section 09 30 13 - Porcelain Tiling.

1.3 INFORMATION SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

B. USA Certificate of Origin: Manufacturer shall supply with first submittal, an example of their Certificate of Origin declaring toilet compartments are wholly manufactured and assembled specifically in the United States, including city and state locations. A notarized Certificate of Origin shall be provided with closeout documents.

C. Shop Drawings: Submit manufacturer's shop drawings for each product specified, including the following:
1. Plans, elevations, details of construction and attachment to adjacent construction.
2. Show anchorage locations and accessory items.
3. Verify dimensions with field measurements prior to final production of toilet compartments.

1.4 ACTION SUBMITTALS

A. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

B. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.

D. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirements as applicable.

E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

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

1.8 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard 25 year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship. Manufacturer's standard 1 year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

B. Manufacturer's Warranty: Manufacturer's standard 2 year warranty for materials and workmanship.

C. Manufacturer's Warranty: Manufacturer's standard 5 year warranty for materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Bobrick Washroom Equipment, Inc.,
      6901 Tujunga Ave.; North Hollywood, CA 91605-6213;
      Tel: 818-764-1000; Fax: 818-765-2700;
      Email:info@bobrick.com;
      Web:www.bobrick.com

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

2.2 COMPACT LAMINATE (SOLID PHENOLIC), MOISTURE RESISTANT SUBSTRATE (DuraLineSeries)

A. Compact Laminate (Solid Phenolic) Toilet Partitions: Bobrick DuraLineSeries.
   1. Design Type::
      a. Standard Height.
         1) Door/Panel Height: 58 inches (147 cm).
         2) Floor Clearance: 12 inches (30 cm).
      b. Maximum Height.
         1) Door/Panel Height: 72 inches (183 cm).
         2) Floor Clearance: 4-5/16 inches (11 cm).
         3) Panels: Up to 72 inches (183 cm) wide, one piece. Splice or two panels joined by bracket not acceptable.
   2. Privacy Style Partitions: No sightlines with gap-free interlocking doors and stiles routed 0.300 inches (7.6 mm) from the edge to allow for 0.175 inch (4.4 mm) overlap to prevent line-of-sight into the toilet compartment. Privacy strips fastened or adhered onto the partition material are not acceptable.
   3. Mounting Configuration:
      a. Floor-mounted.
         1) Stile Standard Height: 69 inches (175 cm); Maximum Height: 75-5/16 inches (194 cm).

B. Compact Laminate (Solid Phenolic) Urinal Screens: Bobrick DuraLineSeries.
   1. Mounting Configuration:
      a. Wall-hung.
         1) Screen Height: 42 inches (107 cm) with 18 inches (46 cm) floor clearance.

C. Materials: Solidly fused plastic laminate with matte-finish melamine surfaces; integrally bonded colored face sheets and black phenolic-resin core.

D. Edges: Black; brown edges not acceptable.

E. Color:
1. As selected by Architect from manufacturer's standard range.

F. Fire Resistance:
1. National Fire Protection Association/International Building Code Interior Wall and Ceiling Finish: Class A / Uniform Building Code: Class I.
a. Flame Spread Index (ASTM E 84): 15-25 for panels, stiles and doors.
b. Smoke Developed Index (ASTM E 84): 25 - 105 for panels, 20-90 for stiles.

G. Finished Thickness:
1. Stiles and Doors: 3/4 inch (19 mm).
2. Panels and Screens: 1/2 inch (13 mm).

H. Stiles: Floor-anchored stiles furnished with expansion shields and threaded rods.
1. Leveling Devices: 7 gauge, 3/16 inches (5 mm) thick, corrosion-resistant, chromate-treated, double zinc-plated steel angle leveling bar bolted to stile; furnished with 3/8 inch (10 mm) diameter threaded rods, hex nuts, lock washers, flat washers, spacer sleeves, expansion anchors, and shoe retainers.
2. Stile Shoes: One-piece, 22 gauge (0.8 mm), 18-8, Type 304 stainless steel, 4 inch (102 mm) height; tops with 90 degree return to stile. One-piece shoe capable of adapting to 3/4 inch (19 mm) or 1 inch (25 mm) stile thickness and capable of being fastened (by clip) to stiles starting at wall line.

I. Wall Posts: Pre-drilled for door hardware, 18-8, Type 304, 16 gauge (1.6 mm) stainless steel with satin finish; 1 inch (25 mm) x 1-1/2 inches (38 mm) x 58 inches high (1473 mm).

J. Anchors: Expansion shields and threaded rods at floor connections as applicable. Threaded rods secured to supports above ceiling as applicable. Supports above ceiling furnished and installed as Work of Section 05 50 00 - Metal Fabrications.

K. Hardware:
1. Compliance: Operating force of less than 5 lb (2.25 kg).
2. Emergency Access: Hinges, latch allow door to be lifted over keeper from outside compartment on inswing doors.
3. Materials: 18-8, Type 304, heavy-gauge stainless steel with satin finish.
4. Doorstops: Prevents inswinging doors from swinging out beyond stile; on outswing doors, doorstop prevents door from swinging in beyond stile.
5. Fastening: Hardware is secured to door and stile with pin-in-head Torx stainless steel machine screws. Hinges, latch and optional door stops secured to door with pin-in-head Torx stainless steel machine screws into factory-installed, threaded brass inserts. Fasteners for hinges, latch and optional door stops secured directly into core not acceptable.
a. Threaded Brass Inserts: Factory-installed; withstand direct pull force exceeding 1500 lb (680 kg) per insert.
6. Clothes Hooks: Projecting no more than 1-1/8 inch (29 mm) from face of door.
7. Door Latch: Track of door latch prevents inswing doors from swinging out beyond stile; on outswing doors, door keeper prevents door from swinging in beyond stile; 16 gauge (1.6 mm) sliding door latch, 14 gauge (2 mm) keeper.
8. Locking: Door locked from inside by sliding door latch into keeper.
9. Hinge Type:
a. Standard.
1) Balanced, with field-adjustable cam to permit door to be fully closed or partially open when compartment is unoccupied.
b. Full-Height Institutional Hinge.

1) Hinges: 16 gauge (1.6 mm) stainless steel, self-closing, 3 section hinges.

10. Mounting Brackets:
    a. Standard concealed.
        1) Mounting Brackets: Mounted inside compartment; exposed brackets on exterior of compartment not acceptable with the exception of outswing doors.
    b. Full-Height.
        1) Mounting Brackets: 18 gauge (1.2 mm) stainless steel and extend full height of panel.
        2) U-Channels: Secure panels to stiles.
        3) Angle Brackets: Secure stiles-to-walls and panels to walls

2.3 FABRICATION

A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

B. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be accessible to people with disabilities.

1. Hinges: Manufacturer's standard self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
2. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates including but not limited to blocking and supports in walls and ceilings at points of attachment using methods recommended by the manufacturer for achieving the best result for the substrates under the project conditions.
1. Inspect areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
2. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.

B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

C. Do not proceed with installation until substrates have been properly prepared with blocking and supports in walls and ceilings at points of attachment and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.2 INSTALLATION

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

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch (13 mm).
b. Panels and Walls: 1 inch (25 mm).

3.3 ADJUSTING

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

B. Touch-up, repair or replace damaged products.

C. Clean exposed surfaces of compartments, hardware, and fittings.

END OF SECTION 10 21 13

SECTION 10 22 13 – WIRE MESH HOLDING CELL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wire mesh partitions for:

1. Holding Cell Door

1.2 RELATED SECTIONS

A. Section 09 90 00 - Painting

1.3 SUBMITTALS

A. Product Data: Manufacturer's printed data on products to be furnished.

B. Shop Drawings: Complete layout and fabrication drawings.

1. For mezzanine railings include evidence that structural design and anchorage meet the requirements of the authorities having jurisdiction.

C. Samples: Finish color samples for selection.

D. Keys: Turn over keys for door locks to Owner at completion of project.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. WireCrafters, LLC;
   6208 Strawberry Lane, Louisville, KY 40214-2900.
   Tel: (800) 626-1816 or (502) 363-6691.
   Fax: (502) 361-3857.
   www.wirecrafters.com
   Email: info@wirecrafters.com

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

2.2 PARTITIONS

A. Wire Mesh Partitions: Factory-assembled modular sized panels stacked between post uprights, complete with all components, accessories, hardware, and fasteners; interchangeable units that allow expansion without waste of components.

1. Style: Full mesh.
2. Post Spacing: As required to suit dimensions, using manufacturer's standard panel widths.
3. Height: Field Verify
4. Finish: Electrostatic sprayed enamel, in manufacturer's standard color.

B. Posts: Square 2 by 2 inch (50 by 50 mm) 14 gauge steel tube.

1. Factory drilled holes for attaching panels.
2. Welded-on base plate, 2 by 7 by 1/4 inch (50 by 178 by 6 mm), with factory drilled holes for floor anchors.
3. Provide appropriate hardware for attaching panels to posts and posts to floor.

C. Wire Mesh Panels: Steel angle frames with wire mesh securely welded in place; frame joints coped at corner and securely welded; factory drilled holes for fasteners.

1. Wire Mesh: 6 gauge, 0.192 inch (5 mm) steel wire woven into 2 inch (50 mm) square mesh.
2. Welded Wire Mesh
3. Frame: 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) hot rolled steel angle.
4. Vertical Panel Stiffeners: 1/4 by 3/4 inch (6 by 19 mm) steel bar securely welded to frame behind mesh on panels 4 feet (1219 mm) or wider.

D. Door Sections: Matching wire mesh panels.

1. Frame: 1-1/4 by 1-1/4 by 1/8 inch (32 by 32 by 3 mm) hot rolled steel angle.
2. Frame: 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) hot rolled steel angle.
3. Stiffeners: Two horizontal and one vertical stiffener of 1/4 by 3/4 inch (6 by 19 mm) flat hot rolled steel bar.
4. Hinged Doors:
   a. Single Door Width: Field Verify
   b. Door Opening Height: Field Verify
   c. Hinges: 3 5-knuckle tight-pin butt hinges fastened to door panel and frame.
5. Locking: Mortise cylinder lock operated by key outside, recessed thumb turn knob inside.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install plumb, level, and securely anchored to floor and to other structural members where indicated.

C. Adjust doors and service windows for smooth, easy operation.

1 **END OF SECTION 10 22 13**

SECTION 10 26 41 BULLET RESISTANT FIBERGLASS

PART 1 GENERAL

1.1 REFERENCE

A. The publication below forms a part of this specification.
   1. Underwriters Laboratory UL 752, 9th Edition, Standard for Bullet Resisting Equipment

1.2 SUBMITTALS

A. The following shall be submitted in accordance with Sections 01340 and the SPECIAL CONTRACT REQUIREMENTS: Submit for approval prior to fabrication catalog cuts, brochures, specifications, UL LISTING VERIFICATION, proof of possession of PRODUCT LIABILITY INSURANCE in an amount not less than five million U.S. dollars, and printed data in sufficient detail to indicate compliance with the contract documents and the manufacturer's instructions for the installation of Bullet Resistant Fiberglass.

1.3 DESIGN

A. Through the design, manufacturing technique and material application the Bullet Resistant Fiberglass shall be of the "non-ricochet type". This design is intended to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver the materials to the project with the manufacturer’s UL Labels intact and legible. Handle the material with care to prevent damage. Store the materials inside under cover, stack flat and off the floor.

1.5 WARRANTY

A. All materials and workmanship shall be warranted against defects for a period of one (1) year from the date of receipt at the project site.

PART 2 PRODUCTS

2.1 BULLET RESISTANT FIBERGLASS MATERIAL

A. The panels shall be made of multiple layers of starch-oil woven roving ballistic grade fiberglass cloth impregnated with a thermoset polyester resin and compressed into flat rigid sheets. The production technique and materials used shall provide the controlled internal delamination to permit the encapture of a penetrating projectile.

2.2 MANUFACTURER

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Bullet Resistant Fiberglass panels shall be UL Listed BRF300 manufactured/ distribute by:

a. C.R. Laurence Co., Inc.
2503 E. Vernon Ave.
Los Angeles, CA 90058
Attn: Tech Sales
800-421-6144 Phone, Extension 7760
crlaurence.com

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States. Unlisted UL752 bullet resistant fiberglass products will not be considered acceptable or equal.

2.3 SECURITY LEVEL

A. The Bullet Resistant Fiberglass must be Ul Listed Rated for Level 3

2.4 SUBSTITUTIONS

A. Other UL Listed bullet resistant fiberglass products are acceptable if in compliance with all requirements of this specification. Alternate products must be submitted to the architect for approval.

PART 3 EXECUTION

3.1 SUPPORTING MEMBERS

A. Prior to installing the bullet resistive material the contractor shall verify that all supports have been installed as required by the contract documents and the architectural drawings.

3.2 JOINTS

A. All joints shall be reinforced by a back-up layer of bullet resistive material. The bullet resistance of the joint, as reinforced, shall be at least equal to that of the panel. Minimum width of reinforcing layer at joint shall be 4". (2" on each panel side or a 2" minimum overlap per side)

3.3 APPLICATION

A. Armor shall be installed in accordance with the manufacturer's printed recommendations. Armor panels shall be adhered using an industrial adhesive, mastic, screws or bolts. Method of application shall maintain the bullet resistive rating at junctures with the concrete floor slab, the concrete roof slab, the bullet resistive door frames, the bullet resistive window frames, and all required penetrations.

END OF SECTION 10 26 41

SECTION 10 28 00 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes toilet and bath accessory items as scheduled.

B. Toilet compartments and related accessories are specified in Division 10.

1.3 ACTION SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.

B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.

C. Maintenance instructions including replaceable parts and service recommendations.

1.4 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay.

B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

1.5 PROJECT CONDITIONS

A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:

1. A & J Washroom Accessories.

2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc. Basis of Design; unless otherwise indicated.
4. Bradley Corporation.
5. McKinney/Parker.
6. General Accessory Manufacturing Co.

2.2 MATERIALS, GENERAL

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034 inch (0.9 mm) minimum thickness.

B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16 (ASTM B 16M); Castings, ASTM B 30.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366 (ASTM A 366M), 0.04 inch (1.0 mm) minimum. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 527 G60 (ASTM A 527M Z180).

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

F. Mirror Glass: Nominal 6.0 mm thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro- plated copper coating, and protective organic coating.

G. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

H. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

2.3 TOILET TISSUE DISPENSER

A. MARK A: Basis of Design: Bobrick Model No. B-4288 Surface mounted multi-roll.

B. MARK Q: Basis of Design: Bobrick Model No. B-386 Partition-mounted multi-roll (serves 2 toilet compartments).

2.4 SOAP DISPENSERS

A. MARK B: Basis of Design: Bobrick Model No. B-4112 surface mounted.

2.5 GRAB BARS

A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inch (1.3 mm) and as follows:

1. Mounting: Concealed, manufacturer's standard flanges and anchorages.
2. Clearance: 1-1/2 inch (38 mm) clearance between wall surface and inside face of bar.
3. Gripping Surfaces: Manufacturer's standard nonslip texture.
4. Heavy-Duty Size: Outside diameter of 1-1/2 inches (38 mm).
5. Provide concealed metal anchor plate, Basis of Design equal to Bobrick Model No. B- 2562.
6. Satin finish.

B. MARK C: Basis of Design equal to Bobrick Model No. B-6806 x 42 inch long.

C. MARK D: Basis of Design equal to Bobrick Model No. B-6806 x 36 inch long.

2.6 MIRROR UNITS

A. Stainless Steel Framed Mirror Units: Fabricate frame with angle shapes not less than 0.05 inch (1.3 mm), with square corners mitered, welded, and ground smooth. Provide in No. 4 satin polished finish.

B. MARK E: Basis of Design: Bobrick Model B-290 1836, 18" x 36", glass mirror with stainless steel angle frame.

2.7 PAPER TOWEL DISPENSER

A. MARK F: Basis of Design: Bobrick Model No. B-4262 Surface mounted .

2.8 RECESSED WASTE RECEPTACLE

A. MARK H: Basis of Design equal to Bobrick Model No. B-43644, recessed mounted waste receptacle .

2.9 MOP HOLDER

A. MARK L: Basis of Design; Bobrick Model No. B-224x36, 36" Long w/ 4 cam type holder clamps and shelf.

2.10 ROBE HOOK

A. MARK P: Basis of Design: Bobrick Model No. B-76717, surface mounted.

2.11 SANITARY NAPKIN DISPOSAL

A. MARK S: Basis of Design: Bobrick Model B-270 Surface mounted.

B. MARK T: Basis of Design: Bobrick Model B-354 Partition mounted.

2.12 CORRECTIONAL PRODUCTS

A. MARK G: Basis of Design: Norix Group, Inc. (800.234.4900) Model IGS Security Grab Bar; 42” length.

B. MARK V: Basis of Design: Norix Group, Inc (800.234.4900) Model ITP-100 Chase Mounted recessed Security Toilet Paper Holder.

C. MARK X: Basis of Design: Norix Group, Inc. (800.234.4900) Model ISD-100 recessed Security Soap Dish.

D. MARK Y: Basis of Design: Norix Group, Inc. (800.234.4900) Model S565-550 recessed

Security Paper Towel Shelf.

2.14 FABRICATION

A. General: Only a maximum 1-1/2 inch (38 mm) diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

D. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:

1. Provide galvanized-steel backing sheet, not less than 0.034 inch (0.9 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

E. Mirror Unit Hangers: Provide system for mounting mirror units that will permit rigid, tamperproof, and theftproof installation, as follows:

1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

F. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.

C. Install grab bars to withstand a downward load of at least 250 lbf (1100 N), complying with ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly.

Replace damaged or defective items.

B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10 28 00

SECTION 10 44 13 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

1.1 GENERAL

A. Coordination: Verify that cabinets are sized to accommodate type and capacity of extinguishers indicated.

B. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.

C. FM-Listed Products: Fire extinguishers approved by Factory Mutual Research Corporation for type, rating, and classification of extinguisher with FM marking.

1.2 ACTION SUBMITTALS

A. Submittals: Submit the following:

1. Product Data: Include rough-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type and materials, trim style, door construction, panel style, and materials.

2.1 PRODUCTS

A. Fire Extinguishers: Provide fire extinguishers for each cabinet and for other locations indicated.

1. Multipurpose Dry Chemical Type: UL-rated 3A:40-B:C, 5-lb nominal capacity, in enameled steel container for Class A, B & C fires; typical locations, except in kitchen.
2. Fire extinguishers which are to be mounted in cabinets and which are to be mounted on a bracket are indicated and noted on the drawings; refer to drawings for locations.

B. Mounting Brackets: Provide brackets of sizes required for type and capacity of extinguisher indicated, in plated finish. Provide a bracket for each extinguisher to be mounted in a cabinet and for each wall mounted fire extinguisher.

C. Cabinet Construction: Box with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

1. Fire-Rated Cabinets: UL listed with UL listing mark with fire-resistance rating of wall where it is installed.
2. Cabinet Type: Suitable for containing the following:

    a. **General Fire extinguisher**.
        1. **Basis of Design**: **Larsen's Manufacturing Co. Model MP5A, typical.**

3. Cabinet Mounting: Suitable for the mounting indicated:

    a. Semi-Recessed: Refer to drawings for locations.

        1. **Basis of Design: Larsen's Manufacturing Co. Model B24095R Medallion Series.**

4. Trim Style: One piece with corners mitered, welded, and ground smooth.

    a. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge.

        1) Square-edge with 1/4- to 5/16-inch backbend depth.
        2) Metal: Same metal and finish as door.

D. Door Material and Construction: Manufacturer's standard of material indicated, coordinated with cabinet types and trim styles selected.

1. Solid Brass: Clear Stain Finish.
2. Door Glazing: Fully tempered float glass complying with ASTM C 1048, Condition A, Type I, Quality q3, Kind FT, and Class as follows:

a. Class 1 (clear).

E. Door Style: Manufacturer's standard design.

1. Duo Panel: Float glass, 1/8 inch thick.

F. Door Hardware: Provide door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

G. Cabinet Finishes: Comply with NAAMM "Metal Finishes Manual." Protect exposed finishes from damage by application of temporary strippable covering prior to shipment.

H. Box: Heavy gauge white baked acrylic enamel box.

3.1 EXECUTION

A. Installation: Provide one fire extinguisher for each cabinet indicated on the Contract Document Drawings. Follow manufacturer's printed instructions.

B. Install at heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

1. Prepare wall recesses for cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
1. Fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb.

END OF SECTION 10 44 13

SECTION 10 75 16 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes ground-set flagpoles made from aluminum.

B. Owner-Furnished Material: Flags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.

B. Shop Drawings: For flagpoles.

1. Include plans, elevations, and attachment details. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
2. Include section, and details of foundation system.

C. Samples for Verification: For each type of exposed finish, in manufacturer's standard sizes.

D. Delegated-Design Submittal: For flagpoles.

E. Submit copy of delegated design calculations to meet project wind speed specified on structural drawings and as required by Florida Building Code – Building for the project location.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design flagpole assemblies.

B. Seismic Performance: Flagpole assemblies shall withstand the effects of earthquake motions determined according to Florida Building Code 2017.

C. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.

1. Wind Loads: Determine according to NAAMM FP 1001. Basic wind speed for Project location is per structural drawings or Florida Building Code – Buildings if not specified.
2. Base flagpole design on **nylon or cotton** flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.3 ALUMINUM FLAGPOLES

A. Aluminum Flagpoles: Entasis-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm).

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

    a. American Flagpole.
    b. Concord Industries, Inc.
    c. Morgan-Francis Flagpoles and Accessories.
    d. U.S. Flag & Flagpole Supply, LP.

B. Exposed Height: **35 feet (11 m)**.

C. Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:

1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

D. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, 0.060-inch (1.52-mm) wall thickness with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch-(19-mm-) diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.

1. Flashing Collar: Same material and finish as flagpole.

E. Sleeve for Aluminum Flagpole: Fiberglass or PVC pipe foundation sleeve, made to fit flagpole, for casting into concrete foundation.

1. Flashing Collar: Same material and finish as flagpole.

F. Cast-Metal Shoe Base: Made from aluminum with same finish and color as flagpoles for anchor-bolt mounting; furnish with anchor bolts.

1. Furnish ground spike.

G. Hinged Baseplate: Cast-metal tilting hinged base and anchor plate joined by permanently secured pivot rod. Furnish with stainless-steel screws for securing tilting base to anchor plate when not tilted; furnish with anchor bolts.

1. Finish: Same as flagpole.
2. Furnish aluminum base or aluminum flashing collar finished to match flagpole.
3. Furnish ground spike.

H. Pivoting Tilt Base: Steel baseplate with channel or rectangular tube uprights, pivot bolt, and locking device for tilting flagpole. Furnish tilting flagpole with steel counterweight box and weights, or furnish with internal counterweight. Furnish base with anchor bolts.

1. Finish: Same as flagpole.
2. Furnish ground spike.

2.4 FITTINGS

A. Finial Ball: Flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch (1.6-mm) spun aluminum, finished to match flagpole with gold anodic finish.

B. Internal Halyard, Cam Cleat System: **5/16-inch- (8-mm**-) diameter, braided polypropylene halyard; cam cleat; and concealed revolving truck assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

1. Halyard Flag Snaps: **Stainless-steel** swivel snap hooks. Furnish two per halyard.

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

B. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

C. Sand: ASTM C 33/C 33M, fine aggregate.

D. Elastomeric Joint Sealant: Single-component neutral-curing silicone joint sealant complying with requirements in Section 07 92 00 "Joint Sealants."

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41.

B. Gold Anodic Finish: AAMA 611, AA-M32C22A43; gold color.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

F. Anchor Bolts: Locate and secure anchor bolts in forms with templates and by tying to reinforcement.

G. Place concrete, as specified in **Section 03 30 00 "Cast-in-Place Concrete."** Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

H. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where indicated and according to **Shop Drawings and** manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.

END OF SECTION 10 75 16

SECTION 12 22 00 - CURTAINS AND DRAPES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Drapes.
2. Drapery tracks.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Drapery Tracks: Include maximum weights of drapes that can be supported.
2. Fabrics.
3. Textile treatments.

B. Shop Drawings:

1. Drapery Tracks: Show installation and anchorage details and locations of controls.
2. Drapes: Show sizes, locations, and details of installation.

C. Samples: As follows:

1. Drapery Tracks: 18 inches (450 mm) long, with carriers, controls, and accessories.
2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches (1000 mm) long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
3. Textile Trims: For each color and pattern indicated, 18 inches (450 mm) long.
4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.

D. Samples for Initial Selection: For each type of product indicated.

E. Samples for Verification: As follows:

1. Drapery Tracks: 18 inches (450 mm) long, with carriers, controls, and accessories.
2. Drapery Fabrics: For each color and pattern indicated, full width by 36 inches (1000 mm) long, from dye lot to be used for the Work and with specified textile treatments applied. Show complete pattern repeat if any. Mark top and face of fabric.
3. Textile Trims: For each color and pattern indicated, 18 inches (450 mm) long.
4. Drape Fabrication: For each heading, fabric, color, and pattern indicated, a complete full-size panel to verify details of fabrication and thread colors.

F. Product Schedule: For drapes and drapery tracks. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For drapery track installation; reflected ceiling plans drawn to scale and coordinating track installation with openings and ceiling-mounted items, on which the following items are shown:

1. Suspended ceiling components.

B. Product Certificates: For each drapery fabric treated with flame retardant, signed by fabric supplier and indicating treatment durability and cleaning procedures required to maintain treatment effectiveness.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For products installed to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Drapery Track Carriers: For each size indicated, equal to 5 percent of amount installed, but no fewer than 10 of each size.
2. Drapery Track Controls: For each type indicated, equal to 5 percent of amount installed, but no fewer than 10 of each type.
3. Drapery Fabrics: For each fabric, color, and pattern indicated, from the same product run, full-width lengths equal to 5 percent of amount installed, but no fewer than 10 yards of each fabric, color, and pattern.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: For drapes and drapery tracks, fabricator of drapes.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup at location and in size shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before drape fabrication, and indicate measurements on Shop Drawings.

B. Scheduling: Do not deliver or install drapes until after other finish work, including painting, is complete and spaces are otherwise ready for occupancy.

PART 2 - PRODUCTS

2.1 DRAPERY TRACKS

A. Manually Operated Track

1. Manufactures:
    1) DFB Sales Inc. (Basis of Design)
    2) Forest Group USA, Inc.
    3) Kirsch Window Fashions; a Newell Rubbermaid brand
    4) Springs Window Faschions; SWFcontract

2. Construction: Extruded aluminum, slotted for mounting at interval of not more than 24 inches (610 mm) o.c.

    a. Lengths and Configurations: As indicated on Drawings
    b. Support Capability: Weight of drape indicated-mounted on track length indicated as per manufacturer recommendation.
    c. Finish: Manufacturer's standard

3. Mounting Brackets: Aluminum, of type suitable for fastening track to surface indicated and designed to support weight of track assembly and drape plus force applied to operate track.

    a. Mounting Surface: As indicated on Drawings
    b. Size: Adjustable

4. Installation Fasteners: Sized to support track assembly and drape, and fabricated from metal compatible with track, brackets, and supporting construction. Provide two fasteners to fasten each bracket to supporting construction.

5. Carriers: Coordinate with drapery headings indicated

2.2 DRAPES

A. Manufacturer:
    1) DFB Sales Inc., (Basis of Design)
    2) County Draperies, Inc.
    3) Fabtex

B. Source Limitations: Obtain each color and pattern of drapery fabric and trim from one dye lot.

C. Fire-Test-Response Characteristics: For fabrics treated with fire retardants, provide products that pass NFPA 701 as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.

D. Drape:

1. Heading:

    a. Pinch (French) Pleats: 150 percent fullness; three-fold (fingers) each pleat.

2. Drapery Fabric: To be selected by Architect
3. Fiber Content: As per Manufacturer recommendation
4. Width: Field verify
5. Pattern Repeat Distance: As per Manufacturer recommendation
6. Textile Treatments: As per Manufacturer recommendation
7. Textile Trim: As per Manufacturer recommendation
8. Tiebacks: To be selected by Architect
9. Hem Weights: As per Manufacturer recommendation

2.3 DRAPE FABRICATION

A. Fabricate drapes in heading styles and fullnesses indicated. Fabricate headings to stand erect. If less than a full width of fabric is required to produce panel of specified fullness, use equal widths of not less than one-half width of fabric located at ends of panel.
1. Center-Opening Drapes: Add 10 inches (254 mm) to overall width for overlap.

B. Seams: Sew vertical seams with twin-needle sewing machine with selvage trimmed and overlocked. Join widths so that patterns match and vertical seams lay flat and straight without puckering. Horizontal seams are unacceptable.

C. Side Hems: Double-turned, 1-1/2-inch- (38-mm-) wide hems consisting of three layers of fabric, and blindstitched so that stitches are invisible on face of drape.

D. Bottom Hems: Double-turned, 4-inch- (102-mm-) wide hems consisting of three layers of fabric, and weighted and blindstitched so that weights and stitches are invisible on face of drape.

1. Sew in square lead weights at each seam and at panel corners.

E. Interlinings: Extend from top of drape to within 1/2 inch (13 mm) of lining's bottom hem and to leading edge of side hems to produce full-shadowed appearance.

F. Linings: Equal to widths of drapery fabric and joined to drapery fabric at top by inside invisible seam, and hand stitched at side hems and shadowed with 1-1/2-inch (38-mm) return of face fabric.

1. Bottom Hem: Blind stitch to drapery fabric.

PART 3 - EXECUTION

3.1 DRAPERY TRACK INSTALLATION

A. Install track systems according to manufacturer's written instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.

B. Isolate metal parts of tracks and brackets from concrete, masonry, and mortar to prevent galvanic action. Use tape or another method recommended in writing by track manufacturer.

3.2 DRAPE INSTALLATION

A. Where drapes abut overhead construction, hang drapes so that clearance between headings and overhead construction is 1/4 inch (6.4 mm).

B. Where drapes extend to floor, install so that bottom hems clear finished floor by not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm).

C. Where drapes extend to windowsill, install so that bottom hems hang above sill line and clear sill line by not more than 1/2 inch (13 mm).

3.3 ADJUSTING

A. After hanging drapes, test and adjust each drapery track to produce unencumbered, smooth operation.

B. Steam and dress down drapes as required to produce crease- and wrinkle-free installation.

C. Remove and replace drapes that are stained or soiled.

END OF SECTION 12 22 00

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 10 inches (250 mm) square. Mark interior face of material if applicable.
2. Roller Shade: Full-size operating unit, not less than 16 inches (400 mm) wide by 36 inches (900 mm) long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.

F. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material.

C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.

B. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

E. Requirements for Roller Shade Installer/Contractor:
1. Roller Shade Hardware, shade fabric, and related controls shall be furnished and installed as a complete two-way communicating system and assembly.

F. Mock-Up: Provide a mock-up of one roller shade assembly for evaluation of mounting, appearance and accessories.
1. Locate mock-up in window designated by Architect.
2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY

A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five year limited warranty.

B. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.

C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. **Basis of Design Manufacturer: MechoShade Systems, Inc.,** which is located at: 42-03 35th St.; Long Island City, NY 11101; Tel: 718-729-2020; Fax: 718-729-2941; Email: glenb@MechoSystems.com; Web: www.mechoshade.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

C. MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

D. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

~~1.~~ Bead Chains: Manufacturer's standard

~~a.~~ Loop Length: Full length of roller shade
~~b.~~ Chain-Retainer Type: Chain tensioner, jamb mounted

E. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right side of interior face of shade.
2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller
~~3.~~ Shadeband-to-Roller Attachment: Manufacturer's standard method

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

H. Shadebands:

1. Shadeband Material: Light-blocking fabric
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

~~a.~~ Type: Enclosed in sealed pocket of shadeband material
b. Color and Finish: As selected by Architect from manufacturer's full range

I. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.

a. Shape: L-shaped
b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm)

2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.

a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm)

2.2 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701 Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

1. Source: Roller shade manufacturer
2. Thickness: As per manufacturer recommendation.
3. Weight: As per manufacturer recommendation.
~~4.~~ Roll Width:72 inches (1829 mm)
~~5.~~ Orientation on Shadeband: Up the bolt
6. Features: Washable
7. Color: As selected by Architect from manufacturer's full range

2.3 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated,

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Roller Shade Locations: As indicated on Drawings

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

SECTION 14 24 00 – MACHINE ROOM-LESS HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Hydraulic passenger elevators as shown and specified. Elevator work includes:
   1. Standard pre-engineered hydraulic passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Jack(s).
   4. Operation and control systems.
   5. Accessibility provisions for physically disabled persons.
   6. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   7. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
   2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
   3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
   4. Division 5 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   6. Division 22 Plumbing:
      a. Sump pit and oil interceptor.
   7. Division 23: Heating and Ventilation:
      a. Heating and ventilating hoistways.
   8. Division 16 Sections:
      a. Providing electrical service to elevators. (note: fused disconnect switch to be provided as part of elevator manufacture product, see section 2.11 Miscellaneous elevator components for further details.)
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in hoistway and pit.

C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.
   1. Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.
   2. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.
   3. Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point.
   4. Elevator hoistways shall have barricades, as required.
   5. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
   6. Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports,

provide divider beams between hoistway at each floor and roof.

7. Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.
8. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.
9. All wire and conduit should run remote from the hoistways.
10. When heat, smoke or combustion sensing devices are required, connect to elevator control cabinet terminals. Contacts on the sensors should be sided for 12 volt D.C.
11. Install and furnish finished flooring in elevator cab.
12. Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.
13. Where sheet rock or drywall construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Drywall contractor to coordinate with elevator contractor.
14. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
15. To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.
16. The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.
17. General Contractor shall fill and grout around entrances, as required.
18. All walls and sill supports must be plumb where openings occur.
19. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.
20. Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Typically this will be at the landing above the 1st floor. Final location must be coordinated with elevator contractor.
21. As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway.
22. For signal systems and power operated door: provide ground and branch wiring circuits.
23. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
24. Controller landing wall thickness must be a minimum of 8 inches thick. This is due to the controller being mounted on the second floor landing in the door frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). These requirements must be coordinated between the general contractor and the elevator contractor.
25. Cutting, patching and recesses to accommodate hall button boxes, signal fixtures, etc..

1.2 SUBMITTALS

A. Product data: When requested, the elevator contractor will provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:
1. Show equipment arrangement in the pit and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.

4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Powder Coat Paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.

D. Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:
1. Owners Manual and Wiring Diagrams.
2. Parts list, with recommended parts inventory.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer with minimum fifteen years experience in manufacturing, installing, and servicing commercial elevators.
1. Must be the manufacturer of the power unit, controller, signal fixtures, door operators cab, entrances, and all other major parts of the elevator operating equipment.
   a. The major parts of the elevator equipment shall be manufactured in the United States, and not be an assembled system.
2. The manufacturer shall have a documented, on-going quality assurance program.
3. ISO-9001:2000 Manufacturer Certified.
4. ISO-14001:2004 Environmental Management System Certified.
5. LEED Gold certified elevator manufacturing facility.

B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than fifteen years of satisfactory experience installing elevators equal in character and performance to the project elevators.

C. Regulatory Requirements:
1. ASME/ANSI A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
2. Building Code: National.
3. NFPA 70 National Electrical Code.
4. NFPA 80 Fire Doors and Windows.
5. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
6. CAN/CSA C22.1 Canadian Electrical Code.
7. CAN/CSA B44 Safety Code for Elevators and Escalators.
8. California Department of Public Health Standard Method V1.1–2010, CA Section 01350

D. Fire-rated Entrance Assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(B), and NFPA 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).

E. Inspection and testing: Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
1. Arrange for inspections and make required tests.
2. Deliver to the Owner upon completion and acceptance of elevator work.

F. Product Qualifications:
1. LCA, EPD and HPD data must be provided for all major components of the elevator system.
2. LCA data must be compatible with GaBI Software.
3. Environmental Product Declaration (EPD): Publicly available, critically reviewed life cycle analysis having at least a cradle-to-gate scope.
4. GreenScreen Chemical Hazard Analysis: All ingredients of 100 parts-per-million or greater

evaluated using GreenScreen for Safer Chemicals Method v1.2.

5. Health Product Declarations (HPD v2 or later): Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-line tool; Unknown hazard listed will not be considered acceptable.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Manufacturing will deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.5 PROJECT CONDITIONS

A. Prohibited Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

1.6 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after completion of installation or acceptance thereof by beneficial use, whichever is earlier.

1.7 MAINTENANCE

A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours, excluding callbacks. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation.

1. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: ThyssenKrupp Elevator

2.2 MATERIALS, GENERAL

A. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD, and shall meet the California Department of Public Health Standard Method V1.1–2010, CA Section 01350 as mentioned in 1.03.9 of this specification.

B. Colors, patterns, and finishes: As selected by the Architect from manufacturer's standard colors, patterns, and finish charts.

C. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.
   3. Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts. Color selection must be based on elevator manufacture’s standard selections

D. Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness. Laminate selection must be based on elevator manufacture’s standard selections.

E. Carpet: By others.

2.3 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood subfloor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

B. Sling: Steel stiles affixed to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.

C. Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.

D. Guide Shoes: Slide guides shall be mounted on top and bottom of the car.

E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on a steel template that is fastened to the pit floor. Provide extensions if required by project conditions.

F. Jack: Jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to insure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction. Provide the following jack type: Twin post holeless telescopic 2-stage. Two jacks piped together, mounted one on each side of the car with each having two telescopic sections designed to extend in a synchronized manner when oil is pumped into the Assembly. Each jack section will be guided from within the casing or the plunger assembly used to house the section. Each plunger shall have a high pressure sealing system which will not allow for seal movement or displacement during the course of operation. Each Jack Assembly shall have a check valve built into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in the section.

G. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the landings and correct for overtravel or undertravel. Self-leveling shall, within its

zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

H. Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. Provide proper grade readily biodegradable oil as specified by the manufacturer of the power unit (see Power Unit section 2.04.G for further details).

I. Pit moisture/water sensor located approximately 1 foot above the pit floor to be provided. Once activated, elevator will perform “flooded pit operation”, which will run the car up to the designated floor, cycle the doors and shut down and trip the circuit breaker shunt to remove 3 phase power from all equipment, including pit equipment.

J. Motorized oil line shut-off valve shall be provided that can be remotely operated from the controller landing service panel. Also, a means for manual operation at the valve in the pit is required.

2.4 POWER UNIT

A. Power Unit (Oil Pumping and Control Mechanism): A self-contained unit located in the elevator pit consisting of the following items:
1. NEMA 4/Sealed Oil reservoir with tank cover including vapor removing tank breather
2. An oil hydraulic pump.
3. An electric motor.
4. Electronic oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.

B. Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.

C. Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating – motors shall be capable of 80 starts per hour with a 30% motor run time during each start.

D. Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.
1. Relief valve shall be adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.
2. Up start and stop valve shall be adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, ensuring smooth up starts and up stops.
3. Check valve shall be designed to close quietly without permitting any perceptible reverse flow.
4. Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.
5. Provided with constant speed regulation in both up and down direction. Feature to compensate for load changes, oil temperature, and viscosity changes.

E. Solid State Starting: Provide an electronic starter featuring adjustable starting currents.

F. A secondary hydraulic power source (powered by 110VAC single phase) must be provided. This is required to be able to raise (reposition) the elevator in the event of a system component failure (i.e. pump motor, starter, etc.)

G. Oil Type: Readily biodegradable that is USDA certified biobased product, ultra low toxicity, readily

biodegradable, energy efficient, high performing fluid made from canola oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives. Especially formulated for operating in environmentally sensitive areas. USDA certified biobased product, 95% bio-based content, per ASTM D6866.

2.5 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
   1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates, sight guards, and necessary hardware.
   2. Main landing door & frame finish: Stainless steel panels, no. 4 brushed finish
   3. Typical door & frame finish: Stainless steel panels with no. 4 brushed finish.

B. Integrated Control System: the elevator controller to be mounted to hoistway entrance above 1st landing. The entrance at this level, shall be designed to accommodate the control system and provide a means of access to critical electrical components and troubleshooting features. See section 2.09 Control System for additional requirements.

C. At the controller landing, the hoistway entrance frame shall have space to accommodate and provide a lockable means of access (group 2 security) to a 3 phase circuit breaker. See section 2.11 Miscellaneous Elevator Components for further details.

D. Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.

E. Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

F. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.6 CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type TKLP, durable wood core finished on both sides with material finish selected by architect.
   2. Canopy: Cold-rolled steel with hinged exit.
   3. Ceiling: Suspended type, lighting and material selected by architect.
   4. Cab Fronts, Return,Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
   5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
      a. Door Finish: Stainless steel panels: No. 4 brushed finish.
      b. Cab Sills: Extruded aluminum, mill finish.
   6. Handrail: Provide 1.5" diameter cylindrical metal on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, no. 4 brushed finish.
   7. Ventilation: Manufacturer’s standard exhaust fan, mounted on the car top.

B. Car Top Inspection: Provide a car top inspection station with an “Auto-Inspection” switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station will give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.7 DOOR OPERATION

A. Door Operation: Provide a direct current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. Closed-loop, microprocessor controlled motor-driven linear door operator, with adjustable torque limits, also acceptable. AC controlled units with oil checks or other deviations are not acceptable.

1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel will reverse and the door will reopen to answer the other call.
4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer will sound. When the obstruction is removed, the door will begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors will stop and resume closing only after the obstruction has been removed.
5. Limited Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors will reverse and reopen partially. After the obstruction is cleared, the doors will begin to close.
6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors will recycle closed then attempt to open six times to try and correct the fault.
7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors will recycle open then attempt to close six times to try and correct the fault.
8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door Protection Devices: Provide a door protection system using 150 or more microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.8 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Swing return shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED’s shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.

B. Emergency Communications System: Integral phone system provided.

C. Auxiliary Operating Panel: Not Required

D. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel.

The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

E. Special Equipment: Not Applicable

2.9 CONTROL SYSTEMS

A. Controller: Shall be integrated in a hoistway entrance jamb. Should be microprocessor based, software oriented and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

B. Service Panel – to be located outside the hoistway in the controller entrance jamb and shall provide the following functionality/features:
1. Access to main control board and CPU
2. Main controller diagnostics
3. Main controller fuses
4. Universal Interface Tool (UIT)
5. Remote valve adjustment
6. Electronic motor starter adjustment and diagnostics
7. Operation of pit motorized shut-off valve with LED feedback to the state of the valve in the pit
8. Operation of auxiliary pump/motor (secondary hydraulic power source)
9. Operation of electrical assisted manual lowering
10. Provide male plug to supply 110VAC into the controller
11. Run/Stop button

C. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

D. Special Operation: Not Applicable

E. Emergency Power Operation: (Battery Lowering 10-DOC) When the loss of normal power is detected, a battery lowering feature is to be activated. The elevator will lower to a predetermined level and open the doors. After passengers have exited the car, the doors will close and the car will shutdown. When normal power becomes available, the elevator will automatically resume operation. The battery lowering feature is included in the elevator contract and does not utilize a building-supplied standby power source.

2.10 HALL STATIONS

A. Hall Stations, General: Provide buttons with red-illuminating LED halos to indicate that a call has been registered at that floor for the indicated direction. Provide 1 set of pushbutton risers. Provide one pushbutton riser with faceplates having a brushed stainless steel finish
1. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Hall Position Indicator: Not Applicable

D. Hall lanterns: Not Applicable

E. Special Equipment: Not Applicable

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

A. Oil Hydraulic Silencer: Install multiple oil hydraulic silencers (muffler device) at the power unit location. The silencers shall contain pulsation absorbing material inserted in a blowout proof housing.

B. Lockable three phase circuit breaker with auxiliary contact with shunt trip capability to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb and should be sized according to the National Electrical Code.

C. Lockable single phase 110V circuit breaker for cab light and fan to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb should be sized according to the National Electrical Code.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and control space, as constructed and verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

C. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

D. Lubricate operating parts of system where recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required by A17.1 Code and local authorities having jurisdiction. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.4 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates

smoothly and accurately.

3.5 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless stall shall be cleaned with soap and water and dried with a non-abrasive surface; shall not be cleaned with bleached-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
   1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.6 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.7 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.8 ELEVATOR SCHEDULE

A. Elevator Qty. 1
   1. Elevator Model: enduraMRL Above-Ground (2-Stage)
   2. Rated Capacity: 2100 lbs.
   3. Rated Speed: 80 ft./min.
   4. Operation System: TAC32
   5. Travel: 14'-0"
   6. Landings: 3 total
   7. Openings:
      a. Front: 3
      b. Rear: 1
   8. Clear Car Inside: 5' - 8" wide x 4' - 3" deep
   9. Cab Height: 8'-0" nominal
   10. Hoistway Entrance Size: 3' - 0" wide x 7'-0" high
   11. Door Type: Single Speed
   12. Power Characteristics: 460 volts, 3 Phase, 60 Hz.
   13. Seismic Requirements: Zone 1
   14. Fixture & Button Style: Signa4 Signal Fixtures
   15. Special Operations: None

3.9 SPECIAL CONDITIONS (Note: Add Special Conditions as Needed)

END OF SECTION 14 21 23.16

DIVISION 21 – FIRE SUPPRESSION

SECTION 21 13 00 – FIRE SUPPRESSION SPRINKLER SYSTEM

PART I - GENERAL

SCOPE:

The Contractor shall modify the existing automatic fire sprinkler system to accommodate the new floor plan as shown on the drawings and as specified herein. Systems shall remain a dry pipe type system. Piping shall be hydraulically calculated to provide a flow density over the most hydraulically remote area as specified on the drawings. The drawings are intended to convey general areas of coverage. Actual sprinkler head layout is delegated to the Professional Engineer producing the working drawings in accordance with Florida Administrative Code 61G15-30.006. The delegate engineer shall ensure the working drawings comply with the requirements of NFPA 13 as well as all other applicable codes and regulations. Sprinkler layout shall be coordinated with the architectural reflected ceiling plan. Variation from the ceiling plan must be approved by the architect.

CODES AND STANDARDS:

a. Installation shall conform to the following codes and standards:

1) NFPA 13, Sprinkler Systems, 2007
2) NFPA 24 , Private Fire Service Mains and Their Appurtenances, 2007
3) State and Local Codes

SUBMITTALS:

a. Submittal data shall be submitted on the following items:

1) Working Drawings: Submit drawings for fabrication and erection not fully described by manufacturer's data. Include plans and elevations at not less than 1/8" to 1'0" scale, details at not less than 3/4" to 1'0" scale. Indicate required anchorage and accessory items, field dimensions and finishes. Indicate construction details, methods of assembly and fastening, relationship and arrangement of piping, sprinklers, valves, and alarms. Submit in accordance with NFPA 13, Chapter 22 and as required by the Authority Having Jurisdiction. Do not start fabrication or construction until after review of approved drawings by the Engineer of Record. Piping shall not be substantially rerouted or pipe sizes changed without prior written approval from the Architect.
2) Sprinkler Heads
3) Valves and Alarms
4) Pipe and Fittings
5) Fire Department Connections
6) Hangers

MATERIALS:

a. Sprinklers:

1) Sprinklers below finished ceilings shall be quick response concealed pendant 1/2-inch orifice, UL listed types having a natural brass finish. Temperature rating shall be 165°F. K value shall be approximately 5.6. Both standard and extended coverage heads may be used. Provide sidewall sprinklers where indicated on drawings. Sprinkler locations shall be coordinated with reflected ceiling plan, mechanical, electrical and plumbing systems.

2) Sprinklers in areas having no finish ceilings shall be standard upright, 1/2-inch UL listed 165°F temperature rated types having brass finish, except in mechanical rooms and near heaters or duct outlets where sprinklers having an intermediate temperature rating shall be used. K value shall be approximately 5.6.

3) A stock of sprinklers shall be furnished in accordance with NFPA 13 6.2.9. working drawing shall clearly delineate the types and number of sprinklers by type. Provide a suitable spare sprinkler cabinet and necessary sprinkler wrenches.

b. Valves: Existing system to remain where possible. If new valves are required they shall comply with the following specification.

1) OS&Y valves, gate valves, butterfly valves, and check valves shall be UL listed types. Shut-off valves installed inside the building shall be provided with a factory installed integral electric tamper switch. Shut-off valves installed outside the building shall be provided with a chain and lock.
2) Double check valve backflow preventer shall be UL listed and shall comply with AWWA C506-78(R83) and AWWA Manual 14.

c. Pipe and Fittings:

1) Exposed Piping: Piping for the exposed sprinkler systems shall be UL listed ferrous meeting the requirements of NFPA 13:6.3 Above Ground Pipe and Tube. Groove joint systems are acceptable.
2) Concealed Piping: Piping for the concealed sprinkler systems shall be UL listed ferrous or non-ferrous meeting the requirements of NFPA 13:6.3 Above Ground Pipe and Tube. Groove joint systems are acceptable.
3) Fittings (Inside Piping): Fittings for the sprinkler systems shall be UL listed ferrous or non-ferrous as appropriate for selected piping meeting the requirements of NFPA 13:6.4 Fittings. Holes for welded fittings shall be sawn or machine cut prior to placement of the fitting.
4) Underground: Underground piping shall be UL listed meeting the requirements of NFPA 13:10.1 Piping Materials.
5) Fittings and Coupling (Underground Piping): Fittings for underground piping shall be UL listed meeting the requirements of NFPA 13:10.2 Fittings.

d. Alarms:

Tamper switches, pressure switches and flow switches shall be UL listed. Alarm item shown shall be furnished and installed by the fire protection contractor. Interlock with fire alarm system shall be furnished under the electrical section.

e. Hangers:

Suitable UL listed hangers shall be provided in accordance with NFPA 13:9.0.

INSTALLATION:

a. Contractor shall begin his work at the existing entry riser and modify system as necessary to meet new requirements.

b. Install schedule 10 steel pipe sleeves at all wall and floor penetrations. Sleeves shall be caulked with a UL listed fire stopping caulk.

c. All piping shall be arranged to drain to main riser or suitable auxiliary drains or plugged outlets in accordance with NFPA 13:8.16.2.

d. Escutcheon plates having a chrome finish shall be provided for all exposed wall and ceiling penetrations. Escutcheons shall be split type with locking screw.

e. Coordinate pipe routing with duct routing, equipment locations, electrical installations, and building structural members, offset piping where required to avoid conflicts avoid penetrating any main structural beam. Notify Architect of any conflicts.

END OF SECTION

DIVISION 22 - PLUMBING

SECTION 22 00 00 - PLUMBING

SCOPE

This section of specifications covers plumbing systems complete as shown on the drawings and as specified herein. All systems shall be tested, balanced and made ready for operation.

PART I - GENERAL

CODES, ORDINANCES AND PERMITS:

General: Where requirements of these specifications exceed specified codes and ordinances, conform to these specifications. Materials and equipment included in Underwriters' Label Service shall bear that label. Electrical equipment shall be UL approved as installed, unless noted otherwise herein.

Codes: The work covered under this section of specifications shall conform to the following codes as applicable:

Florida Building Code- Building, 6th Edition
Florida Building Code - Mechanical, 6th Edition
Florida Building Code - Plumbing, 6th Edition

SUBMITTALS:

General: All equipment and materials shall be new and of best grade. Review of all equipment and materials from the Architect and Engineer shall be obtained by the Contractor before any equipment is ordered.

Submittal Data: The Contractor shall check data carefully to insure compliance with these specifications prior to submitting. Submittal data shall be submitted at one time in one Portable Data Format (pdf) electronic file. Data shall include complete installation instructions, dimensional data, and electrical data, as applicable.

The file shall contain a cover sheet with project title, Architect, Engineer, and Contractor's names and contact information. The submittal shall include an index sheet listing the tab numbers. Submittals not prepared as specified herein will be returned to the Contractor for resubmittal.

Submittal data shall be prepared to include the following:

Plumbing fixtures
Piping and fittings
Floor drains
Clean outs
Pressure reducing valves
Water heaters

SUBSTITUTIONS:

Basis of Design: Model numbers indicated herein or shown on the drawings are the Basis of Design. The Contractor may substitute equal and approved equipment from manufacturers listed in this specification or set forth in an addendum provided said equipment meets all requirements of the plans and specifications, has like electrical characteristics (e.g., same voltage, phase, fusing/circuit breaker requirements, single or multiple points of connection as indicated on the electrical drawings), and will fit in the available spaces in the building

as shown. If the Contractor chooses to provide equipment which meets all of the aforementioned requirements, but has different electrical characteristics, he shall bear all costs associated with that substitution including, but not limited to, breakers, fuses, disconnects, wiring, conduits, panels, starters, contactors, and the like. All electrical connections shall be coordinated with the Engineer and with the electrical subcontractor.

Prior Approval: Substitutions of specified items will be considered only if written request has been submitted to the Architect and Engineer for review at least ten days prior to the receipt of bid proposals. Each request shall include a description of the proposed substitute, the name of material or equipment for which it is to be substituted, drawings, cuts, performance and test data for an evaluation and a statement from the equipment manufacturer's representative that the items to be substituted meet or exceed the specifications of the item substituted for.

Addenda: If the substitution is allowed, such approval will be set forth in an addendum.

Costs: All costs incurred by the acceptance of substitutions shall be borne by the Contractor.

MANUFACTURER'S RECOMMENDATIONS:

The assembly, erection, testing, and adjusting of equipment shall be in strict accordance with the manufacturer's published instructions shipped with the equipment.

GUARANTEE, WARRANTIES AND INSTRUCTIONS:

Guarantee: All equipment and materials furnished and all work performed under this section of specifications shall be guaranteed to be free of defective materials and workmanship for a period of one year (unless a longer period is specified elsewhere herein) after final acceptance of the work by the Owner. Upon notice from the Owner of failure of any part of the guaranteed equipment or failure of systems to operate properly. During the guarantee period, the affected part or parts shall be promptly replaced with new parts by the Contractor at no additional cost to the Owner. All labor required to perform guarantee shall be included as part of the complete guarantee warranty.

Warranties: Provide manufacturer's equipment warranties prior to final inspection. See other paragraphs in this section of specifications for specific equipment warranties.

Instructions: Instruct operating personnel designated by the Owner in operation of all systems included in this section of specifications. Provide signed statement certifying instructions have been received. Frame sequence of operation under glass or plastic and mount on wall as directed by the Owner.

DRAWINGS:

General: Both the drawings and specifications shall be considered supplemental to one another so that materials and labor required by one but not by the other shall be supplied and installed as though specifically called for by both. Where drawings and specifications conflict, the Contractor shall conform to the more stringent requirements.

Scaling: The drawings are diagrammatic only and show generally the location of the equipment, ducts and pipes, but are not to be scaled. All dimensions shall be verified at the building site. Prefabrication of work from the drawings shall be at the Contractor's risk.

SPACE CONDITIONS:

All equipment and materials shall fit into the available spaces in the building and must be introduced into the building so as not to cause damage to the structure. All equipment normally requiring service shall be made readily accessible by access panels, access doors, etc. Equipment located above lift-out ceilings shall be considered to be accessible.

MOISTURE INTEGRITY:

Roof: All roof penetrations shall be watertight.

Wall: All wall fans, louvers, pipe sleeves, and all other wall penetrations shall be watertight.

CUTTING AND PATCHING:

Cutting and patching in connection with the installation shall be done by the trade whose work is to be cut and patched. The Contractor shall lay out and install his work ahead of the work of other trades whenever possible.

PROTECTION OF MATERIALS AND EQUIPMENT:

During Construction: Pipe openings shall be closed with caps or plugs. All equipment shall be covered and protected against water, dirt and chemical and mechanical injury. All equipment and material shall be stored in accordance with manufacturer's recommendations.

Prior to Final Inspection: All materials and equipment shall be cleaned. Chipped or scraped paint shall be retouched to match.

Equipment Painting: Equipment which has been damaged beyond the point of retouching or has been retouched not to match shall be repainted in accordance with Painting Section.

EXCAVATION AND BACKFILL; CUTTING AND PATCHING:

The excavation and backfill for the installation of the plumbing system shall be done in accordance with the requirements of these specifications. All junk metal shall be removed from the site before filling. The bottoms of all pipe trenches in rock or very hard strata shall be excavated a minimum of 6" below the pipe bottoms and refilled with 7" or more of sand and gravel, tamped in place. When ditches are excavated in cinders, organic soils or other injurious materials, these materials shall be excavated a minimum of 6" below the bottom of the pipe line and replaced with inorganic soil. The backfill shall be tamped in 4" layers along the sides of the pipe and for at least 1" above the pipe. The remainder shall be tamped in 6" layers except beneath walks and roads where 4" layers should be used. Contractor shall provide shoring for installation of piping over six (6) feet deep. Contractor shall provide dewatering to keep trenches dry during installation of piping.

PIPING SYSTEM:

Provide and install a complete piping system as shown on the drawings and as specified herein.

Piping:

Water Piping; Domestic Hot and Cold: Schedule 40 CPVC.

Concealed Building Soil, Drain, Waste, Storm, condensate and Vent Piping: DWV-PVC.

Clear Water Drain Piping : DWV-PVC.
.

Grades:

Interior horizontal drainage piping of less than 3" diameter shall be installed with fall of not less than 1/4" per ft. Drainage piping 3" diameter and larger shall be installed with fall of not less than 1/8" per foot, unless otherwise shown.

Exterior horizontal drainage piping shall be installed with minimum fall as described in foregoing paragraph, unless otherwise noted.

Water piping shall be graded for drainage with valves at low points.

Fixture Connections: (except where selected models do not allow)

Water Closets: 4" stub with closet flange and preformed wax setting ring. Provide brass mounting bolts.

Lavatories: 1-1/4" arm.

Counter Sinks: 1-1/2 arm with

Hot and Cold Water Supply Piping to Fixtures: 3/8" brass piping, chrome plated when exposed.

Identification of Piping:

Piping shall be labeled with snap-on pipe markers equal to Seaton "Setmark" pipe markers. Height of letters shall be1/2". Install pipe markers every 15 feet and within 2 feet of each tee branch and valve and at least once in each space where piping is exposed. Colors and legend shall be:

System	Legend	Background Color	Letter Color
Cold Water	Cold Water	Green	Black
Hot Water	Hot Water	Yellow	Black
Recirc. Tempered Water	TW Return	Yellow	Black

VALVES, COCKS AND SPECIALTY ITEMS:

Provide and install as shown on the plans and as specified herein.

	2" and Smaller	
Ball Valves: 400 psi WOG; full port, 3-pc. construction, blow-out proof stem, threaded ends.	Nibco Apollo Pittsburgh Watts	595 82 SP-B B6800
Wall Hydrant:	Zurn	Z-1335

Hose Bibbs: Chrome plated; provide WATTS 8A with vacuum breaker.

Dielectric Unions: Install where ferrous and non-ferrous metals join.

Pressure Reducing Valve: Per detail on drawings.

ESCUTCHEON PLATES:

Exposed insulation and uninsulated pipes through floors, walls, and ceilings shall be fitted with chrome plated escutcheon plates. Each plate shall be large enough to completely hide the hole around the pipe. Plates for exposed insulated pipes shall be sized for the outside diameter of the insulation. Plates shall be securely fastened in place.

Dielectric Unions: Install where ferrous and non-ferrous metals join.

INSULATION:

General: This section covers insulation of equipment and piping systems specified in this section.

Contractor shall provide all necessary labor, materials, tools, and equipment to perform the work required on the drawings and herein specified.

Quality Assurance:

Submit manufacturers data sheets and installation instructions for all insulation, adhesives, coatings, cements, tapes, and finish materials for approval before installation.

All insulation, adhesives, coatings, sealers shall have a flame spread of 25 or less and smoke development of 50 or less (exception allowed for foamed plastic insulation outside plenum) as tested by ASTM E-84 and further must meet the requirements of NFPA 90-A where applicable.

All insulation materials shall be delivered and stored in manufacturer's container and kept free from dirt, water, chemical and mechanical damage.

Insulation shall be applied in a workmanlike manner by experienced workmen.

Insulation shall not be applied until all pressure testing has been completed, inspected, and released for insulation application.
Surfaces to be insulated shall be clean and dry.

All insulation joints shall be butted firmly together and all jackets and tapes shall be smoothly and securely installed.

Hot water piping throughout shall be insulated with ½" thick preformed fiberglass pipe insulation, minimum 4 lb. density, K factor of 0.23 at 75°F mean. Jacket shall be factory applied all service jacket with self-sealing lap (ASJ-SSL). Provide ASJ tape where insulation butts. ASJ jacket shall be continuous. Provide precut fiberglass insulation fitting inserts covered with PVC fitting covers. PVC fitting covers shall have a flame spread of 25 or less and a smoke development of 50 or less.

Condensate and clear water drains accepting condensate piping shall be in insulated with ½" thick closed cell insulation: Closed cell 5 lb. minimum density foamed plastic flexible insulation having a thermal conductivity of not more than 0.26 at 75°F. Seal joints with contact adhesive. Finish insulation exposed to view and exposed outdoors with 2 coats of manufacturer approved foamed plastic coating. Allow a minimum of 2 hours drying time between coats.

CLEANOUTS:

Provide cleanouts where shown on the drawings and as follows:

At a maximum spacing of 50' on 3" and smaller lines; at a maximum spacing of 75' on larger lines.

At all changes in building drain directions greater than 45 degrees.

At or near the foot of each vertical waste or soil stack.

All cleanouts shall be accessible and shall be installed allowing a clearance of not less than 18" for the purpose of rodding.

Schedule:

Location	Finish	Josam	Zurn
Finished Floor	Nickel Bronze	56000	ZN-1400
Wall	Stainless Steel	58600	ZS-1468
Outside	Nickel Bronze	56040	ZN-1400-HD

Notes:

Provide carpet markers for cleanouts in carpeted floors. Floor cleanout taps shall be round.
Provide wrench with each type cleanout.
After installation of cleanouts, remove plug, grease threads and replace.
Cleanouts shall be of the same nominal size as the pipe to which they are joined.
Provide 18" x 18" x 6" concrete pad around outside cleanouts.
Other Accepted Manufacturers: Ancon, Smith, Wade.

FLOOR DRAINS:

Schedule:

Type	Zurn	Notes
FD-A	Z-415B	1,2,4,5,7
FD-B	Z-415B	1,3,4,6,7

Notes:
1. 2" connection
2. 5" strainer
3. 7" strainer
4. Sewer gas seal
5. Type "B" strainer
6. Type "E" strainer, vandal-proof secured top
7. Other Accepted Manufacturers: Ancon, Smith, Wade, Josam or Jonespec

Sewer Gas Seals:

General: Provide waterless sewer gas trap seals in lieu of trap primers. Accepted manufacturers include, SureSeal, Mifab., or Trap Guard.

PRESSURE TESTS:

Plumbing and associate systems shall be subjected to constant inspection and final approval of the Architect/Engineer and code authorities having jurisdiction. Tests, in addition to those included in this section required to show compliance, shall be performed as directed.

Test shall be conducted as indicated in the following schedule. The specified test pressure shall be maintained for four hours. There shall be no drop in pressure during the test. All copper piping shall have the joints struck during the test.

Schedule:

Pipe System	Test Pressure	Type Test
Soil, Waste and Vent	10 Ft.	Water Head
Potable Water	150 PSI	Hydrostatic

All work found to be defective or indicating leakage shall be removed and replaced with new materials. Tests shall be repeated until systems are proved tight. Hydrostatic test shall not be conducted in freezing weather. Caulking of screwed and welded joints will not be acceptable.

CLEANING; PROTECTION AND ADJUSTING:

The Contractor shall remove from the job site all debris and left-over materials for which he is responsible, clean all fixtures and equipment and repair any blemishes in the finish. The Contractor shall be held responsible for replacing fixtures where damage results from failure to provide protection.

Adjusting: All fixtures shall be tested to insure proper operation of all working parts and adjusted to provide proper water flow.

MAINTENANCE:

All parts of the plumbing fixtures and associated equipment shall be maintained by the Contractor throughout the guarantee period. One month after final acceptance of the building by the Owner, the Contractor shall go over all fixtures and test all working parts and put everything in working order. All fixtures, including traps, shall be thoroughly cleaned and all parts put in working order. This work is in addition to that involved under the paragraph "Guarantee". Two copies of a report of completion of this requirement shall be forwarded to the Architect.

DOMESTIC WATER HEATING SYSTEM:

Provide and install water heater where shown. UNIT MUST BE COMPLIANT WITH NAECA 2015, 0.95 EF.

EWH: 30 gal. Capacity, dual non-simultaneous 4.5kW elements. Set for 120°F leaving water temperature.

Temperature and Pressure Relief Valve: Provide an ASME approved valve on water heater.

FIXTURE SCHEDULE:

Furnish and install all plumbing fixtures complete with all equipment, fittings, trim and accessories as required for a complete installation. All fixtures shall be Grade A. The name and trademark of the manufacturer shall be printed or pressed on all closets and lavatories. All fixtures shall be thoroughly cleaned after installation. All fixtures listed as handicap shall meet the requirements of ADA.

P1	ADA Security Lav/Water Closet Combo	Acorn Model 1449-RO-2DMS-04-M-1.6GPF-EVSFV-CW-C01-3, ADA approved stainless steel lavatory-water closet combination unit, with elongated bowl, and flush valve. Provide tempering valve for hot water set to 105F.	• Stainless
P2	Security Lav/Water Closet Combo	Acorn Model 1415-CT-2-BP-04-M-1.6GPF-EVSFV-CW-C01-3, Stainless steel lavatory-water closet combination unit, with elongated bowl, and flush valve. Provide tempering valve for hot water set to 105F.	• Stainless
P3	ADA Water Closet	Kohler Model 4405-0, ADA approved white vitreous china water closet, elongated bowl, Sloan Royal Model 111-1.6, 1.6 gpf flush valve, Kohler Model 4670-CA open front seat.	• White
P4	Water Closet	Kohler Model 4406-0, ADA approved white vitreous china water closet, elongated bowl, Sloan Royal Model 111-1.6, 1.6 gpf flush valve, Kohler Model 4670-CA open front seat.	• White
P5	Lavatory	Kohler Model K-2006 vitreous china, white in color, ADA compliant, Zurn model Z1231 concealed arm carrier, T&S Model B-2990-VF05 faucet, chrome grid strainer, Keeney 17 gauge cast brass P-trap with cleanout, ½"x3/8" chrome angle stops and supplies, insulated drain and supply fittings with PVC jacket. ADA compliant. Provide with tempering valve for hot water set to 110F.	• White
P6	Urinal	Kohler Model K-4904-,ET-0 ADA approved white vitreous china urinal, Kohler Model K-13519-CP, 0.5 gpf manual flushometer	• White
P7	Mop Sink	Fiat Model MSBID2424 Service Basin, 24"x24"x10" one piece molded fiberglass basin with 3" ABS drain and tail piece, 830AA wall faucet with support, 889CC mop hanger, 832AA hose and bracket, MSG2424 wall guard and E77AA vinyl bumper guard.	•
P8	Double Basin Stainless Steel Sink	Just Model DL-2233-A-GR 18 gauge stainless steel sink, T&S Model B-2730 faucet with sidespray and chrome basket strainer, ½"x3/8" chrome angle stops. Provide with tempering valve for hot water set to 110F.	• Stainless

GUARANTEE:

All equipment and materials furnished and all work performed under this section shall be guaranteed to be free of defective materials and workmanship for a period of one year after final acceptance of the work by the

Owner. Upon notice from the Owner of failure of any part of the guarantee equipment during the guarantee period, the affected part or parts shall be promptly replaced with new parts by the Contractor at no additional cost to the Owner. All labor required to perform guarantee shall be included as part of the complete guarantee warranty.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 00 00 - HVAC GENERAL PROVISIONS

GENERAL:

Applicable provisions of the General Conditions of the contract and special requirements govern work under this section.

CODES, ORDINANCES AND PERMITS:

General: Where requirements of these specifications exceed specified codes and ordinances, conform to these specifications. Materials and equipment included in Underwriters' Label Service shall bear that label. Electrical equipment shall be UL approved as installed, unless noted otherwise herein.

Codes: The work covered under this section of specifications shall conform to the following codes as applicable:

Florida Building Code- Building, 6th Edition
Florida Building Code - Mechanical, 6th Edition
Florida Building Code - Plumbing, 6th Edition

SUBMITTALS:

General: All equipment and materials shall be new and of best grade. Review of all equipment and materials from the Architect and Engineer shall be obtained by the Contractor before any equipment is ordered.

Submittal Data: The Contractor shall check data carefully to insure compliance with these specifications prior to submitting. Submittal data shall be submitted at one time in one Portable Data Format (pdf) electronic file. Data shall include complete installation instructions, dimensional data, and electrical data, as applicable.

The file shall contain a cover sheet with project title, Architect, Engineer, and Contractor's names and contact information. The submittal shall include an index sheet listing the tab numbers. Submittals not prepared as specified herein will be returned to the Contractor for resubmittal.

Submittal data shall be prepared to include the following:

a. Flex duct
b. Duct and Pipe Insulation
c. Grilles, Registers, and Diffusers
d. Exhaust Fans
e. Chiller
f. Boiler
g. Pump
h. Hydronic specialties
i. Air Handlers
j. Energy recovery Units
k. Fan coils
l. Blower Coils
m. Building Automation System

SUBSTITUTIONS:

Basis of Design: Model numbers indicated herein or shown on the drawings are the Basis of Design. The Contractor may substitute equal and approved equipment from manufacturers listed in this specification or set forth in an addendum provided said equipment meets all requirements of the plans and specifications, has like electrical characteristics (e.g., same voltage, phase, fusing/circuit breaker requirements, single or multiple points of connection as indicated on the electrical drawings), and will fit in the available spaces in the building as shown. If the Contractor chooses to provide equipment which meets all of the aforementioned requirements, but has different electrical characteristics, he shall bear all costs associated with that substitution including, but not limited to, breakers, fuses, disconnects, wiring, conduits, panels, starters, contactors, and the like. All electrical connections shall be coordinated with the Engineer and with the electrical subcontractor.

Prior Approval: Substitutions of specified items will be considered only if written request has been submitted to the Architect and Engineer for review at least ten days prior to the receipt of bid proposals. Each request shall include a description of the proposed substitute, the name of material or equipment for which it is to be substituted, drawings, cuts, performance and test data for an evaluation and a statement from the equipment manufacturer's representative that the items to be substituted meet or exceed the specifications of the item substituted for.

Addenda: If the substitution is allowed, such approval will be set forth in an addendum.

Costs: All costs incurred by the acceptance of substitutions shall be borne by the Contractor.

MANUFACTURER'S RECOMMENDATIONS:

The assembly, erection, testing, and adjusting of equipment shall be in strict accordance with the manufacturer's published instructions shipped with the equipment.

GUARANTEE, WARRANTIES AND INSTRUCTIONS:

Guarantee: All equipment and materials furnished and all work performed under this section of specifications shall be guaranteed to be free of defective materials and workmanship for a period of one year (unless a longer period is specified elsewhere herein) after final acceptance of the work by the Owner. Upon notice from the Owner of failure of any part of the guaranteed equipment or failure of systems to operate properly. During the guarantee period, the affected part or parts shall be promptly replaced with new parts by the Contractor at no additional cost to the Owner. All labor required to perform guarantee shall be included as part of the complete guarantee warranty.

Warranties: Provide manufacturer's equipment warranties prior to final inspection. See other paragraphs in this section of specifications for specific equipment warranties.

Instructions: Instruct operating personnel designated by the Owner in operation of all systems included in this section of specifications. Provide signed statement certifying instructions have been received. Frame sequence of operation under glass or plastic and mount on wall as directed by the Owner.

DRAWINGS:

General: Both the drawings and specifications shall be considered supplemental to one another so that materials and labor required by one but not by the other shall be supplied and installed as though specifically called for by both. Where drawings and specifications conflict, Contractor shall conform to the more stringent requirements.

Scaling: The drawings are diagrammatic only and show generally the location of the equipment, ducts and pipes, but are not to be scaled. All dimensions shall be verified at the building site. Prefabrication of work from the drawings shall be at the Contractor's risk.

SPACE CONDITIONS:

All equipment and materials shall fit into the available spaces in the building and must be introduced into the building so as not to cause damage to the structure. All equipment normally requiring service shall be made readily accessible by access panels, access doors, etc. Equipment located above lift-out ceilings shall be considered to be accessible.

MOISTURE INTEGRITY:

Roof: All roof fans, rooftop equipment, goosenecks, flue caps, curbs, and all other roof penetrations shall be watertight.

Wall: All wall fans, louvers, pipe sleeves, and all other wall penetrations shall be watertight.

CUTTING AND PATCHING:

Cutting and patching in connection with the installation shall be done by the trade whose work is to be cut and patched. The Contractor shall lay out and install his work ahead of the work of other trades whenever possible.

PROTECTION OF MATERIALS AND EQUIPMENT:

Maintenance of Filters: The Contractor shall be responsible for maintaining all air filters [and liquid strainers] until final certificate is issued. No air system shall be operated at any time without air filters and filters shall not be allowed to become overloaded with dust and dirt. For throwaway filters, new clean filters shall be installed, washable filters shall be cleaned. Store 3 extra set of filters on the job site.

During Construction: Pipe openings shall be closed with caps or plugs. All equipment shall be covered and protected against water, dirt and chemical and mechanical injury. All equipment and material shall be stored in accordance with manufacturer's recommendations.

Prior to Final Inspection: All materials and equipment shall be cleaned. Chipped or scraped paint shall be retouched to match. All dents and sags in ductwork and equipment casings shall be straightened.

Equipment Painting: Equipment which has been damaged beyond the point of retouching or has been retouched not to match shall be repainted in accordance with Painting Section.

ELECTRICAL:

General: Motor starters and contactors mounted integral with the equipment shall be furnished and installed under this section of specifications. Starters, contactors, relays and switches required for proper operation of equipment covered under this Division shall be furnished and installed under Division 26 of the specifications. Devices which are a part of the power wiring circuit and which are not integral parts of the equipment shall be furnished and installed under Division 26.

Wiring: All low voltage control and interlock wiring shall be furnished and installed under Division 23 meeting all the requirements set forth for work accomplished under Division 26. Power wiring through the disconnect and starter and to the motor shall be furnished and installed under Division 26.

Electrical Connections: Voltage, phase, and connection arrangement (e.g. single or multiple point) of each item of electrically driven equipment provided under this section of specifications shall conform to that shown on the Electrical drawings.

Motors: All motors shall have rated horsepower at least 15% above indicated brake horsepower of equipment including drive losses, unless otherwise indicated or specified herein.

Motor Characteristics: The motor horsepower, voltages, and phases shown on the drawings and specified herein, are the estimated power requirements of all equipment furnished herein and is the basis of the design shown on the electrical drawings. If the Contractor selects equipment with larger horsepower, different voltages, or phases, he shall coordinate with other trades to provide any additional wiring, circuitry, transformers, etc., as required at no additional cost to the contract.

NAMEPLATES:

General: Provide nameplates for all equipment, motor starters, remote push-button stations, insertion type thermostats, remote bulb thermometers, filter gauges, pump pressure gauges, fans, air handling units, boilers, receivers, heat exchangers, pumps, etc., panel mounted controls and damper operators in mechanical rooms.

Designation: The names of each device and usage shall be etched in 1/4" maximum, 1/8" minimum height letters and mounted on or adjacent to device cover or attached to the item of equipment.

Type: White core black bakelike secured with brass screws, unless otherwise noted.

PAINTING:

All bare steel piping, pipe hangers, supports and miscellaneous metal in mechanical rooms and elsewhere exposed to view provided under this section of specifications, shall be cleaned and painted in accordance with the Painting Section.

CLEANING:

The Contractor shall maintain the site reasonably clean and free of excessive debris and leftover materials on a daily basis. All trash and debris shall be hauled from the job site on a daily basis for disposal. Prior to testing and adjusting, equipment shall be clean and free of any construction debris and litter.

OPERATING AND MAINTENANCE INSTRUCTIONS:

Three bound and indexed Operating and Maintenance Manuals shall be prepared by the Contractor and be submitted to the Architect for approval prior to delivery to operating personnel.

Each manual shall contain the following information, data and drawings:

- List of contents. Insert under front cover.
- Copy of approved submittals, equipment and materials.
- Installation, operating and maintenance instructions for each item of equipment.
- Manufacturer's list of renewal parts for each item of equipment with recommended stock items and quantities indicated.
- Manufacturer's equipment warranties.
- Copy of shop drawings showing layouts and construction details.
- Copy of Test and Balance Reports including list of instruments and description of methods employed.

COMPLETION OF WORK:

At the completion, an inspection shall be made and the entire system shall be shown to be in specified working condition. The following shall be available during the inspection:

Contractor representative.
Mechanic with hand tools.
Test and Balance Report.
Complete specifications and drawings with all addenda and revisions.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 07 00 – HVAC INSULATION

PART I - GENERAL

Refer to Section 23 00 00 - HVAC General Requirements. Refer to Section 22 00 00 -Plumbing, for additional insulation requirements.

INSULATION:

General: Furnish and install duct, pipe, and equipment insulation as specified below. All surfaces which reach dew point temperatures shall be insulated and provided with an appropriate vapor barrier as necessary to prevent development of condensation. All insulation materials shall have surface burning characteristic ratings not to exceed a flame spread of 25 and a smoke developed rating of 50 as tested by ASTM E-84. Duct insulation must meet the requirements of NFPA 90-A. All materials to be introduced into the above ceiling plenum space must be rated for plenum application.

Installation: All insulation shall be installed in accordance with the insulation manufacturer's instructions unless prohibited herein. Work shall be performed by workers regularly employed as insulators with at least three year's experience.

Staples: When staples are used on cold or dual temperature pipe, duct, or equipment insulation, they shall be sealed with a white vapor barrier coating. Staples shall be outward clinching type.

Duct Insulation:

Blanket Insulation: Glass fiber duct insulation, one lb. density, with FSK facing. Wrap blanket insulation around duct, being careful not to compress it more than 25% at the corners, butting insulation and overlapping facing jacket 2" minimum at all joints. Staple the overlap with outward clinching staples a maximum of 3" on centers. For ducts over 30" wide, additionally support insulation on bottom of horizontal ducts and sides of vertical ducts with rows of welded or adhered clips and washers on not more than 18" centers. Seal all joints and clips with pressure sensitive FSK tape. Seal all penetrations, such as at duct supports, and all terminations of insulation with white vapor barrier coating, reinforced with glass cloth.

Board Insulation: Glass fiber rigid duct insulation board, 6 lb. density, with FSK facing. Cut to fit between standing seams and stiffeners to provide 1/2" minimum cover and secure to ducts with 100% coverage of adhesive and with mechanical fasteners on 12" centers. Butt joints and seal with adhesive. Tape all joints and pin penetrations with 4" wide FSK tape after pointing up clip depressions with insulating cement.

Finish for insulation exposed indoors (such as in mechanical rooms): Secure metal corner beads to all exterior edges and cover with 20 x 20 glass cloth adhered and finished with a white breather coating.

Type and Thickness:

Low Pressure Supply Ducts Concealed Above Ceilings and in Chases: Blanket, 2" thick. Minimum installed R of 6.0.

Return Ducts, Outdoor Air Ducts, Exhaust and Relief Ducts: Do not insulate.

Pipe Insulation:

General: On chilled water, piping, insulate all fittings including valve bonnets. Leave only valve stems, open ends of wells and gauge cocks exposed. On other piping, omit insulation on unions and valves. Taper insulation ends and cover with white breather coating reinforced with glass cloth.

Insulation at Hangers: Hangers for horizontal piping and trapeze supports shall be outside insulation with insulation protectors such as Fee and Mason Fig. 81 or fabricated from minimum 18 gauge galvanized steel, 180° arc, 12" long. Hangers for vertical piping shall be inside insulation. Cut insulation to fit around hanger.

Glass Fiber Insulation: Preformed glass fiber pipe insulation with ASJ self-sealing lap jacketing. Insulate chilled water fittings with pipe insulation mitered to fit and finished smooth to thickness of adjacent insulation with insulating cement or molded fittings. On other piping, use fiberglass inserts with PVC fitting covers. Seal all butt ends of insulation at fittings and on straight runs with white vapor barrier coating.

Cellular Glass Insulation: Molded rigid sectional 8 lb. minimum density cellular glass pipe insulation. Insulate all fittings with pipe insulation mitered to fit and finish smooth to thickness of adjacent insulation with insulating cement. Seal all joints with flexible joint sealer. Secure insulation with 1/2" wide aluminum bands. Finish insulation with white vapor barrier coating reinforced with glass cloth.

Flexible Foamed Plastic Insulation: Closed cell 5 lb. minimum density foamed plastic flexible insulation having a thermal conductivity of not more than 0.26 at 75°F. Seal joints with contact adhesive. Do not split insulation longitudinally except at tees. Finish insulation exposed to view and exposed outdoors with 2 coats of foamed plastic coating. Allow a minimum of 2 hours drying time between coats.

Jackets and Finish:

Concealed and Exposed Indoors: Factory applied white kraft and foil laminate, reinforced, fire retardant jacket and butt strips. Seal all penetrations of jacketing with white vapor barrier coating. Fittings shall be covered with PVC fitting covers and vapor sealed on cold piping.

Buried and exposed outdoors: Provide with a 40 mil pre-fabricated self-adhering sheet type membrane equal to Flex-guard 400, gray in color.

Piping Insulation:

Chilled Water Piping ,All: Foam glass, 1-1/2" thick

.

Heating Hot Water, Interior: Glass fiber insulation, 1-1/2" thick.

Heating Hot Water, Exterior and Buried: Foam glass, 1-1/2"

. Condensate Drain Piping above grade: Foamed plastic, 1/2" thick.

Equipment Insulation:

Chilled Water Pump Head and Suction Diffuser: Foamed plastic insulation, 1" thick. Fabricate removable insulation with contact adhesive and finish with 2 coats of foamed plastic coating. Allow a minimum of 2 hours drying time between coats.

Chilled Water Air Separator: Foamed plastic insulation, 1" thick. Fabricate insulation with contact adhesive and finish with 2 coats of foamed plastic coating. Allow a minimum of 2 hours drying time between coats and cover with flex-guar.

Exposed Ends of Cooling Coils: Cellular glass rigid insulation 1-1/2" thick. Finish with white breather mastic reinforced with glass cloth.

Accessories Manufacturers:

White Vapor Barrier Coating: Foster 30-35 or equal.
White Breather Coating: Foster 30-36 or equal.
Gray Vapor Barrier Mastic: Foster 60-39 or equal.
White Breather Mastic: Foster GPM or equal.
Foamed Plastic Coating: Armstrong Armaflex Finish or equal.
Flexible Joint Sealer: Foster 30-45 or equal.
Contact Adhesive: Armstrong 520 or equal.
Aluminum Jacketting: Childers or equal.
Aluminum Fitting Covers: Childers or equal.
PVC Fitting Covers: Foster or equal.

Insulation Manufacturers: Owens-Corning, Certain-Teed, Manville, or Armstrong.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 21 10 – HANGERS AND SUPPORTS

PART I - GENERAL Refer to Section 23 00 00 - HVAC General Provisions.

Furnish and install pipe and equipment hangers as specified below. All pipe hanger assemblies shall be adjusted after the installation of the piping for the proper grade, with no sagging. Provide hangers as specified below and at each valve, Tee, and change in direction.

Supports: In bar joist construction all hangers and supports shall be attached to the top chord of the bar joist. Attachments shall not be made to the bottom chord. Where necessary for proper hanging of pipe systems, provide bridging between bar joists or other structural members. Coordinate bridging requirements with structural system manufacturer, and steel shop drawings.

Pipe Hangers:

Insulated Pipes: Hangers for horizontal pipes shall be outside insulation with insulation protectors such as Fee and Mason Fig. 81 or fabricated from minimum 18 gauge galvanized steel, 180° arc, 12" long.

Steel Pipe Hangers: Carbon steel two-piece clevis hanger with cross bolt. Provide spreader over cross bolt for sizes large than 14". Provide lock nut on hanger rod.

Fee and Mason Fig. 239
Grinnell Fig. 260
Elcen No. 12c

Copper Tubing Hangers: Copper plated carbon steel band hanger with ability to place on tubing after erection. Provide lock nut on hanger rod.

Fee and Mason Fig. 367
Grinnell Fig. CT-269
Elcen No. 313

Vertical Pipe Hangers, 2" and Smaller: Split ring hanger with wall plate and extension nipple as required. Malleable iron for steel pipe, copper plated malleable iron for copper tubing. Install inside insulation.

Fee & Mason Fig. 302 or Fig. 306
Grinnell Fig. 138R or Fig. CT-122R
Elcen No. 98 or No. 398

Vertical Pipe Hangers, 2-1/2" and Larger: Two piece bolted riser clamp with 4" long legs. Carbon steel for steel pipe, copper plated carbon steel for copper tubing. Install inside insulation.

Fee and Mason Fig. 241 or Fig. 368
Grinnell Fig. 261 or Fig. CT-121
Elcen No. 39 or No. 339

Multiple Pipes: Trapeze support consisting of steel channel suspended from structure and pipe hangers suspended from channel. Channel to be minimum 3" x 3" x 1/4" and larger as load and span dictate.

Upper Attachments:

Steel Bar Joists: 2" x 2" x 1/4" angle clip welded to top chord for single hanger. 3" x 3" x 1/4" angle clips welded to top chords for multiple hangers or trapeze hanger.

Steel Beams: Malleable iron "C" clamp with set screw and lock nut for beam flanges not exceeding 3/4" thick. Set screw to be hardened steel, cup-pointed.

Fee and Mason Fig. 255L
Grinnell Fig. 86
Elcen No. 25L

Poured-in-Place Concrete: Carbon steel concrete insert with integral removable knockout to prevent seepage of concrete during pouring. Elongated hole for lateral hanger rod adjustment.

Fee and Mason Fig. 186
Grinnell Fig. 281
Elcen No. 88

Precast Concrete or Solid Masonry: Concrete expandable anchors.

Hollow Masonry Units: Toggle bolts.

Supports Exposed Beneath Plaster Ceilings: Carbon steel Famet channel, 12 gauge with slotted holes.

Fee and Mason Fig. 550S
Unistrut No. P3000
Elcen No. PS-300S

Hanger Supports: All-threaded steel rods or plain steel rods threaded in the field. Use locknuts at all upper attachments and at all hangers.

Pipe Size	Rod Diameter
2" and Smaller	3/8"
2-1/2" and 3"	1/2"
4" and 5"	5/8"

Hanger Spacing: Provide pipe hangers at maximum intervals listed below and within 2 feet of each side of every change in direction or unsupported end. Hanger spacing for horizontal and vertical piping shall be the same.

Steel Pipe:

Pipe Size	Maximum Spacing
1-1/4" and Smaller	7 ft.
1-1/2" thru 3"	9 ft.
4" thru 6"	14 ft.

Copper Tubing:

Tubing Size	Maximum Spacing
3/4" and Smaller	5 ft.
1" thru 2"	6 ft.
2-1/2" and 3"	9 ft.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 21 13 - PIPING AND PIPING SPECIALTIES

PART I - GENERAL Refer to Section 23 00 00 - HVAC General Provisions.

PIPING:

General: Furnish and install the piping systems indicated on the drawings as specified below. All piping materials and fittings shall be new and shall be of domestic manufacture. The ASTM number and schedule shall be stamped on each length of piping.

Nipples: All thread nipples are prohibited. Nipples 1-1/2" and smaller in diameter and attached to larger pipes shall be Schedule 80 and shall be attached with the use of Threadolets or Weldolets.

Elbows: Long radius elbows shall be used except where space restrictions dictate the use of short radius type.

Weldolets and Threadolets: Weldolets and Threadolets may be used for side outlet reducing tees if the branch is more than two pipe sizes smaller than the main.

Reducers: Reducers and increasers in horizontal piping shall be eccentric type, installed with the tops level. Reducers and increasers in vertical piping shall be concentric type.

Materials:

Exceptions: Pipe, fittings and grades shall be as listed below unless otherwise noted herein or on the drawings.

Hot and Water Piping:

Pipe: Black carbon steel:
4" and smaller: ASTM A-120, Schedule 40.
Fittings:
Steel pipe, 2-1/2" and smaller: 125 lb. black threaded cast iron, ASTM A-126, Class A. Couplings shall be wrought steel.
Steel pipe, 3" and larger and all underground: Buttweld carbon steel, ASTM A-234; wall thickness shall be same as piping. Companion flanges shall be 150 lb. carbon steel ASTM A-181,
Grade 1.

Grade: Top of horizontal piping level unless otherwise indicated on the drawings.

Chilled Water Piping Exterior Above Grade:

Pipe: Black carbon steel, ASTM A-120, Schedule 40 or Type "L" hard drawn copper tubing:

Fittings:
Steel pipe, 2-1/2" and smaller: 125 lb. black threaded cast iron, ASTM A-126, Class A. Couplings shall be wrought steel.

Steel pipe, 3" and larger and all underground: Buttweld carbon steel, ASTM A-234; wall thickness shall be same as piping. Companion flanges shall be 150 lb. carbon steel ASTM A-181,
Grade 1.
Copper pipe: Sweat Type, wrought copper.

Chilled Water Piping Buried:

Pipe & Fittings: Schedule 40, PVC.

Grade: Top of horizontal piping level unless otherwise indicated on the drawings.

Condensate Drains and Automatic Air Vent Discharge Piping:

Pipe: PVC.

Fitting: PVC.

Grade: Horizontal piping pitched down 3/4" per foot minimum in direction of flow.

Relief Valve Discharge Piping: Same materials as specified for the medium being discharged.

JOINTS:

General: Joints shall be determined by the equipment connections or by the valve or fitting specified herein.

Threaded: All threads shall be National Pipe Thread. Apply a commercial grade compound to the male threads only. Ream cut ends and remove all burrs.

Soldered: 95/5 solder shall be used on condensate piping unless otherwise noted. Silfos solder with 5% silver shall be used on all refrigerant piping.

Installation:

General: Remove burrs and all loose material from the interior of piping prior to assembly.

Mitered Fittings and Tapped Pipes: Mitered fittings and tapped pipes are not allowed. All changes in direction and pipe branches shall be accomplished by the use of fittings.

Pipe Routing: Pipes shall be run level (except as required for grading) plumb and parallel with the building structure unless otherwise indicated on the drawings.

Spacing Pipe: Maintain 4" minimum clearance between parallel runs of piping after insulating, space permitting.

Coring: Core drill all openings in masonry and concrete walls and floor slabs where sleeves were not installed as the wall or floor slab was constructed.

Air Vents on Water Lines: Install automatic air vents at all high points in the piping system and where shown on the drawings.

VALVES AND PIPING SPECIALTIES:

General: Furnish and install valves and piping specialties as specified herein and as indicated on the drawings. All valves and piping specialties shall be the same size as the entering piping unless noted otherwise on the plans.

Valves:

Ball Valves:

2" and smaller: 125 SWP, 400 WOG, threaded two piece bronze body, conventional port.

NIBCO	T-580	Hammond	805
Crane	2180	Watts Regulator	B-6000
Apollo	70-100	Red & White	5009

Globe Valves:

2-1/2" and smaller: 125 SWP, 200 WOG, threaded bronze body, teflon disc, screwed bonnet.

NIBCO	T-211-B	Hammond	IB-440
Crane	1	Milwaukee	502
Stockham		B-16	

Check Valves:

2-1/2" and smaller: Non slam, spring loaded type 125 SWP, 200 WOG, threaded bronze body, teflon disc, screwed bonnet.

NIBCO	S-413-Y	Hammond	IB-942
Crane	41	Milwaukee	509
Stockham		B-3058	

3" and larger: Non slam, spring loaded type 125 SWP, wafer style "F", flanged iron body, bronze trim, stainless steel spring.

NIBCO	F-918-B	Hammond	IR-1124
Crane	373	Milwaukee	F-2974
Stockham		931	

Butterfly Valves:

2-1/2" and larger: 150 WOG, 250°F maximum temperature, wafer style, iron body, extended neck, EPDM liner, stainless steel one-piece stem, bronze disc, lever lock, adjustable memory stop.

NIBCO	WL-082	Hammond	3537		
Crane	22F-BRZ	Centerline		Series A	
Stockham		LG-551-BS3-E	Watts		BF-04-121-1

Plug Cocks:

2-1/2" and smaller: 175 WOG, threaded ends, lubricating plug type, bolted gland.

Rockwell	142	Walworth	1796
Resun	R-1430	Homestead	611

Dielectric Unions: Use where ferrous and non-ferrous pipes join.

Calibrated Balancing Valves:

Furnish and install at the discharge of each pump not shown with a Triple Duty Valve and as shown on plans a calibrated balance valve.

Pre-Set Balance Feature: Valves to be designed to allow installing contractor to pre-set balance points for proportional system balance prior to system start-up in accordance with pre-set balance schedule.

Valve Design and Construction: All valves 1/2" to 3" pipe size to be of bronze body/brass ball construction with glass and carbon filled TFE seat rings. Valves to have differential pressure read-out ports across valve seat area. Read-out ports to be fitted with internal EPT insert and check valve. Valve bodies to have 1/4" NPT tapped drain/purge port. Valves to have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves to have calibrated name plate to assure specific valve settings. Valves to be leak-tight at full rated working pressure.

Valves 4" pipe size to be of cast iron body/brass vane construction with differential pressure read-out ports fitted with internal EPT insert and check valve.

Preformed Insulation: All valves to be provided with molded insulation to permit access for balance and read-out.

Floor and Ceiling Escutcheons: Chromium plated with concealed hinges and catch. Provide where insulated and uninsulated pipes and hanger rods exposed to view pass through floor, walls, ceilings, and cabinets in finished areas.

Strainers: Y-type same size as entering pipe with removable screen; 3" and larger, flanged; 2-1/2" and smaller, screwed. Rating 125 psig. Screens shall be easily removable. Remove screen from strainer after approximately 60 hours operating time, clean and reinstall. Provide ahead of each pump not provided with suction diffuser with integral strainer.

Hot and Chilled Water: 3/64" diameter perforated brass screen.

Mueller	751	Metraflex	Style M-1
Hoffman	Series 400	Keckley	Styles A and B

Water Pressure Reducing Valves: Bronze body, nickel alloy seat, high temperature resisting diaphragm with stainless steel perforated strainer screen and built-in bypass.

Watts	223SB	Taco	320
Case-Acme	Type "E"		

Flexible Pipe Connectors: Spherical connector constructed of neoprene and nylon with bias ply tire cords, complete with steel plate flanges tapped or drilled to mate with 150 lb. flanges. Connectors shall be capable of controlling compression, elongation, lateral and angular movement. Temperature range 20°F to 240°F. Flexible pipe connectors shall be manufactured by Metraflex, Keflex, Belmont, Garlock, Southeastern Hose.

Expansion Tank: Bladder type with steel shell designed and constructed in accordance with ASME Section VIII. Bladder shall be removable for inspection and shall be fabricated from heavy duty butyl rubber. Tank shall be stamped for working pressure of 125 psig and maximum operating temperature of 240°F. Expansion tanks shall be manufactured by Taco, Amtrol, Thrush, Wood, Wessel or Bell and Gosset.

Air Separators: Combination tangential type air separator and system strainer. Units to have internal perforated stainless steel air collector tube to direct released air into the compression tank or to atmosphere via an automatic air vent. A blow-down connection shall be provided for routine cleaning. Units shall be constructed in accordance with ASME and stamped 125 lb. working pressure. Refer to previous paragraph for insulation requirements. Air separators shall be manufactured by Bell and Gossett, Amtrol, Thrush, Wessel or Armstrong.

Triple-duty Valves: Flanged straight type or angle type body as indicated with combination non-slam type check valve/isolating valve/balancing valve. Provide external operating stem, with memory stop for balancing purposes. Provide at discharge of each pump. Triple-duty valves shall be manufactured by Bell & Gossett, Armstrong or Taco.

Backflow Preventers: Reduced pressure type consisting of a pressure differential relief valve located between two positive seating check valves. Bronze body construction, stainless steel internal parts and flange bolts, and rubber check valve assemblies. Provide inlet strainer, test ports, isolation gate valves, and a discharge cup with drain piping routed to the nearest discharge location (e.g., floor drain). Unit shall be suitable for pressures to 175 psi, supply water temperatures of 140°F and backflow water temperatures of 210°F. The devices shall meet the requirements of ASSE Standard 1013 and AWWA Standard C506-78. Provide in all make-up water lines and as indicated. Backflow preventers shall be manufactured by Watts, Model No. 909HW-S, or equal by Lawler, or Beeco.

INSTRUMENTS:

General: Furnish and install instruments for the hydronic systems as specified below. All instruments shall be properly calibrated at the factory or on the job site before final inspection.

Stem Type Thermometers:

General: Adjustable angle industrial type constructed of brass or cast aluminum case, rattle-proof glass window, black scale graduations and red reading mercury tube. Stem to be constructed of brass or stainless steel, with 3/4" thread for use with separable socket well. Scale to be 7" long with 3-1/2" long stem.

Ranges:

Hot Water:	30 to 240°F in 2 degree divisions
Chilled Water:	0 to 100°F in 2 degree divisions

Separable Socket Wells: Provide for all thermometers and control bulbs mounted in piping. Wells shall be constructed of brass or stainless steel, be furnished complete with screwed cap and shall have lagging extension. Wells shall be suitable for 3-1/2" stems. Where wells are installed in straight runs of pipe smaller than 2-1/2", increase pipe size to 2-1/2" for minimum 4" either side of well. Wells shall be installed in accordance with manufacturers recommendations and well shall be swabbed with manufacturers recommended heat transfer medium.

Manufacturers: Stem type thermometers shall be manufactured by Ashcroft, Trerice, Weksler, Weiss, or Moeller.

Dial Type Pressure Gauges:

General: Case constructed of brass or cast aluminum, back flange for surface mounting, flangeless for remote mounting, rattle-proof glass window held in place with an "O" ring and screwed ring, black scale graduations on a white background and adjustable pointer. Socket and tip to be stainless steel or brass, threaded 1/4" NPT. Bourdon tube to be phosphor bronze or stainless steel with brass movement. Gauge to be 4-1/2" diameter. Provide pulsation dampener.

Ranges: 0-100 psi dial range, 20 psi figure intervals, 2 psi graduations.

Manufacturers: Dial type pressure gauges shall be manufactured by Ashcroft, Trerice, Weksler, Weiss, or Moeller.

Gauge Cocks: Each gauge shall be provided with a needle valve type gauge cock. "T" handle and lever handle type ball or plug cocks will not be accepted.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 30 00 – HVAC AIR DISTRIBUTION

PART I - GENERAL Refer to Section 23 00 00 - Mechanical General Requirements.

AIR DISTRIBUTION SYSTEM:

General: The air distribution system shall be furnished and installed to include, but not necessarily be limited to primary medium pressure supply, low pressure secondary supply, return, exhaust, relief, outside air ductwork, and all fittings and accessories generally as shown on the drawings. Plate numbers referred to below are derived from the applicable Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Standards.

Supports: Where necessary for proper hanging of duct system, provide bridging between bar joists or other structural members. Coordinate bridging requirements with structural system manufacturer.

LOW PRESSURE DUCTWORK:

General: Sheet metal low pressure ductwork shall be fabricated and installed in accordance with SMACNA HVAC Duct Construction Standards, Metal and Flexible First Edition, unless otherwise indicated on the drawings or specified herein. Ducts shall not be supported from metal decks.

Flexible Connections: Install at the ductwork connections to all equipment with motors and elsewhere as indicated on the drawings. Connections shall be fireproof material composed of watertight, impregnated 30 oz. glass fabric. Fig. 2-19.

Branch From Trunk Duct and Tap-in Connections: Fig. 2-1.

Turning Vanes: Fig. 2-2, Type RE2 or RE3. Provide at all square elbows in ductwork and where noted.

Low Pressure Supply Duct Joints and Return and Exhaust Duct Joints: Tape with flame resistant polyethylene impregnated and coated 9 mil thick duct tape, 50 oz. per sq. in. minimum adhesion. Taped joint shall be 3" total width minimum. Coat with synthetic base caulk equal to Ductmate #765 sealant.

Parallel Flow Branches or TEE's: Dampers shall be provided with locking quadrants outside insulation or locking push rods. Opposed blade type when larger than one blade.

Paint: Inside of unlined ducts visible through sidewall grilles and registers shall be painted flat black.

Construction: Low pressure ductwork shall be constructed from lock forming quality galvanized steel sheets having a galvanized coating of 1-1/4 ounces total for both sides per one square foot of sheet.

FLEXIBLE ROUND DUCTWORK:

Low Pressure Ducts:

General: Insulated low pressure flexible duct shall be a factory fabricated assembly consisting of a zinc-coated spring steel helix, nonperforated inner liner, wrapped with a nominal 1/2" thick x 0.88 lb. cu. ft. density fiberglass insulation and a reinforced metalized film outer vapor barrier wrap. The insulation shall have a maximum conductance of 0.21 at 75°F. The composite assembly, including insulation and vapor barrier, shall meet the Class 1 requirements of NFPA 90-A and be labeled by Underwriters' Laboratories, Inc., with a flame spread rating of 25 or less and a smoke developed rating of 50 or under. Flexible ducts shall be

installed in a fully extended condition free of sags and kinks, using only the minimum length required to make the connection. Installation, including attachment and support, shall be in accordance with the manufacturer's written instructions and with the latest edition of SMACNA Flexible Duct Installation Standards.

Manufacturers: Low pressure flexible round ductwork shall be manufactured by CertainTeed, Flex-Aire, Flexmaster, Thermaflex, or Genflex.

SPIN-IN TAKE-OFF FITTINGS: Suitable for use with sheet metal trunk ducts, constructed of sheet metal and incorporating an air scoop and balancing damper. Protruding neck of each fitting shall be minimum 3" long. Provide for each spin-in fitting a nylon zipper fastener [stainless steel band and housing with carbon steel hardened screw], for the attachment of flexible ductwork. Provide spin-in fitting at each flexible round branch duct take off.

MANUAL VOLUME CONTROL DAMPERS:

Fig. 2-14 B or C. Dampers shall be opposed blade when larger than one blade, Fig. 2-15 A. 2" x 1/2" x 1/8" steel channel frame with blade stops top and bottom; 16 ga. steel blades with formed edge groove to provide 3/8" interlock between adjacent blades, 7" minimum blade width, self-lubricating oilite bronze or nylon bearings with 1/2" diameter cadmium plated shaft extended 6" beyond frame, blade linkage finished with rust inhibitor coating. Volume dampers shall be manufactured by Ruskin, Louvers and Dampers, Dowco, or Prefco, Air Control Products, or Phillips-Aire.

SLEEVES:

General: Furnish and install sleeves at all locations where pipes and ducts or non-ducted louvers penetrate masonry walls or fire rated partitions. On insulated pipes and ducts, the sleeves shall be of sufficient size to include the insulation with a maximum gap between insulation and sleeve of 1/4" for ducts. For pipes, the next largest pipe size shall be used.

Sleeves for Ducts: Sleeves for ducts shall be fabricated from minimum 20 gauge galvanized steel sheet, formed into a rectangle and cut to length so that a 1/2" wide flange can be hammered back on either side of the wall. Sleeves shall be installed in place during the wall construction and sleeves greater than 16" wide in masonry walls shall have temporary bracing to prevent deformation.

Caulking: Sleeves installed in exterior walls and in mechanical room walls shall have caulking applied between the sleeve and pipe or duct, or between the sleeve and insulation. Caulk shall be suitable for use without painting, gun consistency, off-white color. Sleeves installed in fire rated partitions shall have caulking applied between the sleeve and pipe or duct, or between the sleeve and insulation. Caulk shall be fire stopping, expanding type designed to seal out noise fire, fumes, smoke and water for up to three hours exposure to temperatures up to 250°F. Caulk shall be UL listed firestopping sealant as manufactured by Dow Corning, Flammadur or Standard Oil.

END OF SECTION

DIVISION 23 - MECHANICAL

SECTION 23 36 12 –FAN COILS

PART I - GENERAL

Furnish and install Fan Coil Units of the configuration scheduled where indicated on the plans and in the specifications. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with ARI Standard 440-2008. Units shall be manufactured by ENVIRO-TEC or approved equal.

CONSTRUCTION

All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. All unit chassis panels shall be insulated with Elastomeric Closed Cell Foam Insulation. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Polyethylene or Fiberglass insulation is not acceptable.

All exposed floor mounted units shall have exterior panels fabricated of not less than 20 gauge galvannealed steel. The front panel shall be attached with quarter turn quick open fasteners to allow for easy removal and access for service. Side panels shall be removable for access to controls and piping within the end pockets.

Top panel shall be removable from fan coil without the need to disconnect piping or electrical wiring. The top panel shall be removed through not more than 8 screws.

Units shall include a recessed stamped louver discharge grille.

PAINTED FINISH

All painted cabinet exterior panels shall be finished with a heat cured anodic acrylic powder paint of the standard factory color. Liquid coat paint shall not be acceptable.

SOUND

Units shall have published sound power level data tested in accordance with ARI Standard 350.

FAN & MOTOR

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps. Shaded pole motors are not acceptable. Single speed motors are not acceptable.

The fan/motor assembly shall be removable and serviceable through the front panel and shall be easily removable by a single service technician.

DRAIN PAN

Primary condensate drain pans shall extend under the entire coil section. Drain pans shall be of one piece construction and be positively sloped for condensate removal. Drain pan access that requires removal of coils is not acceptable.

The primary drain pan shall be externally insulated with a fire retardant, elastomeric closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Double wall non-corrosive auxiliary drain pan is used for condensate from primary drain pan and optional valve packages.

COILS

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin. Minimum copper tube thickness shall be 0.016".

Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Lanced fins shall not be acceptable.

All coils shall be tested at 325 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.

All water coils shall be designed to connect with ½" nominal pipe connections.

Coil Casing shall be fabricated from galvanized steel.

Heating coils shall be furnished in the re-heat position.

All water coils shall be provided with a manual air vent fitting to allow for coil venting.

FILTERS

All units shall be furnished with a minimum 1" pleated MERV 8 filter. Filters shall be tight fitting to prevent air bypass. Filters shall be easily removable from the return air opening without the need for tools.

ELECTRICAL

Units shall be furnished with single point power connection. Provide an electrical junction box for motor and other electrical terminations.

Provide 24 VAC fan relay board with 25 VA transformer. Fan relay board designed to operate in conjunction with factory provided 24 V thermostat. Fan relay board designed to accept 115 V input power. Fan relay board to be factory installed.

Relay board shall operate with generic thermostat designed to control up to three independently energized fan speeds.

END OF SECTION

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 43 00 - TESTING, ADJUSTING, AND BALANCING

PART I - GENERAL

The General and Supplementary Conditions, and General Requirements of these specifications apply to all work specified in this section. Testing and balancing shall be performed by an independent testing and balancing agency certified by either Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

SCOPE:

Testing and balancing shall be performed for each item of heating, ventilating, and air conditioning equipment individually and then further testing and balancing shall be done to each system including accessories. Testing and balancing shall include but not be limited to equipment, air systems, control systems, and space temperature conditions.

METHODS:

Testing and balancing shall be performed in complete accordance with AABC National Standards for Total Systems Balance, latest edition, as published by the Associated Air Balance Council when the testing and balancing work is performed by an AABC certified firm; or in complete accordance with Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems, Latest Edition, as published by the National Environmental Balancing Bureau when the testing and balancing work is performed by an NEBB certified firm.

INSTRUMENTS:

Instruments used for testing and balancing must have been calibrated within a period of six months prior to use and must meet the specified calibration criteria as published by AABC or NEBB as applicable. Types and dates of calibration of all instruments shall be provided in all testing and balancing reports.

CERTIFIED REPORTS:

Three copies of the testing and balancing report shall be submitted for review by the Architect and/or Engineer prior to request for final inspection. This initial report shall include all data listed elsewhere in this section for all systems and equipment. Where the discrepancies have been noted on initial balancing report, the recheck report shall list the disposition of discrepancies.

COORDINATION:

The General Contractor and mechanical subcontractor shall coordinate their work with the testing and balancing subcontractor to allow sufficient time prior to final inspection for completion of testing and balancing work. The testing and balancing subcontractor shall immediately notify the mechanical subcontractor of any noted discrepancies or omissions for correction by the mechanical subcontractor. The testing and balancing subcontractor shall notify the mechanical subcontractor of the need for additional pulleys and belts, balancing dampers, gauge cocks, test ports, or other items which are needed to balance the system properly so that these items may be installed by the mechanical subcontractor.

EQUIPMENT:

The mechanical subcontractor shall have all heating, ventilating, air conditioning, and control systems in full operation and shall keep all systems in full operation continuously while testing and balancing work is in progress.

JOB DATA:

The testing and balancing subcontractor shall be provided with up-to-date plans, specifications, change orders, and approved submittals in sufficient time so that preliminary paperwork may be completed prior to beginning job site work.

REVIEW:

The testing and balancing subcontractor performing services under this section of the specifications shall review the plans, specifications, approved submittals, and existing conditions and shall notify the Architect, prior to beginning work, of any discrepancies, omissions, or conflicts noted which would adversely affect testing and balancing.

EQUIPMENT CONNECTIONS:

Where a system is made up of multiple pieces of equipment such as blower- coil and condensing unit, the testing and balancing shall be done as a complete system with simultaneous operation of all items of the system.

HYDRONIC BALANCE PERFORMANCE REQUIREMENTS:

Measurements: Where installed, flow meters and/or balancing valves with flow taps shall be used to balance water flows. Where these items are not installed, flow rates shall be obtained by pressure drop across valves or equipment using factory provided CV data. If no provision is available for actual flow measurements as listed above, balancing shall be performed by the temperature differential method, but the temperature differential method shall be performed only after specified air balancing has been completed. Pump flow rates shall be measured by flow meters, balancing valves with flow taps, or differential pressure measurements.

Adjustments: All hydronic circuits shall be adjusted by the use of the specified balancing valves. All balancing valves shall be permanently marked after balancing is completed so they may be returned to the correct position if disturbed.

AIR HANDLING EQUIPMENT:

Provide for all air handling equipment including but not limited to installed air handling units, central plant equipment, fan-coil units, fans, and fan powered boxes:

Installed Unit Data:

- Unit designation
- Manufacturer
- Model number and/or size
- Motor HP, voltage, phase, cycles, full load amps

Test Results (as applicable):

Supply air CFM, design and resultant
Return air CFM, design and resultant
Outside air CFM, design and resultant
Fan Total Static Pressure (TSP), design and resultant
Unit External Static Pressure (ESP), design and resultant

Components static pressure loss, i.e., filters, heating and/or cooling coils, bypass dampers
Motor voltage, phase, cycles, full load amps
Motor calculated BHP
Blower RPM, design and resultant
Cooling coil inlet air temperature, DB and WB, design and resultant
Cooling coil outlet air temperature, DB and WB, design and resultant
Heating coil inlet air temperature, design and resultant
Heating coil outlet air temperature, design and resultant
Energy wheel inlet air temperature (exhaust and outside air streams), DB and WB, design and resultant
Energy wheel outlet air temperature (exhaust and outside air streams), DB and WB, design and resultant
Return air temperature, DB and WB, design and resultant
Outside air temperature, DB and WB, design and resultant
For variable volume system, or system with variable volume terminal units, provide all specified data separately with system operating at maximum CFM, minimum CFM, and design CFM.

INDIVIDUAL AIR OUTLETS AND INLETS:

Outlet and inlet identification; provide identification number and diagrams Outlet and inlet size
Outlet air pattern
Outlet damper setting
Design and resultant test velocities, FPM
Design and resultant test quantities, CFM

HYDRONIC BALANCING DATA--PUMPS:

Installed Pump Data:

Unit designation
Manufacturer
Model number and/or size
Motor HP, voltage, cycles, phase and full load amps
Type drive

Test Data:

Discharge pressure; full flow, no flow, and design flow
Suction pressure; full flow, no flow, and design flow
Operating head; design and resultant
Motor operating amps; full flow, no flow, and design flow
Calculated full flow BHP

MOTORS DATA (Provide for all motors):

Motor nameplate data
Actual operating voltage, phase, and amps
Overload heater number and manufacturer
Overload heater amps rating

CONTROL SYSTEM DATA AND TESTING:

Testing: Operate all controls through full range and at all specified conditions and confirm proper operation. Simulation may be used if operating conditions do not permit actual operation at specified conditions.

Sensors: Record temperature at all sensors; equipment, space, duct, and pipe. Provide tabulation of all readings.

Controllers: Tabulate settings of all controllers and identify by location, equipment, and/or space.

Space Temperatures: Record the temperature of each conditioned space and the dry bulb setting of each controlling thermostat. Provide tabulation of all readings.

DESIGN/INSTALLED DATA:

For all items of equipment, accessories, and controls, provide complete nameplate data.

For all items of equipment, accessories, and controls, provide complete specified design data in addition to installed test data.

DEFICIENCIES:

List all deficiencies noted. This is applicable to equipment, accessories, installation, control systems or other factors which would affect proper balancing of all components and systems.

OPERATIONAL TEST:

After balancing of each system has been completed, the balancing subcontractor shall perform an operational test over a minimum period of eight hours. This test shall be performed only after each piece of equipment has been individually tested and is in correct operating condition. This test shall be made at a time when outdoor dry bulb temperature is above 85 degrees F. or below 50 degrees F. When the testing is done during the cooling cycle, all lights shall be turned on, doors to all spaces shall be closed, and all space thermostats set at 75 degrees F. The following data shall be recorded and included in the initial balancing report:

Date

Outdoor DB and WB temperatures during the testing period.

Temperature of each conditioned space with the dry bulb setting of the controlling thermostat.

END OF SECTION

DIVISION 23 - MECHANICAL

SECTION 23 64 23 – AIR COOLED CHILLER

PART 1: GENERAL

1.01 SUMMARY

A. Section includes design, performance criteria, refrigerants, controls, and installation requirements for air-cooled scroll compressor chillers.

1.02 REFERENCES

A. Comply with applicable Standards/Codes of AHRI 550/590, ANSI/ASHRAE 15, ETL, cETL, NEC, and OSHA as adopted by the State.

B. Units shall meet the efficiency standards of the current version of ASHRAE Standard 90.1, and FEMP standard 2012.

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with the specifications.

B. Submittals shall include the following:

1. Dimensioned plan and elevation view drawings, required clearances, and location of all field connections
2. Summary of all auxiliary utility requirements such as electricity, water, etc. Summary shall indicate quality and quantity of each required utility.
3. Single line schematic drawing of the field power hookup requirements, indicating all items that are furnished.
4. Schematic diagram of control system indicating points for field interface/connection.
5. Diagram shall fully delineate field and factory wiring.
6. Installation and operating manuals.

1.04 QUALITY ASSURANCE

A. Qualifications: Equipment manufacturer must specialize in the manufacture of the products specified and have five years experience with the type of equipment and refrigerant offered.

B. Regulatory Requirements: Comply with the codes and standards specified.

C. Chiller manufacturer plant must be ISO Registered.

1.05 DELIVERY AND HANDLING

A. Chiller shall be delivered to the job site completely assembled and charged with refrigerant and oil by the manufacturer.

B. Comply with the manufacturer's instructions for rigging and handling equipment.

1.06 WARRANTY

A. Standard Warranty: The refrigeration equipment manufacturer's guarantee shall be for a period of one year from date of equipment start-up but not more than 18 months from shipment. The guarantee shall provide for repair or replacement due to failure by material and workmanship that prove defective within the above period, excluding refrigerant.

B. 1st Year Labor Warranty: Entire unit

C. Extended Compressor Warranty: 5 years.
D. Extended Unit Warranty: Entire unit with dual pumps, one (1) year parts only.
E. Refrigerant Warranty: One (1) year R410A refrigerant.
F. Delay Warranty Start: Twelve (12) additional months (up to 30 months).

1.07 MAINTENANCE

A. Maintenance of the chillers shall be the responsibility of the owner and performed in accordance with the manufacturer's instructions.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Daikin Applied
B. As approved

2.02 UNIT DESCRIPTION

A. Provide and install as shown on the plans a factory-assembled, factory-charged air-cooled scroll compressor packaged chiller. Chiller shall consist of hermetic tandem scroll compressor sets (total four compressors), brazed plate evaporator, air-cooled condenser section, microprocessor-based control system and all components necessary for controlled unit operation.
B. Chiller shall be functionally tested at the factory to ensure trouble free field operation

2.03 DESIGN REQUIREMENTS

A. Flow Range: The chiller shall have the ability to support variable flow range down to 40% of nominal design (based on AHRI conditions).
B. Operating Range: The chiller shall have the ability to control leaving chilled fluid temperature from 15F to 65F.
C. General: Provide a complete scroll compressor packaged chiller as specified herein and as shown on the drawings. The unit shall be in accordance with the standards referenced in section 1.02 and any local codes in effect.
D. Performance: Refer to the schedule of performance on the drawings. The chiller shall be capable of stable operation to a minimum percentage of full load (without hot gas bypass) of 25%. Performance shall be in accordance with AHRI Standard 550/590.
E. Acoustics: Sound pressure levels for the unit shall not exceed the following specified levels. All manufacturers shall provide the necessary sound treatment (parts and labor) to meet these levels if required. Sound data shall be provided with the quotation. Test shall be in accordance with AHRI Standard 370.

Sound Pressure (at 30 feet)											
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**Overall dBA**	75% Load dBA	50% Load dBA	25% Load dBA
Sound Power											
63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**Overall dBA**	75% Load dBA	50% Load dBA	25% Load dBA

2.04 CHILLER COMPONENTS

A. Compressor

1. The compressors shall be sealed hermetic, scroll type with crankcase oil heater and suction strainer. The compressor motor shall be refrigerant gas cooled, high torque, hermetic induction type, two-pole, with inherent thermal protection on all three phases and shall be mounted on RIS vibration isolator pads. The compressors shall be equipped with an internal module providing compressor protection and communication capability.

B. Evaporator

1. The evaporator shall be a compact, high efficiency, dual circuit, brazed plate-to-plate type heat exchanger consisting of parallel stainless steel plates.

2. The evaporator shall be protected with an external, electric resistance heater plate and insulated with 3/4" (19mm) thick closed-cell polyurethane insulation. This combination shall provide freeze protection down to -20°F (-29°C) ambient air temperature.

3. The water-side maximum design pressure shall be rated at a minimum of 653 psig (4502 kPa). Evaporators shall be designed and constructed according to, and listed by Underwriters Laboratories (UL).

C. Condenser

1. Condenser fans shall be propeller type arranged for vertical air discharge and individually driven by direct-drive fan motors. The fans shall be equipped with a heavy-gauge vinyl-coated fan guard. Fan motors shall be TEAO type with permanently lubricated ball bearings, inherent overload protection, three-phase, direct-drive, 1140 rpm. Each fan section shall be partitioned to avoid cross circulation.

2. Coil shall be microchannel design and shall have a series of flat tubes containing multiple, parallel flow microchannels layered between the refrigerant manifolds. Tubes shall be 9153 aluminum alloy. Tubes made of 3102 alloy or other alloys of lower corrosion resistance shall not be accepted. Coils shall consist of a two-pass arrangement. Each condenser coil shall be factory leak tested with high-pressure air under water. Coils shall withstand 1000+ hour acidified synthetic sea water fog (SWAAT) test (ASTM G85-02) at 120°F (49°C) with 0% fin loss and develop no leaks.

D. Refrigerant Circuit

1. Each of the two refrigerant circuits shall include a replaceable-core refrigerant filter-drier, sight glass with moisture indicator, liquid line solenoid valve (no exceptions), expansion valve, and insulated suction line.

E. Construction

1. Unit casing and all structural members and rails shall be fabricated of pre-painted or galvanized steel. Painted parts shall be able to meet ASTM B117, 1000-hour salt spray test.

2. Upper section of unit shall have protective and decorative louvers covering the coils and unit end and have painted steel wraps enclosing the coil end sections and piping.

F. Control System

1. A centrally located weatherproof control panel shall contain the field power connection points, control interlock terminals, and control system. Box shall be designed in accordance with NEMA 3R rating. Power and starting components shall include factory circuit breaker for fan motors and control circuit, individual contactors for each fan motor, solid-state compressor three-phase motor overload protection, inherent fan motor overload protection and two power blocks (one per circuit) for connection to remote, contractor supplied disconnect switches. Hinged access doors shall be lockable. Barrier panels or separate

enclosures are required to protect against accidental contact with line voltage when accessing the control system.

2. Shall include optional single-point connection to a non-fused disconnect switch with through-the-door handle and compressor circuit breakers.

G. Unit Controller

1. An advanced DDC microprocessor unit controller with a 5-line by 22-character liquid crystal display provides the operating and protection functions. The controller shall take preemptive limiting action in case of high discharge pressure or low evaporator pressure. The controller shall contain the following features as a minimum:

2. The unit shall be protected in two ways: (1) by alarms that shut the unit down and require manual reset to restore unit operation and (2) by limit alarms that reduce unit operation in response to some out-of-limit condition. Shut down alarms shall activate an alarm signal.

3. Shutdown Alarms
   a. No evaporator water flow (auto-restart)
   b. Sensor failures
   c. Low evaporator pressure
   d. Evaporator freeze protection
   e. High condenser pressure
   f. Outside ambient temperature (auto-restart)
   g. Motor protection system
   h. Phase voltage protection

4. Limit Alarms
   a. Condenser pressure stage down, unloads unit at high discharge pressures.
   b. Low ambient lockout, shuts off unit at low ambient temperatures.
   c. Low evaporator pressure hold, holds stage #1 until pressure rises.
   d. Low evaporator pressure unload, shuts off one compressor.

5. Unit Enable Section
   a. Enables unit operation from either local keypad, digital input, or BAS

6. Unit Mode Selection
   a. Selects standard cooling, ice, glycol, or test operation mode

7. Analog Inputs:
   a. Reset of leaving water temperature, 4-20 mA\
   b. Current Limit

8. Digital Inputs
   a. Unit off switch
   b. Remote start/stop
   c. Flow switch
   d. Ice mode switch, converts operation and setpoints for ice production
   e. Motor protection

9. Digital Outputs
   a. Shutdown alarm; field wired, activates on an alarm condition, off when alarm is cleared
   b. Evaporator pump; field wired, starts pump when unit is set to start

10. Condenser fan control - The unit controller shall provide control of condenser fans based on compressor discharge pressure.

11. Building Automation System (BAS) Interface

a. Factory mounted DDC controller(s) shall support operation on a BACnet®, Modbus® or LONMARK ® network via one of the data link / physical layers listed below as specified by the successful Building Automation System (BAS) supplier.
b. BACnet MS/TP master (Clause 9)
c. BACnet IP, (Annex J)
d. BACnet ISO 8802-3, (Ethernet)
e. LONMARK FTT-10A. The unit controller shall be LONMARK® certified.
f. The information communicated between the BAS and the factory mounted unit controllers shall include the reading and writing of data to allow unit monitoring, control and alarm notification as specified in the unit sequence of operation and the unit points list.
g. For chillers communicating over a LONMARK network, the corresponding LONMARK eXternal Interface File (XIF) shall be provided with the chiller submittal data.
h. All communication from the chiller unit controller as specified in the points list shall be via standard BACnet objects. Proprietary BACnet objects shall not be allowed. BACnet communications shall conform to the BACnet protocol (ANSI/ASHRAE135-2001). A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided along with the unit submittal.

2.05 OPTIONS AND ACCESSORIES

A. The following options are to be included:
1. Hot Gas Bypass: allows unit operation to 10 percent of full load. Includes factory-mounted hot gas bypass valve, solenoid valve, and manual shutoff valve for each circuit.
2. Low Ambient Control: Provide fan cycling control to allow unit operation down to 32°F
3. Phase loss with under/over voltage protection and with LED indication of the fault type to guard against compressor motor burnout.
4. BAS interface module to provide interface with the BACnet MSTP protocol.
5. The following accessories are to be included:
a. Rubber-in-shear vibration isolators for field installation
b. 115V GFI convenience outlet

B. Factory-Installed Pump Package: The pump package shall be factory mounted and wired on the chiller. The chiller controller shall provide a pump start/stop signal when operation is required. On dual pump systems, the chiller shall provide also automatic alternating of pump starts and duty/standby functionality. The package shall be equipped with:
1. Dual Pumps in a Single Casting Model 4392: single-spring inside-seal vertical, in-line, radially split-case pumps, mounted in a common casing with a common inlet connection and outlet connection and including a flapper valve to prevent recirculation when only one pump is operating. An isolation valve shall be included to allow one pump to operate when the other is removed. The pumps shall be designed for duty/standby, not parallel operation.
2. Pump package shall also be equipped with:
a. "Y" type inlet strainer
b. Combination triple-duty outlet valve having a drip-tight discharge shutoff valve, non-slam check valve, and flow throttling valve
c. Combination suction guide with flow stabilizing outlet vanes and stainless steel strainer with a disposable fine-mesh strainer for start-up
d. Factory power and control wiring from the chiller to the pump package control panel

e. Flow switch mounted and wired
f. Interconnecting schedule 40 piping with Victaulic couplings
g. Insulation of all cold surfaces
h. Water pressure gauges on the pump suction and discharge
i.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install in strict accordance with manufacturer's requirements, shop drawings, and contract documents.

B. Adjust and level chiller in alignment on supports.

C. Coordinate electrical installation with electrical contractor.

D. Coordinate controls with control contractor.

E. Install a field-supplied or optional manufacturer-supplied strainer in the chilled water return line at the evaporator inlet that meets manufacturer perforation size specifications.

3.02 START-UP

Provide testing and starting of machine, and instruct the Owner

operation and maintenance.

END OF SECTION

DIVISION 23 - MECHANICAL

SECTION 23 73 00 –MODULAR AIR HANDLERS

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Indoor Air Handling Units.

1.02 REFERENCES

A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
B. AMCA 99 - Standards Handbook.
C. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
E. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
F. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
G. AHRI 430 - Central-Station Air-Handling Units.
H. AHRI 435 - Application of Central-Station Air-Handling Units.
I. ASTMB117 - Standard Practice for Operating Salt Spray Apparatus.
J. NEMA MG1 - Motors and Generators.
K. NFPA 70 - National Electrical Code.
L. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
M. UL 723 - Test for Surface Burning Characteristics of Building Materials.
N. UL 900 - Test Performance of Air Filter Units.
O. UL 1995 - Standard for Heating and Cooling Equipment.
P. UL 94 - Test for Flammability of Plastic Materials for Parts in Devices and Appliances.
Q. IBC 2000, 2003 - International Building Code.
R. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
S. NFPA 5000 - Building Construction and Safety Code.
T. ASHRAE 90.1 Energy Code.
U. AHRI Standard 1060 - Rating Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment.
V. GSA 2003 Facilities Standard - 5.9 HVAC Systems and Components.

1.03 SUBMITTALS

A. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, and electrical characteristics and connection requirements. Computer generated fan curves for each air handling unit shall be submitted with specific design operating point noted. A computer generated psychometric chart shall be submitted for each cooling coil with design points and final operating point clearly noted. Sound data for discharge, radiated and return positions shall be submitted by octave band for each unit. Calculations for required baserail heights to satisfy condensate trapping requirements of cooling coil shall be included.
B. Product Data:
1. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, finishes of materials, electrical characteristics, and connection requirements.
2. Provide data of filter media, filter performance data, filter assembly, and filter frames.
3. Provide manufacturer's installation instructions.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Air Handler products specified in this section must show a minimum five years documented experience and complete catalog data on total product.

1.05 SAFETY AGENCY LISTED & CERTIFICATION

A. Air Handling units shall be cETLus safety listed to conform with UL Standard 1995 and CAN/CSA Standard C22.2 No. 236. Units shall be accepted for use in New York City by the Department of Building, MEA 342-99-E.

B. Air handler furnished with double width, double inlet (DWDI) fans and/or plenum fans where applicable, shall be certified in accordance with the central station air handling units certification program, which is based on AHRI Standard 430. (NOTE: Above does not apply to fan array)

C. Air handling unit water heating & cooling coils shall be certified in accordance with the forced circulation air cooling and air heating coils certification program, which is based on AHRI Standard 410.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Accept products on site on factory-furnished shipping skids. Inspect for damage.

C. Store in clean dry place and protect from construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are approved for use.

1. Daikin Applied 'Vision' Air Handler shall be the basis of design.
2. AS APPROVED

2.02 GENERAL DESCRIPTION

A. Configuration: Fabricate as detailed on drawings.

B. Performance: Conform to AHRI 430. See schedules on prints. (NOTE: above does not apply to fan array)

C. Acoustics: Sound power levels (dB) for the unit shall not exceed the specified levels shown on the unit schedule. The manufacturer shall provide the necessary sound treatment to meet these levels if required.

2.03 UNIT CONSTRUCTION

A. Fabricate unit with heavy gauge channel posts and panels secured with mechanical fasteners. All panels, access doors, and ship sections shall be sealed with permanently applied bulb-type gasket. Shipped loose gasketing is not allowed.

B. Panels and access doors shall be constructed as a 2-inch nominal thick; thermal broke double wall assembly, injected with foam insulation with an R-value of not less than R-13.

1. The inner liner shall be constructed of G90 galvanized steel.
2. The outer panel shall be constructed of G90 galvanized steel.
3. The floor plate shall be constructed as specified for the inner liner.
4. Unit will be furnished with solid inner liners.

C. Panel deflection shall not exceed L/240 ratio at 125% of design static pressure, maximum 5 inches of positive or 6 inches of negative static pressure. Deflection shall be measured at the panel midpoint.

D. The casing leakage rate shall not exceed 0.50 cfm per square foot of casing surface area at design static pressure up to a maximum of +5” w.c. in positive pressure sections and -6” w.c. in negative pressure sections (.0025 m3/s per square meter of cabinet area at 1.24 kPa static pressure)

E. Module to module field assembly shall be accomplished with an overlapping, full perimeter internal splice joint that is sealed with bulb type gasketing on both mating modules to minimize on-site labor and meet indoor air quality standards.

F. Access doors shall be flush mounted to cabinetry, with minimum of two six inch long stainless steel piano-type hinges, latch and full size handle assembly. Access doors shall swing outward for

unit sections under negative pressure. Access doors on positive pressure sections, shall have a secondary latch to relieve pressure and prevent injury upon access.

G. A 6-inch formed G60 galvanized steel base rail shall be provided by the unit manufacturer for structural rigidity and condensate trapping.. The base rail shall be constructed with 12-gauge nominal for unit sizes 003 - 035 and 10-gauge nominal for unit sizes 040 - 090. The following calculation shall determine the required height of the baserail to allow for adequate drainage. Use the largest pressure to determine base rail height. [(Negative)(Positive) static pressure (in)] (2) + 4" = required baserail height. Should the unit baserail not be factory supplied at this height, the contractor is required to supply a concrete housekeeping pad to make up the difference.

H. Construct drain pans from stainless steel with cross break and double sloping pitch to drain connection. Provide drain pans under cooling coil section. Drain connection centerline shall be a minimum of 3'' above the base rail to aid in proper condensate trapping. Drain connections that protrude from the base rail are not acceptable. There must be a full 2'' thickness of insulation under drain pan.

2.04 FAN ASSEMBLIES

A. Acceptable fan assembly shall be a single width, single inlet, class II, direct-drive type plenum fan dynamically balanced as an assembly, as shown in schedule. Maximum fan RPM shall be below first critical fan speed. Fan assemblies shall be dynamically balanced by the manufacturer on all three planes. Provide access to motor and fan assembly through hinged access door.

B. Fan and motor shall be mounted internally on a steel base. Factory mount motor on slide base that can be slid out the side of the unit if removal is required. Provide access to motor, drive, and bearings through hinged access door. Fan and motor assembly shall be mounted on 2" deflection spring vibration type isolators inside cabinetry.

2.05 BEARINGS, SHAFTS, AND DRIVES

A. Bearings: Basic load rating computed in accordance with AFBMA - ANSI Standards. The bearings shall be provided on the motor with the fan wheel mounted directly on the motor shaft, AMCA arrangement 4.

B. Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.

C. The fan wheel shall be direct coupled to the motor shaft. The wheel width shall be determined by motor speed and fan performance characteristics.

2.06 ELECTRICAL

A. Fan motors shall be manufacturer provided and installed, Open Drip Proof, premium efficiency (meets or exceeds EPAct requirements), 1750 RPM, single speed, 200V / 60HZ / 3P. Complete electrical characteristics for each fan motor shall be as shown in schedule.

B. Fan motors shall be manufacturer provided and installed, Open Drip Proof, premium efficiency (meets or exceeds EPAct requirements), 3500 RPM, single speed, 200V / 60HZ / 3P. Complete electrical characteristics for each fan motor shall be as shown in schedule.

C. The air handler(s) shall be ETL and ETL-Canada listed by Intertek Testing Services, Inc. Units shall conform to bi-national standard ANSI/UL Standard 1995/CSA Standard C22.2 No. 236.

D. Wiring Termination: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclosed terminal lugs in terminal box sized to NFPA 70.

E. Manufacturer shall provide ASHRAE 90.1 Energy Efficiency equation details for individual equipment to assist Building Engineer for calculating system compliance.

F. Installing contractor shall provide GFI receptacle within 25 feet of unit to satisfy National Electrical Code requirements.

G. Air handler manufacturer shall provide, mount and wire ABB variable speed drive with electrical characteristics such as indicated on project schedule and shown on manufacturer's data sheets.

2.07 COOLING AND HEATING COILS

A. Certification: Acceptable water cooling, water heating, steam, and refrigerant coils shall be

certified in accordance with AHRI Standard 410 and bear the AHRI label. Coils exceeding the scope of the manufacturer's certification and/or the range of AHRI's standard rating conditions will be considered provided the manufacturer is a current member of the AHRI Forced Circulation Air-Cooling and Air-Heating Coils certification programs and that the coils have been rated in accordance with AHRI Standard 410. Manufacturer must be ISO 9002 certified.

B. Water cooling coil shall be provided. Provide access to coil(s) for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided exterior to unit casing. Coil connections must be factory sealed with grommets on interior and exterior panel liners to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.

1. Headers shall consist of seamless copper tubing to assure compatibility with primary surface. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with fluid flow requirements.
2. Fins shall have a minimum thickness of 0.0075 inch aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.
3. Coil tubes shall be 5/8 inch OD seamless copper, 0.020 inch nominal tube wall thickness, expanded into fins, brazed at joints.
4. Coil connections shall be carbon steel, NPT threaded connection. Connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent and drain fittings shall be furnished on the connections, exterior to the air handler. Vent connections provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to insure complete drainage and prevent freeze-up.
5. Coil casing shall be a formed channel frame of stainless steel.

C. Water heating coil shall be provided. Provide access to coil(s) for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 5" beyond unit casing for ease of installation. Drain and vent connections shall be provided exterior to unit casing. Coil connections must be factory sealed with grommets on interior and exterior panel liners to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.

1. Headers shall consist of seamless copper tubing to assure compatibility with primary surface. Headers to have intruded tube holes to provide maximum brazing surface for tube to header joint, strength, and inherent flexibility. Header diameter should vary with fluid flow requirements.
2. Fins shall have a minimum thickness of 0.0075 inch aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.
3. Coil tubes shall be 5/8 inch OD seamless copper, 0.020 inch nominal tube wall thickness, expanded into fins, brazed at joints.
4. Coil connections shall be carbon steel, threaded connection. Connection size to be determined by manufacturer based upon the most efficient coil circuiting. Vent and drain fittings shall be furnished on the connections, exterior to the air handler. Vent connections provided at the highest point to assure proper venting. Drain connections shall be provided at the lowest point to insure complete drainage and prevent freeze-up.
5. Coil shall be furnished as an uncased galvanized steel to allow for thermal movement and slide into a pitched track for fluid drainage.

2.08 FILTERS

A. Where no energy wheel is specified furnish flat panel filter section with 2-inch pleated MERV 8 filter. Provide side loading and removal of filters.

B. Filter media shall be UL 900 listed, Class I or Class II.

C. Filter Magnehelic gauge(s) shall be furnished and mounted by others.

D. Where an energy wheel is specified furnish a flat panel filter section with 2-inch pleated MERV 8 filter and MERV 13 final filter in both air streams. Provide side loading and removal of filters.

E. Filter media shall be UL 900 listed, Class I or Class II.

F. Filter Magnehelic gauge(s) shall be furnished and mounted by others.

2.09 ADDITIONAL SECTIONS

A. Plenum section shall be provided and properly sized for inlet and/or discharge air flow (between 600 and 1500 feet per minute). The plenum shall provide single or multiple openings as shown on drawings and project schedule.

B. Access section shall be provided for access between components.

C. Energy recovery wheel shall be constructed of corrugated synthetic fibrous media, with a desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media. Rotors with desiccants coated bonded, or synthesized onto the media are not acceptable due to delaminating or erosion of the desiccant material. Media shall be synthetic to provide corrosion resistance and resistance against attack from laboratory chemicals present in pharmaceutical, hospital, etc. environments as well as attack from external outdoor air conditions. Coated aluminum is not acceptable. Face flatness of the wheel shall be maximized in order to minimize wear on inner seal surfaces and to minimize cross leakage. Rotor shall be constructed of alternating layers of flat and corrugated media. Wheel layers should be uniform in construction forming uniform aperture sizes for airflow. Wheel construction shall be fluted or formed honeycomb geometry so as to eliminate internal wheel bypass. Wheel layers that can be separated or spread apart by airflow are unacceptable due to the possibility of channeling and performance degradation. The minimum acceptable performance shall be as specified in the unit schedule.

Desiccant Material: The desiccant material shall be a molecular sieve, and specifically a 4A or smaller molecular sieve to minimize cross contamination. Wheel Media Support System: The wheel frames shall consist of evenly spaced steel spokes, galvanized steel outer band and rigid center hub. The wheel construction should allow for post fabrication wheel alignment. Wheel Seals: The wheel seals shall be full contact nylon brush seals or equivalent. Seals should be easily adjustable. Wheel cassette: Cassettes shall be fabricated of heavy duty reinforced galvanized steel or welded structural box tubing. Cassettes shall have a built in adjustable purge section minimizing cross contamination of supply air as shown on unit schedule. Bearings shall be inboard, zero maintenance, permanently sealed roller bearings, or alternatively, external flanged or pillow block bearings. Drive systems shall consist of fractional horsepower AC drive motors with multi-link drive belts. Face and bypass dampers shall be furnished as shown on unit schedule and drawings. Certification: The wheel shall be AHRI certified by the energy recovery wheel supplier to AHRI Standard 1060 and must bear the AHRI certification stamp. Private independent testing performed "in accordance with" various standards is not a substitute for AHRI certification and shall not be accepted. The wheel shall be listed or recognized by UL or equivalent.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s Installation & Maintenance instructions.

3.02 ENVIRONMENTAL REQUIREMENTS

A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are

in place, bearings lubricated, and fan has been test run under observation.

3.03 EXTRA MATERIALS

A. Provide one extra set of fan belts and filters for each scheduled unit.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 00 00 – ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

The General and Supplementary conditions shall apply to and form a part of this section as if written in full herein.

SCOPE OF WORK:

This project is to support the phased renovation of this historic building. In this phase the goal is to achieve completion of the required electrical.

Work shall include furnishing and installation of all electrical items shown on the drawings or herein specified, unless shown or specified otherwise including but not limited to those listed below:

Connection of all equipment requiring electrical connection, mentioned in this specification or shown on drawings, whether furnished by electrical contractor or others.

Complete system of outlet boxes, face plates, conduit raceways, and terminal backboard for telephone/Data/television system. Telephone/Data/television systems proper by others.

Complete electric lighting system, power system and control system as shown or herein specified.

Complete Fire Alarm System

Support to other systems for interlock wiring.

INSTRUCTION AND WARRANTY :

A. Contractor shall fully instruct Owner in operation and maintenance of electrical system.

B. Contractor shall assemble and bind manufacturers' operating and maintenance literature for inclusion in Maintenance Manual. Literature shall include record shop drawings, wiring diagrams, instruction sheets, replacement parts list, warranties, and guarantee for all equipment furnished under this section of the specifications. Three sets of such literature shall be provided.

C. Contractor shall warrant all work for a period of one year from date of substantial completion. Contractor shall rectify any defects due to faulty materials or workmanship and pay for any damage to other work resulting therefrom which occurs within said period. Work shall be performed by journeyman skilled in trade involved and with new materials as approved by the Architect. The Owner will give notice of observed defects with reasonable promptness. The above warranty is in addition to any guarantee of equipment by a manufacturer.

D. Contractor shall furnish written warranty that all systems have been installed complete and are functioning properly and that all materials and workmanship are free from defects.

DRAWINGS:

A. The drawings are schematic showing relative locations and connections and shall not be scaled for exact locations. Unless specified dimensions are shown, the structural, architectural and site conditions shall govern the exact locations.

B. Should any difficulty occur in the running of conduits, setting of cabinets, outlets, fixtures or any other devices or connections at the points shown, provide necessary minor deviations therefrom as approved without additional cost.

C. Where conflicts occur between the requirements of the drawings, specifications, and applicable codes, the contractor shall provide an installation that conforms with the most stringent requirement and the most expensive procedure.

PART 2 - PRODUCTS

MATERIALS:

A. Materials and equipment shall be new, standard current products of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's latest design.

B. All materials shall bear the label of the Underwriter's Laboratory for the intended use or shall be materials approved by the code enforcing authorities and the Architect/Engineer.

C. Materials shall be delivered to the site in the manufacturer's original unopened containers except where prior approval and inspection is obtained from the Architect. Materials shall be inspected prior to storage. Damaged, defective, or improper equipment shall be replaced or repaired at the expense of the Contractor and in a manner meeting with approval of the Architect. Electrical cables shall be handled and stored carefully to avoid damage to the insulation and damage from weather. All metallic materials shall be suitably protected against corrosion.

D. Specific references to any article, device, product, material, fixture, form or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. The contractor may use any article, device, product, material, fixture, form or type of construction which in the judgment of the Architect expressed in writing is equal to that specified. Ten day prior approval is required for all substitutions.

E. The contractor shall coordinate sizes indicated for electrical components such as circuit breakers, disconnects, feeders and starters with requirements for equipment actually provided and shall notify the Architect if any item is inadequate in size for equipment installed or proposed. Contractor shall install as a minimum the size indicated unless he receives in writing from the Architect directions to reduce the component in size.

F. When the equipment to be installed has a requirement which is greater than shown, the Contractor shall increase the size of the electrical component as work under the section of this specification which installs the equipment requiring the same. Modifications to the contract will not be issued for failure to coordinate with other trades or with the requirements of owner furnished equipment.

G. All materials, equipment, and devices shall, as a minimum, meet the requirements of UL where UL standards are established for those items, and the requirements of NFPA 70. All items shall be new unless specified or indicated otherwise.

HARDWARE:

All hardware and accessory fittings shall be of a type designed, intended or appropriate for the use, and complement the items with which they are used, and shall have corrosion protection suitable for the atmosphere in which they are installed. All such hardware shall be U.S. Standard sizes.

EQUIPMENT:

Equipment of a similar nature shall be identical. Example: All panel boards shall be of the same manufacturer and of the same style.

MATERIAL PROTECTION :

Store and protect all materials from injury prior to installation. Materials shall not be stored directly on the ground or floor shall be kept clean and dry as possible and free from damage or deteriorating elements. Damaged materials shall not be installed.

WOOD BACKBOARDS:

Type: 3/4" thick Grade 1 plywood attached to wall with 1/4" toggle bolts.

Finish: Frame and coat both front and back with two coats of enamel (grey).

SHOP DRAWINGS AND CATALOG DATA:

The Contractor shall check data carefully to insure compliance with these specifications prior to submitting. Submittal data shall be submitted at one time in one Portable Data Format (pdf) electronic file. All shop drawings for this project shall be made in one submittal, and within thirty (30) days after award of contract. Shop drawings of all power equipment shall contain exact details of device placement, phasing and numbering, in form of elevations, for each major piece of equipment.

Contractor's Approval: Shop drawings and cuts shall be bare a dated stamp by Contractor as evidence of checking to ensure compliance with plans and specifications. Unstamped documents will be returned.

Submittals: Submittal shall include but not be limited to:

(1) Panelboards
(2) Circuit Breakers
(3) Wiring Devices and Plates
(4) Conduit, boxes and Fittings
(5) Conductors
(6) Light fixtures
(7) Transient Voltage Surge Suppression System
(8) Fire Alarm System and devices

Incomplete or uncoordinated submittals shall be returned to the Contractor without action.

None of the above items shall be installed until shop drawings or catalog data has been accepted in writing.

SUBSTITUTIONS:

Basis of Design: Model numbers indicated herein or shown on the drawings are the Basis of Design. The Contractor may substitute equivalent and approved equipment from manufacturers listed in this specification or set forth in an addendum provided said equipment meets all requirements of the plans and specifications, and will fit in the available spaces in the building as shown.

Prior Approval: Substitutions of specified items will be considered only if written request has been submitted and received by the Architect for review at least ten (10) days prior to the receipt of bid proposals. Each request shall include a description of the proposed substitute, the name of material or equipment for which it is to be substituted, drawings, cuts, performance and test data for an evaluation and a statement from the equipment manufacturer's representative that the items to be substituted meet or exceed the specifications of the item substituted for.

Addenda: If the substitution is allowed, such approval will be set forth in an addendum.

Costs: All costs incurred by the acceptance of substitutions shall be borne by the Contractor.

PART 3 -EXECUTION

INSTALLATION:

A. All work will be installed in accordance with regulations of the National Electrical Code, the Life Safety Code, and ordinances of the state and local governments.

B. Contractor shall obtain all necessary permits and inspections as required and pay all charges for same, and shall turn over to the Architect Certificate of final inspection. Should any part of the design fail to comply with such requirements, discrepancy shall be called to the attention of the Architect prior to submission of bid.

C. Follow the installation directions and recommendations of the material and equipment manufacturers.

D. Materials damaged during installation shall be repaired to a new condition or shall be replaced. Finishes on equipment which have been scratched or marred shall be touched up to match finish or shall be completely refinished.

SCHEDULING OF WORK:

A. Electrical feeders, branch wiring, signal wiring, and other similar work shall be scheduled to correspond with the sequence of work necessary to construct new work.

B. Electrical work shall be scheduled to provide an orderly installation without causing any delays in the overall construction of the project.

IDENTIFICATION:

A. Each panel and equipment disconnect/starter shall be identified consistent with the terminology of the contract documents using engraved white core black face plastic laminate nameplates, white block letters with black background, permanently attached to panel and disconnect/starter with brass screws. Text shall be ¼" in height. In addition, each disconnect/starter tag shall designate the panel and circuit which serves the piece of equipment. This text shall be 3/16" in height. Each of the three electrical service disconnects shall be identified as "Service Disconnect 1 of 3", "Service Disconnect 2 of 3", or "Service Disconnect 3 of 3" as appropriate using engraved white core red face plastic laminate nameplates, white block letters with red

background, permanently attached to panel and disconnect/starter with brass screws. Text shall be 1-1/2” in height.

TEMPORARY SERVICE AND SUPERVISION:

A. Temporary power and construction lighting shall be provided as needed under this section of the specifications. Both shall be provided in a safe and sufficient manner for the orderly completion of the work. The cost of power shall be paid for by the general contractor.

B. All work shall be performed under the direct supervision of a journeyman electrician.

POWER INTERRUPTIONS:

A. The contractor shall schedule any power interruptions necessary to complete the work with the knowledge and consent of the owner. The owner's work schedule shall not be interrupted.

UTILITIES:

It shall be the responsibility of this Contractor to reaffirm with the Utility Company, that the location, arrangement (and with power voltage and phase) and connections to utility service are in accordance with their regulations and requirements including utility required provisions for pad mounted equipment.

EXCAVATION, CUTTING, PATCHING:

Perform all excavating and cutting as required to receive electrical work, and after inspection and approval of work by the Engineer, do all required backfilling, patching and repairing. Obtain specific approval of the Architect before cutting into any structural members.

STORAGE OF MATERIALS:

Store all materials to prevent damage from rust, corrosion, physical injury, etc.

Keep site clean of accumulation of cartons, trash, debris, etc. on a day-to-day basis.

"AS-BUILT" DRAWINGS:

The Contractor shall keep a complete set of electrical plans on the job site on which any changes shall be made on a daily basis and in red color. The drafting of the changes on the plans shall be made with the aid of templates, straight-edges and other appropriate tools and the lettering neatly done in order that they may be legible and readily understood. Upon completion of work all changes shall be transferred to electronic format using AutoCAD. An electronic file on a 3.5” floppy disk and three prints of as-built drawings shall be turned over to the Owner at the completion of the project.

ACCEPTANCE TESTING:

Electrical System: Upon completion of work, the entire wiring system shall be tested, and shall be shown to be in perfect working condition in accordance with intent of the specifications and drawings. It shall be the responsibility of the electrical contractor to have all systems ready for operation and to have an electrician available to operate same in accordance with and under the supervision of the inspection representative of the Engineer. The electrician shall be available to assist in removal of panel fronts, etc., to permit inspection as required. The following shall be made available to personnel conducting the test:

(1) Accurate voltmeter
(2) Clamp-on ammeter
(3) Test lamp
(4) Phase rotation indicator
(5) Complete electrical specifications and drawings with addenda and revisions.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 05 19 - CONDUCTORS (600 – VOLT)

PART I - GENERAL

GENERAL REQUIREMENTS:

Section 26 00 00, "Electrical General Requirements" applies to this Section with additions and modifications specified herein. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears.

Provide factory fabricated wire of the size and rating as indicated for each service. Where not indicated, provide proper selection to comply with installation requirements and with NEC standards. The minimum size for power and lighting outlet wiring is #12 AWG, copper except that branch circuit "homeruns" over 100 feet in length shall be No. 10 for 120/208V circuits.

PART II - PRODUCTS

MATERIALS AND EQUIPMENT, GENERAL:

All materials, equipment and devices shall, as a minimum, meet the requirements of UL where UL standards are established for those items, and the requirements of NFPA 70. All items shall be new unless specified or indicated otherwise.

Metal Clad Cable: MC cable is acceptable in the residential area of construction.

CONDUCTORS (TO 600 VOLTS):

Minimum size AWG 12 copper with minimum conductance of 98% unless noted otherwise, solid for #10 and smaller, stranded for #8 and larger. Install all in continuous conduit system.

Conductor Insulation, Unless Noted Otherwise:

No. 6 and Smaller: Type "THWN or THHN".

Larger than No. 6: Type "XHHW" or "THW".

Color Coding: All ungrounded conductors No. 8 and smaller shall be wired with color-coded wire with the same color used for a system throughout the building. Ungrounded conductors above No. 8 shall either be fully color-coded or shall have black insulation and be similarly color-coded with tape in all junction boxes and panels. Ground conductors shall be color-coded green.
Unless otherwise approved, color-code shall be as follows:

		120/208V	277/480V
Ø	A	Black	Brown
Ø	B	Red	Orange
Ø	C	Blue	Yellow
	Neutral	White	Grey

All grounded conductors No. 6 and smaller shall be wired with color-coded wire, color-coding shall be continuous the full length of the grounded conductor in accordance with NEC 310-12.

The color code shall be permanently posted at each panelboard in accordance with NEC-210-4(d).

Manufacturers: Anaconda, Brand-Rex, Okonite, Pirelli, Rome, Triangle or Southwire.

TAPS AND SPLICES:

All taps and splices in No. 8 or smaller branch circuits shall be fastened together by means of "wire nut" connectors (Ideal or approved substitution). All taps and splices in branch circuits larger than No. 8 shall be made with compression type connectors and taped to provide insulation equal to wire.

Taps and splices shall not be made in feeders.

PART III - EXECUTION

INSTALLATION:

General Requirements: Electrical installations shall conform to the requirements of NFPA 70 and to the requirements specified herein.

Wiring: Install all wiring in raceways. Make installation only after the raceway system is complete and equipment-terminating conduit has been fixed in position. Remove water and debris by swabbing out raceway before wiring is installed.

Do not pull conductors into conduits until all work that may cause damage to the wires is completed. Install wire and cables so as not to damage the insulation or cable sheath. Pull all conductors to be installed in a raceway together. Train and guide wires into the raceway using a pulling compound or lubricant when necessary unless prohibited by NEC Article 517 or similar restrictions. Provide a means of communication between the pulling and guiding points to facilitate installation and to help prevent damage. Use a pulling means that will not damage the raceway or conductors. Limit pulling-in tensions to manufacturer's recommendation.

Splicing:

Keep conductor splices to a minimum. Provide splices and taps with at least the equivalent mechanical strength and insulation rating as the conductors. Provide splice and tap devices of the proper size and type for the use and compatible with the conductor material and use the proper materials and tools as listed by the manufacturer for installation.

Make splices only in accessible locations. Use wire nuts in interior dry locations only for branch circuit conductors #8 AWG and smaller. Use compression type connectors for branch circuit conductors #6 AWG and larger. Insulate splice with insulating putty and tape to twice conductor insulation thickness. Cover with two half-lapped layers of electrical tape extending at least two cable diameters over original insulation. An approved lug/cable cover may be substituted for the insulating putty where such is available for the connector used and is of the same manufacture.

Termination:

Terminate wires so that there is no bare conductor at the terminal. The conductor insulation shall bear against the terminal or connector shoulder. Do not reduce diameter of wire at termination or connection.

Terminate conductors at equipment using either approved mechanical lugs furnished with the equipment or compression lugs. Terminate conductors at motors (#8 AWG and larger) using NEMA spade lugs and machine bolt, Belleville washer, washer and nut arrangement.

Insulate and cover as for splices. When #10 stranded conductor is approved, breakers must have compression lugs.

Provide sufficient length of conductors within cabinets and boxes to neatly train the conductor to the terminal point with no excess. Fasten the cables together in neat bundles using "Ty-Wraps".

Where conductors are to be electrically connected to metallic surfaces, polish the coated surface of the metal before installing the connector. Remove lacquer coating of conduits where ground clamps are to be installed.

Bending Radius: Limit cable or wire bending radius to 10 cable/wire diameters where under tension. Limit radius to 8 cable/wire diameters elsewhere.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 05 26 - GROUNDING

PART I - GENERAL

SCOPE:

This Section deals with the grounding of service equipment, and all non-current carrying conductive surfaces of equipment.

All grounding connections shall be installed in accordance with the National Electrical Code and all local codes and requirements. Such codes shall be considered minimum requirements and the installation of the grounding system shall ensure freedom from dangerous shock, voltage exposure and provide a low impedance ground fault path to permit operation of over-current and ground fault protective devices.

Resistance to ground shall not exceed 5 ohms.

PART II - PRODUCTS

CONDUCTORS:

Grounding conductors shall be copper.

GROUND RODS:

Ground rods shall be 3/4 inch by 10 feet long, copperweld.

CONNECTIONS:

The connection of a grounding conductor to ground rods, building steel, water piping, and reinforcement bar mat shall be by means of a cadweld or thermoweld process.

Grounding conductor connections at conduit terminations shall be made by approved grounding bushings.

PART III - EXECUTION

MAIN SERVICE GROUND:

The main service grounding electrode system shall consist of the following items bonded together by the grounding electrode conductors, resistance to ground shall not exceed 15 ohms:

1. A minimum three driven ground rods spaced 10 feet apart in a triangle. Connection to ground rods shall be by exothermic weld process. Top of ground rods shall be minimum of 24 inches below grade. Drive additional ground rods as needed to meet required resistance to ground.
2. Metallic Water Service: Make connection to metallic water pipe by suitable ground clamp. (If flanged pipe is used, make connection on street side of flange connection).
3. Structural steel, ground grid mats and re-bar in footings and slab and water piping shall be bonded and connected to the main building service ground.

GROUNDING ELECTRODE SYSTEM:

The Grounding Electrode System shall be connected to the grounded conductor (neutral on the supply side of the service disconnecting means) by a grounding electrode conductor not smaller than that shown in Table 250-66 of the N.E.C. The equipment grounding conductor shall be connected to the grounded conductor on the supply side of the service disconnecting means in accordance with Table 250-122 of the N.E.C., for the ampere rating of the service entrance equipment. These connections shall be made inside the service entrance equipment enclosure.

FEEDERS AND BRANCH CIRCUITS:

All feeders and branch circuits shall have installed in the same raceway as the circuit conductors, an insulated copper grounding conductor sized in accordance with Table 250-122 of the National Electrical Code unless such a grounding conductor is shown to be larger on the drawings.

EXPOSED NON-CURRENT CARRYING CONDUCTIVE SURFACES:

All exposed non-current carrying conductive surfaces of electrical equipment shall be grounded by a grounding conductor either run with the circuit conductors, and/or separate grounding conductors as shown.

CONVENIENCE OUTLETS AND RECEPTACLES:

All grounding type outlets and receptacles shall be grounded by a separate ground conductor with green insulation.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 05 33 – RACEWAYS AND BOXES

PART I - GENERAL

SCOPE:

This Section specifies furnishing and installing raceways, outlet boxes, junction boxes, pull boxes, connections and support.

General: Conduit shall be rigid galvanized conduit, intermediate metallic conduit, heavy wall schedule 40-PVC plastic conduit (in slab or below ground only), electrical metallic tubing or surface mounted system (when specifically indicated). All above grade conduits 1-1/2" and larger, exposed below 8'-0"or exposed to weather shall be IMC or rigid. Only rigid galvanized conduit and/or heavy wall schedule 40-PVC shall be installed underground and in or under concrete slab on grade. Elsewhere conduit shall be EMT or surface mounted system where indicated. Provide outlet boxes for lighting fixtures, wall switches, wall receptacles, etc., of such form and dimensions as to be adapted to their specific usage, location and size and number of conduits connecting thereto. MC cable is acceptable in wall cavities, attics, crawl spaces, and in areas where future ceilings will conceal the cable.

REFERENCE STANDARDS:

ANSI/NEMA Publication No. OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers and Box Supports, and Cast Aluminum Covers.

ANSI/UL 514 - Electrical Outlet Boxes and Fittings.

UL 50 - Cabinets and boxes.

PART II – PRODUCTS

Electrical Metallic Tubing (EMT):

Electrical Metallic tubing shall meet Federal Specification WW-C-563.

Rigid Galvanized Conduit (RCG):

Shall be standard threaded type, galvanized outside and inside by hot dipping. Threadless and clamp type not acceptable. Federal Specification WW-C-581.

Intermediate Metal Conduit (IMC):

Intermediate metal conduit (IMC) shall be high frequency electro-welded into tube form to produce a high ductile conduit that can be easily bent with standard tools approved for IMC.

The electro-galvanized zinc finish shall be corrosion resistant and shall not crack or flake. A chromate conversion coating shall be applied over the entire tube as an additional corrosive preventative. The interior shall be protected and lubricated with a special silicone hard finish enamel.

Both ends shall have precision cut hi-torque threads. One end shall have a coupling and the other shall be covered with a color-coded plastic thread protector. Conduit shall be manufactured in 10 foot lengths.

IMC shall be U.L. labeled and manufactured in accordance with U.L. Standard #1242.

Surface Mounted Raceway System:

Surface mounted raceway system shall be steel construction, Wiremold Series V500.
Flexible Steel Conduit:

Continuous length, spirally wound steel strip, zinc-coated, each convolution interlocked with following convolution. Federal Specification WW-C-566.

Liquid-Tight Flexible Steel Conduit: Plastic jacketed flexible steel conduit with copper bonding conductor.

PVC Conduit:

PVC conduit shall be composed of High Impact PVC and shall be UL listed in accordance with Article 347 of National Electrical Code for underground and exposed use.

Couplings and Connectors - EMT:

Shall be steel, split ring compression type. All couplings and connectors shall be Efcor or equal series of Raco. Connectors shall have insulated throat. Pressure indented or set screw type connectors or cast metal will not be approved for any location.

Connectors - Raintight:

Meyers or approved equal.

Bushings:

Rigid, shall be threaded, insulated, malleable iron O.Z. type "B" or Efcor type 55. Grounding bushings shall be O.Z. type "LG" or Efcor type 56.

EMT shall be equipped with insulating throat.

Water Tight Flex Connectors:

Efcor, Raco, or Midwest Liquid Tite, with insulated throat.

Conduit Clamps and Supports:

Shall be as manufactured by Efcor, Steel City, or G.A. Tinnerman.

Conduit Fittings:

Shall be manufactured by Killark, Crouse-Hinds, Russell & Stoll or Appleton

Boxes: Boxes and covers shall be not less than 1/16" thick single piece steel construction and firmly anchored in place and shall be provided with approved 3/8" fixture studs for fixtures. Junction boxes shall be

provided with blank covers painted to match surroundings.

Pullboxes: Shall be constructed of code gauge welded and galvanized steel. Such boxes shall be sized in accordance with NEC requirements and shall be furnished without knockouts; holes for raceways shall be drilled on the job.

Manufacturers: Crouse-Hinds Condulets, Appleton or Pyle.

Surface Box System: Surface boxes shall be Wiremold Surface Systems, V500 series.

Floor Box System: Floor boxes shall be Wiremold Walker Industries Infloor Systems, Modulink 880MP.

PART III – EXECUTION

Conduit, Type of Installation:

EMT may be used where concealed in ceiling or walls, where there is no danger of mechanical injury. EMT may be used exposed above eight (8) feet above floor.

PVC may be used underground or in slab. Where PVC penetrates a floor from underground or in a slab, a black mastic coated steel conduit elbow shall be used. Provide steel conduit to 8" above slab.

Installation of Conduit:

Follow methods which are appropriate and approved for the location and conditions involved. Where not otherwise shown, specified, or approved in a particular case, run all wiring concealed.

Where rigid and/or IMC conduits enter boxes they shall be secured in place by approved lock nuts and bushings.

Where EMT enters boxes they shall be secured in place with approved insulated fittings. All conduit stub-ups to above ceiling shall have bushed ends.

Conduit ends shall be carefully plugged during construction.

Use of running threads is absolutely prohibited. Conduit shall be jointed with approved conduit couplings. All couplings on IMC and rigid conduit shall be threaded.

Before installing raceways for motors and fixed appliances, check locations of motor and/or appliance connections and locate and arrange raceways appropriately.

All conduit runs shall be paralleled to and/or at right angles to building walls and/or partitions.

Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings. Field-made bends and offsets shall be made with an approved hickey or conduit-bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes, fittings and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.

An approved conduit expansion fitting will be installed in all conduits crossing structural expansion joints or at

intervals not exceeding 200 feet equally proportioned on long conduit runs interior or exterior.

Raceways shall be securely supported and fastened in place at intervals of not more than 10 feet or within 3 feet from a change in direction with pipe straps, wall brackets, hangers, threaded C-clamps with retainers, or ceiling trapeze. Ceiling system shall not be used. Wire shall not be used. Fastenings shall be by wood screws or screw-type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded-threaded studs, heat-treated or spring-steel-tension clamps on steel work. Nail-type nylon anchors or threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine or wood screws. Raceways or pipe straps shall not be welded to steel structures. Holes not used shall be filled.

Apply two coats of asphaltum paint to all underground metallic conduit. All joints shall be recoated after installation. Carefully retouch any breaks in paint and allow to dry before covering with earth. Leave exposed until after Engineer's inspection. Pittsburgh Standard Rob-Kote may be used in lieu of painting.

Conduit shall be sized in accordance with the latest National Electrical Code except that 1/2 inch conduit shall contain no more than 8 #12 wires. Conduit shall be sized larger than required above when so shown on the drawings or when required by local Code.

No conduit with an external diameter larger than 1/3 the thickness of the slab shall be placed in the slab. Conduits in the slab shall not be spaced closer than 3 diameters on center

All exposed conduit threads, metal supports, etc., exposed to elements or exterior of building shall be painted with rust preventive paint.A pull wire shall be inserted in each empty raceway in which wiring is to be installed by others. The pull wire shall be No. 14 AWG zinc-coated steel, or of plastic having not less than 200 pound tensile strength. Not less than 10 inches of slack shall be left at each end of the pull wire.

All conduit connections to sheet metal cabinets or enclosures subject to the elements shall terminate by use of raintight hubs.

All raceways shall have an insulated copper system ground conductor. All metallic raceway systems shall be fully bonded to achieve a dual ground path for each raceway system.

Provide and install pullboxes, junction boxes, fire barriers at fire rated walls as required by NEC Article 300.

Boxes:

1.The approximate locations of outlets are shown on the drawings. The exact locations shall be determined at the building. The right is reserved to change without additional cost the location of any outlet before it is permanently installed.
2. Unless otherwise indicated or directed, wall outlet boxes shall be placed with centerline at distances above the finished floor as follows:
   A. Convenience Outlets 18
   B. Switches 48"
3.After completion, using an indelible wide tip marker, indicate on the cover of each junction and pull box the designation of the circuits contained therein, i.e.: RP-1,3,5

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 24 00 - PANELBOARDS

PART I - GENERAL

Scope: This section specifies furnishing and installing distribution and branch circuit panelboards.

Reference Standards:

ANSI/UL 67 - Electric Panelboards.

NEMA AB 1 - Molded Case Circuit Breakers.

NEMA PB 1 - Panelboards.

Submittals: Product data and shop drawings:

1. Product data shall be submitted on:

    a. Panel
    b. Cabinet
    c. Bus
    d. Construction
    e. Dimensions

2. Shop drawing shall be submitted for each and every panel; drawing shall clearly indicate the following information:

    a. U.L. Label
    b. Each circuit breaker amperage rating, circuit number and position/location in panel
    c. Electrical characteristics of panel
    d. Mains rating
    e. Main device rating
    f. Mounting
    g. Dimension, width, depth, height
    h. Bus material
    i. Interrupting capacity of minimum rated breaker and panel nameplate AIC rating
    j. Panel type

PART II – PRODUCTS

ENCLOSURE:

Cabinet: Construct cabinets in accordance with UL 50. Use not less than 16 gage galvanized sheet steel. Provide a minimum 4-inch gutter wiring space on each side. Reinforce cabinets and securely support bus bars and over-current devices to prevent vibration and breakage in handling. Provide standard conduit knockouts in ends of cabinets. Finish cabinets of surface mounted panelboards to match doors and trim as specified below.

Doors and Trim: Fabricate doors and trim of cold rolled sheet steel. Equip doors with flush type combination

catch and key lock. Key all locks alike. Fasten trim for flush mounted panelboards to cabinets by an approved means which permits both horizontal and vertical adjustment. Trim for surface mounted panelboards must fit the cabinet with no overhang. Apply a finish to trim and doors consisting of two coats of enamel over a rust inhibiting prime coat.

Bus: Fabricate bus of 98 percent IACS conductivity copper with rounded edges. Size bars as indicated and brace them to withstand symmetrical short circuit current as specified. Install buses in allotted spaces so that devices can be added without additional matching, drilling or tapping. Use buses with silver plated contact surfaces. Mount full sized neutral bars, when provided, on the end opposite of the main lugs. Include a ground bus in panelboard rated not less than 25 percent of the main bus ampacity.

Main Lugs: Provide solderless lugs on mains and neutral.

PROTECTIVE DEVICES:

Circuit Breakers: Provide circuit breakers for the specified service with the number of poles and ampere ratings indicated.

Provide breakers which are quick-make and quick-break on both manual and automatic operation. Use a trip-free breaker which is trip indicating. Incorporate inverse time characteristic by bimetallic overload elements and instantaneous characteristic by magnetic trip. Where indicated, provide ground fault breakers (GFCB).

For 2-pole and 3-pole breakers, use the common trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.

Unless otherwise indicated, provide breakers U.L. listed and rated for voltage and class of service to which applied.

All interiors shall be factory assembled. Connect breakers to the main bus by means of a solidly bolted connection. Use breakers which are interchangeable, capable of being operated in any position within the panel. Independently mount breakers so that a single unit can ge removed from the front of the panel without disturbing or removing main bus, other units or other branch circuit connections.

Series rated circuit breakers used to obtain higher than individually rated interrupting capacities shall not be used.

Nameplates: Panelboards shall be furnished with nameplates.

Circuit Identification: For each panelboard, provide a directory frame mounted inside the door with a heat resistant transparent face and a typewritten directory card for identifying the load served. Directories shall show the actual type of load and room numbers used, not necessarily as shown on the drawings.

Transient surge protection:
All service entrance equipment shall have transient voltage surge protection. Clamping voltage to be less than 330 volts. Response time to be less than five nanoseconds. Main panel protection shall be equal to Current Technology Transguard series TG100. Sub panels shall not be protected. Acceptable manufacturers are Advance Protection Technologies, Surelogic, and APC.

Listing: UL 67 - Electric Panelboards.

Acceptable Manufacturers: Acceptable manufacturers are General Electric,

Square D, ITE, Westinghouse or Siemens.

PART III - EXECUTION

Install panelboards in the locations as shown and as recommended in NEMA PB1.1. Do not mount directly to masonry or concrete walls. Provide a 3/4" plywood backboard on wall and securely mount panelboard on the plywood.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 27 26 - WIRING DEVICES

PART I - GENERAL

GENERAL REQUIREMENTS: Section 26 00 00, "Electrical General Requirements", applies to this Section with additions and modifications specified herein. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears.

Reference Standards:

(1) ANSI/UL 498 - Electrical Attachment Plugs and Receptacles.

(2) NEMA WD 1 - General Purpose Wiring Devices.

PART II - PRODUCTS

MATERIALS AND EQUIPMENT, GENERAL: All materials, equipment, and devices shall, as a minimum meet the requirements of UL where UL standards as established for those items, and the requirements of NFPA 70. All items shall be new unless specified or indicated otherwise.

WIRING DEVICES:

Switches: Device shall be residential grade, silent type, flush toggle switches, 15 ampere, 125-277 volt AC as required, with mounting yoke insulated from mechanism, equipped with equipment ground screw terminal, plaster ears, white color switch handle, and side-wired screw terminals.

	Bryant
SPST	RSD115
Three-Way	RSD315

Dimmers: Where dimming is indicated, provide white Bryant RDV series dimmers appropriate to the fixture/lamp type be controlled.

Receptacles:

(1) Duplex: Device shall be commercial grade duplex type receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, ground terminals and poles internally connected to mounting yoke, 20 ampere, 125 volts, with metal plaster ears, side wiring, white, NEMA configuration 5-20R unless otherwise indicated.

(2) GFCI: Device shall be commercial grade, duplex, ground fault circuit interrupter receptacles, grounding type, UL rated Class A, Group 1, 20 ampere rating, 125 volts, 60 Hz; with solid state ground fault sensing and signaling; with 5 milliampere ground fault trip level; equipped with 20 ampere receptacle configuration, NEMA 5-20R.

	Bryant
Duplex (20A-120V)	DRS20WHI
Ground Fault	GFST20W
Weather Proof	GFTR20W

DEVICE PLATES:

Gangs: Where two or more devices are shown adjacent, they shall be mounted in ganged boxes and covered with one face plate.

Size: Plates shall be standard size, except where necessary to cover masonry openings jumbo plates shall be used.

Finish: Device plates shall be white colored high impact nylon.

ALTERNATE MANUFACTURERS: As specifically noted on the plans or GE and Leviton,

PART III - EXECUTION

INSTALLATION:

General Requirements: Electrical installations shall conform to the requirements of NFPA 70 and to the requirements specified herein. All devices shall be installed using side wired terminals only.

Wiring Devices: Provide devices as specified herein and as shown on the drawings. Receptacles not specified herein nor scheduled on drawings but shown on the drawings shall be of similar construction and NEMA configuration.

Grounding: All wiring devices shall be grounded by a separate ground conductor with green insulation. Also, connect "pig tail" to the equipment grounding conductor by means of a screw connection to the device box in a manner such that removal of the device will not interrupt the continuity of the equipment grounding conductor.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 50 00 - LIGHTING FIXTURES

PART 1 - GENERAL

SCOPE:

This Section includes the lighting fixtures, lamps, trim, ballasts, poles, bases, and accessories.

QUALIFICATIONS:

A. Photometric data of independent nationally recognized testing agencies will be accepted.

B. Photometric data of testing laboratories of fixture manufacturers may be accepted if certified and approved by the Engineer.

SUBMITTALS:

A. Submit Shop Drawings for each fixture assembly consisting of catalog cuts, photometric data, dimensions, ballasts data, voltage, materials, finishes and installation data. Submittals shall be bound in a manual, indexed and identified in accordance with schedules.

FIXTURES, GENERAL REQUIREMENTS:

A. Light fixtures shall be furnished complete with lamps and all necessary mounting hardware and trim and installed as shown on the drawings.

B. Light fixtures shall be neatly and firmly mounted, using standard supports for outlets and fixtures. Suitable support members shall be provided for all fixtures, outlet boxes and hangers under this section of specification.

C. Except as indicated or specified otherwise, the metal parts of light fixtures shall be of corrosion-resistant metal or shall be suitably finished to resist corrosion; metal portions of fixtures which will be visible after installation shall have an unblemished finish.

D. Lens frames shall be supported so as to avoid sagging, and shall be readily removable with suitable hinges and latches. Removable frames shall have adequate retention for use when servicing

G. Fluorescent ballasts shall be ETL tested, UL listed, high power factor, Class P, sound rating A, energy saving type equal to Advance Mark III unless specifically noted otherwise.

H. Fixtures in exterior locations and all H.I.D. fixtures shall have nickel plated screw shells.

I. Where dimming is indicated, provide necessary dimming ballasts or accessories.

PART 3 -EXECUTION

INSTALLATION:

A. Adjust directional fixtures to obtain the most uniform distribution. Orient all similar fixtures consistently. Coordinate fixtures with speakers, air grilles, pipes and ductwork.

B. Fixture bottoms, edges, and ends shall be even. Clean all fixtures of debris and fingerprints and adjust trim to fit surfaces snug.

C. Provide all necessary hangers, mounting accessories, and miscellaneous steel for a complete installation.

D. Locate the fluorescent fixture in equipment rooms to best illuminate the equipment installed. Use chains or rods to support below ducts and pipes as required. Install after pipes and ducts are in.

E. Test all fixtures, switches and controls for operation. Replace all lamp burnouts if their estimated operating period is less than 80% rated lamp life prior to final acceptance.

F. Fire rated suspended ceiling grid systems shall be supported with a vertical hanger from each corner of each Lay-in fluorescent troffer or as required by the ceiling system UL listing.

G. Troffers shall be fastened to the ceiling grid members by approved methods per Section 410-16 (c) of the NEC.

H. Recessed incandescent or compact fluorescent fixtures that are not IC rated, must have three inches of clear air space all around the fixture. In insulated ceilings, the contractor shall provide an insulation dam around the fixture to keep insulation at least three inches from the fixture.

I. All poles mounted to concrete bases with anchor bolts shall be furnished with a base cover of the same material and finish as the pole.

END OF SECTION

DIVISION 26 - ELECTRICAL

SECTION 26 60 00 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this section.

B. The work covered by this section is to be coordinated with related work as specified elsewhere in the specifications.

C. The system and all associated operations shall be in accordance with the following:

1. Requirements of the following Florida Building Code-5th Ed.

2. NFPA 72, National Fire Alarm Code, 2016 Edition

3. NFPA 70, National Electrical Code,2014 Edition

4. NFPA 101, Life Safety Code 2015 Edition

5. ANSI/ASME A17.1 / CSA B44, Safety Code for Elevators and Escalators, 2013 Edition

6. Local Jurisdictional Adopted Codes and Standards

7. ADA Accessibility Guidelines

1.2 SUMMARY

A. This Section covers fire alarm systems, including initiating devices, notification appliances, controls, and supervisory devices.

B. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.

C. The Fire Alarm System shall consist of all necessary hardware equipment and software programming to perform the following functions:

1. Fire alarm system detection and notification operations.

2. Control and monitoring of elevators, fire suppression systems, and other equipment as indicated in the drawings and specifications.

1.3 SCOPE OF WORK

A. PHASED CONSTRUCTION: The project calls for phased construction. In this phase electrical and fire alarm systems are predominate. Future phases include mechanical systems and additional framing and finishes. As such this system must function to provide building protection for the period between phases as well as thereafter. Some components may be installed as part of this phase that anticipate future work such as the smoke and heat detectors for the elevator shaft and machine room. In cases such as that the sensors shall be bagged to protect them from the elements until such time as their use is needed.

1.4 SYSTEM DESCRIPTION

A. General: Provide a complete, non-coded addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.

B. Power Requirements

1. The control unit shall receive AC power via a dedicated fused disconnect circuit.

2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 5 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.

3. All circuits requiring system-operating power shall be 24 VDC nominal voltage and shall be individually fused at the control unit.

4. The incoming power to the system shall be supervised so that any power failure will be indicated at the control unit. A green "power on" LED shall be displayed continuously at the user interface while incoming power is present.

5. The system batteries shall be supervised so that a low battery or a depleted battery condition, or disconnection of the battery shall be indicated at the control unit and displayed for the specific fault type.

6. The system shall support NAC Lockout feature to prevent subsequent activation of Notification Appliance Circuits after a Depleted Battery condition occurs in order to make use of battery reserve for front panel annunciation and control.

7. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.

8. Loss of primary power shall sound a trouble signal at the FACU. FACU shall indicate when the system is operating on an alternate power supply.

C. Software: The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary.

1. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.

2. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.

D. History Logs: The system shall provide a means to recall alarms and trouble conditions in chronological order for the purpose of recreating an event history. A separate alarm and trouble log shall be provided.

E. Recording of Events: The system shall be capable of recording all alarm, supervisory, and trouble events. The event shall include the type of signal (alarm, supervisory, or trouble) the device identification, date and time of the occurrence. The history shall differentiate alarm signals from all other printed indications.

F. Wiring/Signal Transmission:

1. Transmission shall be hard-wired using separate individual circuits for each zone of alarm operation, as required or addressable signal transmission, dedicated to fire alarm service only.

2. System connections for initiating device circuits shall be Class B, Style D, signaling line circuits shall be Class B, Style 4 and notification appliance circuits shall be Class B, Style Y.

3. Circuit Supervision: Circuit faults shall be indicated by a trouble signal at the FACU. Provide a distinctive indicating audible tone and alphanumeric annunciation.

4. Constant Supervision Audio: When provided, audio notification appliance circuits shall be supervised during standby by monitoring for DC continuity to end-of-line resistors.

G. Supplemental Notification and Remote User Access (Fire Panel Internet Interface)

1. Fire Alarm Control Unit (FACU) shall have the capability to provide supplemental notification and remote user access to the FACU using Ethernet and TCP/IP communications protocol compatible with IEEE Standard 802.3.

H. Remote Services Access:

1. Fire Alarm Control Unit (FACU) shall have the capability to provide a remote service access feature using Ethernet and TCP/IP communications protocol compatible with IEEE Standard 802.3. The Remote Access feature shall provide automatic notification of system faults and remote diagnostics of system status

for responding technicians prior to arrival on site.

I. Required Functions: The following are required system functions and operating features:

1. Priority of Signals: Fire alarm events have highest priority. Subsequent alarm events are queued in the order received and do not affect existing alarm conditions. Priority Two, Supervisory and Trouble events have second-, third-, and fourth-level priority, respectively. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all events regardless of priority or order received.

2. Noninterfering: An event on one zone does not prevent the receipt of signals from any other zone. All zones are manually resettable from the FACU after the initiating device or devices are restored to normal. The activation of an addressable device does not prevent the receipt of signals from subsequent addressable device activations.

3. Transmission to an approved Supervising Station: Automatically route alarm, supervisory, and trouble signals to an approved supervising station service provider, under another contract.

4. Annunciation: Operation of alarm and supervisory initiating devices shall be annunciated at the FACU and the remote annunciator, indicating the type of device, the operational state of the device (i.e. alarm, trouble or supervisory) and shall display the custom label associated with the device.

5. Selective Alarm: A system alarm shall include:

a) Indication of alarm condition at the FACU and the annunciator(s).
b) Identification of the device /zone that is the source of the alarm at the FACU and the annunciator(s).
c) Operation of audible and visible notification appliances until silenced at FACU.
d) Selectively closing doors normally held open by magnetic door holders on the fire floor, floor above and floor below.
e) Unlocking designated doors.
f) Shutting down supply and return fans serving zone where alarm is initiated.
g) Closing smoke dampers on system serving zone where alarm is initiated.
h) Initiation of smoke control sequence.
i) Transmission of signal to the supervising station.
j) Initiation of elevator Phase I functions (recall, shunt trip, illumination of indicator in cab, etc.) in accordance with ANSI/ASME A17.1 / CSA B44, Safety Code for Elevators and Escalators, when specified detectors or sensors are activated, as appropriate.

6. Supervisory Operations: Upon activation of a supervisory device such as a low air pressure switch, and tamper switch, the system shall operate as follows:

a) Activate the system supervisory service audible signal and illuminate the LED at the control unit and the remote annunciator.

b) Pressing the Supervisory Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory LED "on" indicating off-normal condition.
c) Record the event in the FACU historical log.
d) Transmission of supervisory signal to the supervising station.
e) Restoring the condition shall cause the Supervisory LED to clear and restore the system to normal.

7. Alarm Silencing: If the "Alarm Silence" button is pressed, all audible and visible alarm signals shall cease operation.

8. System Reset

a) The "System Reset" button shall be used to return the system to its normal state. Display messages shall provide operator assurance of the sequential steps ("IN PROGRESS", "RESET COMPLETED") as they occur. The system shall verify all circuits or devices are restored prior to resetting the system to avoid the potential for re-alarming the system. The display message shall indicate "ALARM PRESENT, SYSTEM RESET ABORTED."
b) Should an alarm condition continue, the system will remain in an alarmed state.

9. A manual evacuation (drill) switch shall be provided to operate the notification appliances without causing other control circuits to be activated.

10. WALKTEST: The system shall have the capacity of 8 programmable passcode protected one person testing groups, such that only a portion of the system need be disabled during testing. The actuation of the "enable one person test" program at the control unit shall activate the "One Person Testing" mode of the system as follows:

a) The city circuit connection and any suppression release circuits shall be bypassed for the testing group.
b) Control relay functions associated with one of the 8 testing groups shall be bypassed.
c) The control unit shall indicate a trouble condition.
d) The alarm activation of any initiating device in the testing group shall cause the audible notification appliances assigned only to that group to sound a code to identify the device or zone.
e) The unit shall automatically reset itself after signaling is complete.
f) Any opening of an initiating device or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds indicating the trouble condition.

11. Install Mode: The system shall provide the capability to group all non-commissioned points and devices into a single "Install Mode" trouble condition allowing an operator to clearly identify event activations from commissioned points and devices in occupied areas.

a) It shall be possible to individually remove points from Install Mode as required for phased system commissioning.

b) It shall be possible to retrieve an Install Mode report listing that includes a list of all points assigned to the Install Mode. Panels not having an install mode shall be reprogrammed to remove any non-commissioned points and devices.

12. Module Distribution:

a) The fire alarm control unit shall be capable of allowing remote location of the following modules; interface of such modules shall be through a Style 4 (Class B) supervised serial communications channel (SLC):
(a) Initiating Device Circuits
(b) Notification Appliance Circuits
(c) Auxiliary Control Circuits
(d) Graphic Annunciator LED/Switch Control Modules
(1) In systems with two or more Annunciators and/or Command Centers, each Annunciator/Command Center shall be programmable to allow multiple Annunciators/Command Centers to have equal operation priority or to allow hierarchal priority control to be assigned to individual Annunciator/Command Center locations.

J. Analog Smoke Sensors:

1. Monitoring: FACU shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.

2. Environmental Compensation: The FACU shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.

3. Programmable Sensitivity: Photoelectric Smoke Sensors shall have 7 selectable sensitivity levels ranging from 0.2% to 3.7%, programmed and monitored from the FACU.

4. Sensitivity Testing Reports: The FACU shall provide sensor reports that meet NFPA 72 calibrated test method requirements.

a) Reports shall be capable of being printed for annual recording and logging of the calibration maintenance schedule.

5. The FACU shall automatically indicate when an individual sensor needs cleaning. The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are provided. The first level shall indicate if a sensor is close to a trouble reporting condition and will be indicated on the FACU as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "DIRTY SENSOR" condition shall be indicated at the FACU and subsequently a system trouble is reported. The sensor base LED shall glow steady giving a visible

indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.

6. The FACU shall continuously perform an automatic self-test on each sensor that will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.

7. Multi-Sensors shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.2 to 3.7 %/ft obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.

8. Programmable bases. It shall be possible to program relay and sounder bases to operate independently of their associated sensor.

9. Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.

K. Fire Suppression Monitoring:

1. Water flow: Activation of a water flow switch shall initiate general alarm operations.

2. Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.

3. Water flow switch and sprinkler valve tamper switch shall be capable of existing on the same initiating zone. Activation of either device shall distinctly report which device is in alarm on the initiating zone.

L. Audible Alarm Notification: By horns in areas as indicated on drawings.

1.5 SUBMITTALS

A. General: The Contractor shall check data carefully to insure compliance with these specifications prior to submitting. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification. Submittal data shall be submitted at one time in one Portable Data Format (pdf) electronic file. Submittals shall include:

1. Wiring diagrams from manufacturer.

2. Shop drawings showing system details including location of FACU, all devices,

circuiting and details of graphic annunciator, if applicable.

3. System power and battery charts with performance graphs and voltage drop calculations to assure that the system will operate in accordance with the prescribed backup time periods and under all voltage conditions per UL and NFPA standards.

4. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs and outputs. A list of all input and output points in the system shall be provided with a label indicating location or use of IDC, SLC, NAC, relay, sensor, and auxiliary control circuits.

5. Operating instructions for FACU.

6. Operation and maintenance data for inclusion in Operating and Maintenance Manual. Include data for each type product, including all features and operating sequences, both automatic and manual. Provide the names, addresses, and telephone numbers of service organizations.

7. Product certification signed by a certified representative of the manufacturer of the fire alarm system components certifying that their products comply with indicated requirements.

8. Record of field tests of system.

B. Hard copy submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical hard copy submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions, if required, to make clarifications or revisions to obtain approval.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A factory authorized installer is to perform the work of this section.

B. Each and every item of the Fire Alarm System shall be listed under the appropriate category by a Nationally Recognized Testing Laboratory and shall bear the respective "NRTL" label.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of fire-alarm service.

2. Do not proceed with interruption of fire-alarm service without Architect's written permission.

1.8 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.9 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning with Substantial Completion, provide software support for two years.

C. 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.

1.10 MAINTENANCE SERVICE

A. Warranty Maintenance Service: Provide maintenance of fire alarm systems and equipment for a period of 12 months, using factory-authorized service representatives

1.11 EXTRA MATERIALS

A. General: Furnish extra materials, packaged with protective covering for storage, and identified with labels clearly describing contents as follows:

1. Break Rods for Manual Stations: Furnish quantity equal to 15 percent of the number of manual stations installed; minimum of 6 rods.

2. Notification Appliances: Furnish quantity equal to 10 percent of each type and number of units installed, but not less than one of each type.

3. Smoke Detectors or Sensors, Fire Detectors, and Flame Detectors: Furnish quantity equal to 10 percent of each type and number of units installed but not less than one of each type.

4. Detector or Sensor Bases: Furnish quantity equal to 2 percent of each type and number of units installed but not less than one of each type.

PART 2 - PRODUCTS

2.1 ACCEPTABLE EQUIPMENT AND SERVICE PROVIDERS

A. Manufacturers: The equipment and service described in this specification are those supplied and supported by Tyco SimplexGrinnell and represent the base bid for the equipment.

1. Subject to compliance with the requirements of this specification, provide products by one of the following:

a) Simplex, a Tyco Company
b) Notifier,
c) Hochiki,
d) Edwards

B. Being listed as an acceptable Manufacturer in no way relieves obligation to provide all equipment and features in accordance with these specifications.

C. Alternate products must be submitted to the Engineer two weeks prior to bid for approval. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this specification.

D. The equipment and service provider shall be a nationally recognized company specializing in fire alarm and detection systems. This provider shall employ factory trained and certified technicians, and shall maintain a service organization within 50 miles of this project location. The equipment and service provider shall have a minimum of 10 years' experience in the fire protective signaling systems industry.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:

1. Manual stations.

2. Heat detectors.

3. Flame detectors.

4. Smoke detectors.

5. Duct smoke detectors.

6. Verified automatic alarm operation of smoke detectors.

7. Automatic sprinkler system water flow.

8. Heat detectors in elevator shaft and pit.

9. Fire-extinguishing system operation.

10. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.

2. Identify alarm at fire-alarm control unit and remote annunciators.

3. Transmit an alarm signal to the remote alarm receiving station.

4. Unlock electric door locks in designated egress paths.

5. Release fire and smoke doors held open by magnetic door holders.

6. Activate voice/alarm communication system.

7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.

8. Activate smoke-control system (smoke management) at firefighter smoke-control system panel.

9. Activate stairwell and elevator-shaft pressurization systems.

10. Close smoke dampers in air ducts of designated air-conditioning duct systems.

11. Recall elevators to primary or alternate recall floors.

12. Activate emergency lighting control.

13. Activate emergency shutoffs for gas and fuel supplies.

14. Record events in the system memory.

15. Record events by the system printer.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.

2. Low-air-pressure switch of a dry-pipe sprinkler system.

3. Elevator shunt-trip supervision.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.

2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.

3. Loss of primary power at fire-alarm control unit.

4. Ground or a single break in fire-alarm control unit internal circuits.

5. Abnormal AC voltage at fire-alarm control unit.

6. Break in standby battery circuitry.

7. Failure of battery charging.

8. Abnormal position of any switch at fire-alarm control unit or annunciator.

9. Fire-pump power failure, including a dead-phase or phase-reversal condition.

E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer where provided.

2.3 FIRE ALARM CONTROL UNIT

A. General: Comply with UL 864, "Control Units and Accessories for Fire Alarm Systems".

B. The following FACU hardware shall be provided:

1. Power Limited base panel with 120 VAC input power.

2. 2,500 point capacity where (1) point equals (1) monitor (input) or (1) control (output).

3. 2000 points of annunciation where one (1) point of annunciation equals:

a) 1 LED driver output on a graphic driver or 1 switch input on a graphic switch input module.
b) 1 LED on panel or 1 switch on panel.

4. 9 Amp Power Supply minimum with temperature compensated, dual-rate battery charger capable of charging up to 110 Ah batteries without a separate external battery charger. Battery charger voltage and amperage values shall be accessible on the FACU LCD display.

5. One Auxiliary electronically resettable fused 2A @24VDC Output, with programmable disconnect operation for 4-wire detector reset.

6. One Auxiliary Relay, SPDT 2A @32VDC, programmable as a trouble relay, either as normally energized or de-energized, or as an auxiliary control.

7. Three (3) Class B Addressable Notification Appliance Signaling Line Circuits (SLCs).

a) Each Addressable Notification Appliance SLC shall be rated at 3A and capable of supporting up to 127 Notification Appliances per channel.
b) Wiring shall be 18 AWG to 12 AWG unshielded twisted pair wire. Systems that require shielded wire for Notification Appliances shall not be accepted.
c) A constant voltage under both primary and secondary power conditions shall be maintained at the notification appliance field wiring terminal connections in the FACU to ensure the voltage drop on the circuit is consistent under both primary and secondary power conditions.
d) For systems that do not provide a constant voltage source at the FACU notification appliance field wiring terminal connections, the fire alarm contractor shall:
(a) Provide separate point-to-point voltage drop calculations for all notification appliances under worst case secondary power specifications, and
(b) Perform a complete functional test of all notification appliances under worst case secondary power conditions.

8. Three (3) Class B Notification Appliance Circuits (NAC; rated 3A@24VDC, resistive).

a) NAC's shall be conventional reverse polarity operation and shall be for synchronized strobes and independent horn/strobe operation over two wires.
b) NACs shall be selectable as auxiliary power outputs derated to 2 A for continuous duty.
c) Strobe synchronization and audible cadence synchronization shall be across all panel NAC circuits. Systems that cannot provide listed synchronization across all panel NAC's shall not be acceptable.

9. Where required provide Intelligent Remote Battery Charger for charging up to 110Ah batteries.

10. Expansion Power Supplies with three (3) Class B integral Intelligent Addressable Notification Appliance Signaling Line Circuits (SLCs) for system expansion. Expansion power supplys shall provide complete capability as the primary power supply.

11. Power Supplies with integral conventional reverse polarity Notification Appliance

Circuit Class B for system expansion. Expansion power supplys shall provide complete capability as the primary power supply.

12. The FACU shall support up to (5) RS-232-C ports and one service port. All (5) RS-232 Ports shall be capable of two-way communications.

13. Remote Unit Interface: supervised serial communication channel for control and monitoring of remotely located annunciators and I/O panels.

C. Cabinet: Lockable steel enclosure. Arrange unit so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control unit, provide exactly matching modular unit enclosures.

D. Alphanumeric Display and System Controls: Panel shall include an 80 character LCD display to indicate alarm, supervisory, and component status messages and shall include a keypad for use in entering and executing control commands.

2.4 ADDRESSABLE INITIATING

A. ADDRESSABLE MANUAL PULL STATIONS

1. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

2. Description: Addressable single-action type, red LEXAN. Station shall mechanically latch upon operation and remain so until manually reset by opening with a key common with the control units. Station shall be pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

3. Provide with a front showing red LED showing that will flash each time it is scanned by the Control Unit (once every 4 seconds). In alarm condition, the station LED shall be on steady.

B. ADDRESSABLE ANALOG SMOKE SENSORS

1. General Requirements for System Smoke Detectors:

a) Comply with UL 268, "Smoke Detectors for Fire Protective Signaling Systems." Include the following features:
b) Factory Nameplate: Serial number and type identification.
c) Operating Voltage: 24 VDC, nominal and shall be two-wire type.
d) Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore normal operation.
e) Each sensor base shall contain a magnetically actuated test switch to provide

for easy pre-certification alarm testing at the sensor location.

f) Each sensor shall be scanned by the Control Unit for its type identification to prevent inadvertent substitution of another sensor type. Upon detection of a "wrong device", the control unit shall operate with the installed device at the default alarm settings for that sensor; 2.5% obscuration for photoelectric sensor, 135-deg F and 15-deg F rate-of-rise for the heat sensor, but shall indicate a "Wrong Device" trouble condition.

g) Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit. Provide multiple levels of detection sensitivity for each sensor.

h) Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor shall be provided by the FACU.

i) The sensor's electronics shall be immune from nuisance alarms caused by EMI and RFI. Removal of the sensor head for cleaning shall not require the setting of addresses.

j) Bases: CO Sensor, relay output, sounder and isolator bases shall be supported alternatives to the standard base.

2. Addressable Sensor Bases

a) Standard base - Twist lock addressable base with address selection DIP switch accessible from front with sensor removed. Integral red LED for power-on (pulsing), or alarm or trouble (steady on). Locking anti-tamper design mounts on standard outlet box.

b) Sensor Base with remote device connection - All standard base features with wired connection for either a Remote LED alarm indicator or remote relay (relay is unsupervised and requires separate 24VDC)

c) Supervised Relay Bases - All standard base features and shall be available in either a 4-Wire Sensor Base to use with remote or locally mounted relay; requires separate 24 VDC, or as a 2-Wire Sensor Base to use with remote or locally mounted relay; no separate power required. Supervised relay operation shall be programmable and shall be manually operated from control panel.

d) Sensor base with built-in electronic alarm sounder - All standard base features and piezoelectric sounder shall provide high output (88 dBA) with low current requirements (20 mA). Sounder shall be synchronized via SLC communications or by the NAC if NAC powered, sounder shall operation shall be programmable and shall be manually operated from control panel.

C. ADDRESSABLE DUCT SMOKE SENSOR

1. Standard Addressable Duct Smoke Sensor Unit. Photoelectric type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied. Duct housing shall include relay or relay driver as required for fan shutdown.

a) Environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor

shall be provided by the FACU.

b) The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.

c) Duct Housing shall provide a magnetic test area and Red sensor status LED and Duct Housing shall provide a relay control Yellow LED trouble indicator.

d) Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.

e) Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports will allow aerosol injection in order to test the activation of the duct smoke sensor.

f) For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

g) Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.

h) Where indicated provide a NEMA 4X weatherproof duct housing enclosure that shall provide for the circulation of conditioned air around the internally mounted addressable duct sensor housing to maintain the sensor housing at its rated temperature range. The housing shall be UL Listed to Standard 268A.

2. Addressable In-Duct Mounted Smoke Sensors. Photoelectric type, for applications with controlled dust and humidity providing HVAC duct smoke sensing where sampling tube designs are not appropriate. In-Duct housing shall include relay or relay driver as required for fan shutdown.

a) Shall accommodate duct airflow from 0 to 4000 ft/min (0 to 1220 m/min), and provide environmental compensation, programmable sensitivity settings, status testing, and monitoring of sensor dirt accumulation for the duct smoke sensor by the FACU.

b) The In-Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC. This auxiliary relay output shall be fully programmable independent of the sensor head for activation by other alarm initiating devices within the fire alarm system. Relay shall be mounted within 3 feet of HVAC control circuit.

c) Standard models shall be for rectangular ducts from 6” (152 mm) square to 36” (914 mm) square with optional adapters available to allow use with round ducts of 6”, 8” (203 mm), 10” (254 mm) or 12” (305 mm) in diameter.

d) In-Duct Housing shall provide a magnetic test area and Red sensor status LED and In-Duct Housing shall provide a relay control Yellow LED trouble indicator.

e) Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.

f) Each duct smoke sensor shall be provided with a Remote Test Station with an alarm LED and test switch.

D. ADDRESSABLE HEAT SENSORS

1. General Requirements for Heat Detectors: Comply with UL 521.

2. Thermal Sensor Combination type: Fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp; Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.

3. Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag. Selectable rate compensated, fixed temperature sensing with or without rate-of-rise operation.

4. Mounting: Twist-lock base interchangeable with smoke-sensor heads.

5. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

6. Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate at 135-deg F or 155-deg F. Sensor rate-of-rise temperature detection shall be selectable at the FACU for either 15-deg F or 20-deg F per minute.

7. Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 32-deg F to 155-deg F.

8. Unless otherwise indicated, sensors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for temperature by fire-alarm control unit.

a) Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
b) Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).

E. ADDRESSABLE CIRCUIT INTERFACE MODULES

1. Addressable Circuit Interface Modules: Arrange to monitor or control one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of AHU systems.

2. Addressable Circuit Interface Modules will be capable of mounting in a standard electric outlet box. Modules will include cover plates to allow surface or flush mounting. Modules will receive their operating power from the signaling line

circuit or a separate two wire pair running from an appropriate power supply, as required.

2.5 ADDRESSABLE NOTIFICATION

A. ADDRESSABLE ALARM NOTIFICATION APPLIANCES

1. Addressable Notification Appliances: The Contractor shall furnish and install Addressable Notification Appliances and accessories to operate on compatible signaling line circuits (SLC).

a) Addressable Notification appliance operation shall provide power, supervision and separate control of horns and strobes over a single pair of wires. The controlling channel (SLC) digitally communicates with each appliance and receives a response to verify the appliance's presence on the channel. The channel provides a digital command to control appliance operation. SLC channel wiring shall be unshielded twisted pair (UTP), with a capacitance rating of less than 60pf/ft and a minimum 3 twists (turns) per foot.

b) All Notification Appliances shall operate as a completely independent device allowing for specific location alerting of both fire alarm and Mass Notification functions. Each visible device (both clear fire alarm and amber mass notification) shall be capable of operating on multiple notification zones or completely separate from all other notification devices, this allows “On the fly” program operation changes for Mass Notification alerting and fire alarm notification.

c) All Notification Appliances shall operate as a completely independent device allowing for appliances in handicap accessible rooms and other locations to operate on the same SLC and to activate individually based on an alarm condition in a room or as part of a general alarm condition where all appliances activate together.

d) Individual Notification Appliances shall be able to be grouped into zones (or operational groups) by central programming at the main fire alarm control unit.

e) Notification Appliances shall provide for “unobtrusive” testing. Each Notification Appliance shall be tested for audible and visible operation on an individual basis at the device or from the main fire alarm control unit, allowing for minimal invasive impact.

f) Class B (Style 4) notification appliances shall be wired without requiring traditional in/out wiring methods; addressable "T" Tapping shall be permitted. Up to 127 addresses can be supported on a single channel.

g) Each Addressable notification appliance shall contain an electronic module and a selectable address setting to allow it to occupy a unique location on the channel. This on-board module shall also allow the channel to perform appliance diagnostics that assist with installation and subsequent test operations. A visible LED on each appliance shall provide verification of communications and shall flash with the appliances address setting when locally requested using a magnetic test tool.

h) Each addressable notification appliance shall have electrical test point access

without removing the device cover.

i) Both wall mount and ceiling mount devices shall be available.

2.6 MAGNETIC DOOR HOLDERS

A. Description: Units shall be listed to UL 228. Units are equipped for wall or floor mounting as indicated and are complete with matching door plate. Unit shall operate from a 120VAC, a 24VAC or a 24VDC source, and develop a minimum of 25 lbs. holding force.

B. Material and Finish: Match door hardware.

2.7 REMOTE LCD ANNUNCIATOR

A. Provide a remote LCD Annunciator, with the same "look and feel" as the FACU operator interface. The Remote LCD Annunciator shall use the same Primary Acknowledge, Silence, and Reset Keys; Status LEDs and LCD Display as the FACU.

B. Annunciator shall have super-twist LCD display with two lines of 40 characters each. Annunciator shall be provided with four (4) programmable control switches and associated LEDs.

C. Under normal conditions the LCD shall display a "SYSTEM IS NORMAL" message and the current time and date.

D. Should an abnormal condition be detected the appropriate LED (Alarm, Supervisory or Trouble) shall flash. The unit audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions.

E. The LCD shall display the following information relative to the abnormal condition of a point in the system:

1. 40 character custom location label.

2. Type of device (e.g., smoke, pull station, waterflow).

3. Point status (e.g., alarm, trouble).

F. Operator keys shall be key switch enabled to prevent unauthorized use. The key shall only be removable in the disabled position. Acknowledge, Silence and Reset operation shall be the same as the FACU.

2.8 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal

from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.

2. Programming device.

3. LED display.

4. Manual test report function and manual transmission clear indication.

5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.

2. Address of the supervisory signal.

3. Address or loss of power.

4. Low battery.

5. Abnormal test signal.

6. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

B. Installation personnel shall be supervised by persons who are qualified and

experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:

1. Factory trained and certified personnel.

2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.

3. Personnel licensed or certified by state or local authority.

3.2 EQUIPMENT INSTALLATION

A. Furnish and install a complete Fire Alarm System as described herein and as shown on the plans. Include sufficient control unit(s), annunciator(s), manual stations, automatic fire detectors, smoke detectors, audible and visible notification appliances, wiring, terminations, electrical boxes, ethernet drops, and all other necessary material for a complete operating system.

B. Existing Fire Alarm Equipment shall be maintained fully operational until the new equipment has been tested and accepted.

C. Equipment Removal: After acceptance of the new fire alarm system, disconnect and remove the existing fire alarm equipment and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed and deliver to the Owner. Remove from the site and legally dispose of the remainder of the existing material.

D. Water-Flow and Valve Supervisory Switches: Connect for each sprinkler valve required to be supervised.

E. Device Location-Indicating Lights: Locate in the public space immediately adjacent to the device they monitor.

F. Install manual station with operating handle 48 inches (1.22 m) above floor. Install wall mounted audible and visual notification appliances not less than 80 inches (2.03 m) above floor to bottom of lens and not greater than 96 inches (2.44 m) above floor to bottom of lens.

G. Mount outlet box for electric door holder to withstand 80 pounds pulling force.

H. Make conduit and wiring connections to sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control units, duct smoke detectors .

I. Automatic Detector Installation: Conform to NFPA 72.

3.3 WIRING INSTALLATION

A. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction and shall be

installed in accordance with the appropriate articles from the current approved edition of NFPA 70: National Electric Code (NEC).

B. Contractor shall obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.

C. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.

3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

3.6 TRAINING

A. Provide the services of a factory-authorized service representative to demonstrate the system and train Owner's maintenance personnel as specified below.

1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 4 hours' training.

2. Schedule training with the Owner at least seven days in advance.

SECTION 31 00 00 - EXCAVATION, FILLING AND COMPACTION FOR STRUCTURES

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings, Geotechnical Report and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

DESCRIPTION OF WORK:

Work to occur at location of buildings and structures as shown on the drawings.

Excavation and fill work includes, but is not limited to:

Removal of underground obstructions.

Fill compaction.

See site clearing specification for site work.

Soil work for paving and walks is noted in specification for non-building structures

Contractor shall perform all earthwork, compaction and filling in accordance with recommendations set forth in the Geotechnical Report. The Contractor shall review all requirements stipulated in the Geotechnical Report and become familiar with the existing conditions and the site.

COMPLIANCE WITH STANDARDS:

All work in this section shall meet the requirements and recommendations of applicable portions of the standards listed. In case of conflict between the referenced specifications or standards, the more stringent requirements shall govern.

American Society for Testing and Materials - ASTM
Florida Building Code 2017 - FBC 2017
Florida Department of Transportation - FDOT, Latest Edition

PART 2 - PRODUCTS

MATERIALS:

Borrow material shall be selected from an approved off-site source and shall be free from large lumps, wood, pipe clay and other extraneous material.

Fill material shall be clean to slightly silty or clayey fine sands, free of organic or other deleterious materials, with less than 12 percent passing the U.S. No. 200 sieve. Selected on-site excavated material may be used for fill provided it meets all the requirements for fill and backfill material specified hereinafter and provided the proper moisture content can be achieved to obtain the specified densities.

Fill and backfill material shall be of quality acceptable to the Architect and shall be free from large lumps, wood, pipe clay and other extraneous material. If the material at the site is not considered suitable for use, or if the required compaction cannot be obtained, the Contractor shall be responsible for removing the site material and bringing in material suitable for this purpose.

Topsoil stripping and stockpiling is specified.

Sand fill under slabs on grade and sand backfill against walls shall be clean, inorganic sand with no clay fines. Sand may be any concrete or masonry sand or may be any natural sand meeting these Specifications that is readily compactable to the requirements specified herein. The sand backfill against walls shall have no more than ten percent, by dry weight, passing the No. 200 sieve.

PART 3 - EXECUTION

EXCAVATION FOR STRUCTURES (GENERAL):

Dimensions: Excavate to elevations and dimensions indicated on the Drawings and specified herein. Allow additional space as required for construction operations and inspecting foundations.

Drainage During Construction: The Contractor shall control the grading around buildings so that the ground is pitched to prevent water from running into the excavated areas or damaging the structures. Maintain all pits and trenches, where footings are to be placed, free of water at all times. Provide all pumping required to keep excavated spaces clear of water during construction. Should any springs of running water be encountered in the excavation, the Architect shall be notified and the Contractor shall provide its free discharge by trenches and drain to an appropriate point of disposal. If permanent provision must be made for disposal of water, the Contract price will be adjusted.

Foundation Trenches: Where soil conditions will permit, trenches may be excavated to the exact dimensions of the concrete, and side forms omitted. Fill with concrete any excess cut under footings and foundations.

Frost Protection: Do not place foundations or slabs on frozen ground. When freezing temperatures may be expected, do not excavate to the full depth indicated, unless the foundations or slabs can be placed immediately after the excavation has been completed. Protect the bottoms from frost if placing of concrete is delayed. Refer to Division-3 of these specifications for cold weather placement of concrete.

Reuse of Excavated Material: Excavated material that is suitable may be used for fills and backfills indicated or required. All unsuitable material, and all surplus excavated material not required for site grading and backfill, shall be removed from the site by the Contractor. The location of dump and length of haul shall be the Contractor's responsibility.

EXCAVATION, COMPACTION AND FILLING FOR FLOOR SLABS AND FOUNDATIONS:

Excavation and Initial Compaction: After the stripping operation is complete, excavate required areas to the desired elevation and proof-roll the entire area of buildings and structure as required by the Geotechnical report, and to five feet outside the limits of foundations, to a density of at least 95 percent of the Modified Proctor Density to a depth of 12 inches below the compacted surface. Adjust moisture content as noted in the Geotechnical Report to aid compaction.

The fill should be placed in level lifts not exceeding 12 inches in uncompacted thickness. Each lift should be compacted by repeated passes with appropriate compaction equipment to achieve at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557). The filling and compaction operations should continue until the desired elevation(s) is achieved. Per information provided in the Geotechnical Report, a vibratory roller should not be used for compaction to avoid disturbance of existing buildings.

Excavation, Compaction and Backfill for Foundations: Excavate areas under continuous wall footing, column footings slab and site as required by the Geotechnical Report, and, thereafter, verify the in-place compaction. Compact the bottom of the excavations to achieve a minimum dry density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557). This density should be developed to a minimum depth of 12 inches below the bottom of the footings. Overexcavate and recompact, as necessary, to fulfill the above compaction criteria. The moisture content of the foundation soils must be controlled during the compaction procedure to aid compaction.

Overexcavation Requirements: When existing soils are too wet or otherwise will not compact to the depth and densification specified herein, overexcavate the soil an additional twelve inches and place and compact fill as specified hereinafter.

Fill and Compaction: Furnish fill in twelve (12) inch maximum loose layers to the required elevation and compact each layer to at least 95 percent of the Modified Proctor Density. Fill and compaction next to existing building walls should be within 90 to 94% of ASTM D-1557 using hand operated tampers only.

SAND FILL UNDER SLABS:

Sand Fill Under Slabs on Grade: Furnish twelve (12) inches of compacted sand fill under all concrete slabs on grade and elsewhere as may be called for on Drawings and specified hereinafter. A density of 95 percent of the Modified Proctor Density shall be obtained. Do not use water (puddling) for compaction of fill.

BACKFILL FOR UTILITY TRENCHES:

Backfill shall not commence until construction below finish grade has been approved, underground utilities systems inspected and tested, forms removed and the excavation cleaned of trash and debris. Backfill work shall be accomplished by placing in horizontal layers not over twelve inches in depth. Each layer shall be thoroughly tamped and compacted so that no settlement in completed work will occur.

TESTING:

The Contractor shall provide, schedule and pay for all tests necessary to establish compliance with the requirements of these Specifications. Compaction tests to be performed as follows: one (1) for every 75 LF of wall footings, one (1) for every three isolated column spread footing, one (1) for every 2000 SF of slab area for fill lifts and (1) for every 2000 SF of prepared existing subgrade under the building slab area.

Send test reports to the Architect promptly following testing.

Tests shall be made by a qualified testing laboratory in accordance with the specification as follows: (Verify all requirements with the Geotechnical Report)

AREA	COMPACTION	SPECIFICATION
Within 5'-0" Beyond Foundation Lines:		
Before Placing Fill	95%(12")	ASTMD-1557
Placing of Fill	95% (12")	ASTMD-1557
Wall/Column Footings		
Below main MBM column footings	95%(72")	ASTMD-1557
Below Wall and remaining column footings	95%(12")	ASTMD-1557
Final Sand Layer Under Slabs	95% (12")	ASTMD-1557
Fill next to existing Building Walls	90 to 94%	ASTMD-1557

Any additional testing required due to failure to pass the original tests shall be paid for by the Contractor.
Contractor shall not use heavy equipment when compacting soil next to retaining walls. Contractor to use hand tamping equipment within 5' of building walls.

REPAIRS TO DAMAGED PROPERTY:

Repairs: Sections of walk, curbing, concrete paving and other permanent features which have been damaged during and as a result of construction operations in connection with this Contract shall be removed and the full section between joints replaced to match the original construction.

Replacement of Grass and/or Shrubs: All grass areas and/or shrubs which have been rutted and/or damaged or broken during and as a result of construction operations in connections with this Contract shall be removed and replaced. This shall apply to the grass and shrubs outside the Contract limits as shown on the Site Plan as well as new work within these limits.

Protection: Protect newly graded areas from erosion or disturbance by the elements. Any settlement or washing that occurs prior to acceptance of the work shall be repaired, and grades re-established to the required elevations and slopes. Fill to required grades all areas where settlement has occurred.

CLEANING:

During construction, debris shall be removed from site as soon as practical, and the exterior of the site and the interior of the building kept clean at all times.
If adjacent surface areas outside of the property lines are damaged, become washed with dirt, or in any way disturbed, the Contractor shall promptly restore such areas to their original condition.

END OF SECTION 31 00 00

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SECTION 31 31 16 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes soil treatment for termite control at slab, foundation, under new slabs and treating the central portion under the elevated 1st floor (approx. 60' x 60').

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides. Submit evidence that provided termiticides bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
2. Include the EPA-Registered Label for termiticide products.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of termite control product.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

D. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.

B. Engage a professional pest control operator who is licensed according to regulations of

governing authorities to apply soil treatment solution.

C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.7 FIELD CONDITIONS

A. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.

B. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.8 WARRANTY

A. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

B. Warranty Period: 5 years from date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

D. The warranty shall contain an optional renewal of the service on the same terms, for years six (6) through ten (10)

E. The service agreement shall state that in the event of damage during the guarantee period, the Contractor shall make repairs to the structurally damaged surfaces and architectural millwork to a dollar value based on the size of the building.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

A. General: Use an emulsible, concentrated termiticide that dilutes with water, specially formulated to prevent termites infestation. Fuel oil will not be permitted as a diluent. Provide a solution consisting of one of following chemical elements.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Chloropyrifos:
   a. Dursban TC, Dow Chemical Co.

2. Permathrin:
   a. Dragnet FT, FMC Corp.
   b. Torpedo, ICI Americas, Inc.

3. Cypermethrine:
   a. Prevail FT, FMC Corp.
   b. Demon, ICI Americas, Inc.

4. Fenvalerate:
   a. Gold Coast Tribute, Du Pont.

5. Isofenphose:
   a. Pryfon, Mobay Corp.

C. Dilute with water to concentration level recommended by manufacturer.

D. Other solutions may be used as recommended by Applicator if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

PART 3 - EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placing compacted fill under slabs if recommended by toxicant manufacturer.

B. Application Rates: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply soil treatment in strict accordance with manufacturer's instructions and recommendations which meet the warranty requirement for the material used. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Apply in the following locations:

1. Under slab-on-grade structures: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are in place. At existing structure treat existing materials.
2. Below grade, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures.
3. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab, around interior column footers, priers, chimney bases, and along the entire outside perimeter, from grade to bottom of footing.
4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
5. Masonry: Treat voids.
6. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.

C. Post signs in areas of application.

D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION 31 31 16

SECTION 32 14 00 - UNIT PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Brick pavers set in sand setting bed.
2. Concrete edge restraints with pavers set in sand setting bed or acceptable compacted aggregate sub-base.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for compacted sub-grade and sub-base course, under unit pavers.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Brick pavers.

B. Samples for Verification: Full-size units of each type of unit paver indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain each type of unit paver and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

C. Mockups: Before installing unit pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Accepted mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect unit pavers during storage and construction against soiling or contamination from earth and other materials.

1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.6 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not build on frozen sub-grade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout: Comply with the following requirements:

1. Cold-Weather Requirements: Protect unit paver work against freezing when atmospheric temperature is 40 deg F (4 deg C) and falling.
2. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds. Provide artificial shade and windbreaks and use cooled materials as required.

a. When ambient temperature exceeds 100 or 90 deg F (38 or 32 deg C) with a wind velocity greater than 8 mph (13 km/h), set pavers within 1 minute of spreading setting-bed mortar.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brick Pavers:
   a. As manufactured by Hanover Architectural Products, Traditional 4”x 8” Prest Brick, Color selected by Achitect.
   b. Thickness: 2-1/4”.
2. Latex-Portland Cement Mortars and Grouts (for edge restraint setting):
   a. Bonsal: W. R. Bonsal Company.
   b. Laticrete International, Inc.
   c. Mapei Corp.
   d. Southern Grouts & Mortars, Inc.

2.2 UNIT PAVERS

A. Brick Pavers: Light-traffic paving brick; ASTM C 902, Class SX, Type I, Application PX. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.

2.3 EDGE RESTRAINT

A. Concrete curbing per details in contract documents.

2.4 AGGREGATE SETTING-BED MATERIALS

A. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Vacuum clean substrates to remove dirt, dust, debris, and loose particles.

B. Proof-roll prepared sub-grade surface to check for unstable areas and areas requiring additional compaction. Proceed with unit paver installation only after deficient sub-grades have been corrected and are ready to receive sub-base for unit pavers.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Joint Pattern: Herringbone joint pattern.

E. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

F. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
   1. Install job-built concrete edge restraints (curbing) to comply with requirements in Division 3 Section "Cast-in-Place Concrete."

3.4 AGGREGATE SETTING-BED PAVER APPLICATIONS

A. Compact soil sub-grade uniformly to at least 95 percent of ASTM D 1557 laboratory density.

B. Place sand base in thickness indicated (min 1.1/2” thick). Compact by tamping with plate vibrator and screed to depth required to allow setting of pavers.

C. Place leveling course and screed to a thickness of 1 to 1-1/2 inches (25 to 38 mm), taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

D. Treat leveling base with soil sterilizer to inhibit growth of grass and weeds.

E. Set pavers with a minimum joint width of 1/16 inch (1.6 mm) and a maximum of 1/8 inch (3 mm), being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.

F. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf (16- to 22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:

   1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
   2. Before ending each day's work, fully compact installed concrete pavers to within 36 inches (900 mm) of the laying face. Cover open layers with nonstaining plastic sheets overlapped 48 inches (1200 mm) on each side of the laying face to protect it from rain.

G. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.

H. Do not allow traffic on installed pavers until sand has been vibrated into joints.

I. <u>Repeat joint-filling process 30 days later.</u>

3.5 REPAIR, POINTING, CLEANING, AND PROTECTION

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

END OF SECTION 32 14 00

SECTION 32 31 21 ALUMINUM LOUVER FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Ornamental fixed louver modular fencing panels fabricated with extruded aluminum louvers and flat aluminum bars, including extruded aluminum fence posts and aluminum louver gates.

1.2 REFERENCES

A. ASTM International (ASTM):
   1. ASTM B117 - Operating Salt Spray (Fog) Apparatus.
   2. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
   3. ASTM B221 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   4. ASTM D822 - Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
   5. ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
   6. ASTM D3363 - Test Method for Film Hardness by Pencil Test.

1.3 SUBMITTALS

A. Provide in accordance with Section 01 33 00 - Submittal Procedures:
   1. Product data for components and accessories.
   2. Shop drawings showing layout, dimensions, spacing of components, and anchorage and installation details.
   3. Sample: 8 by 10 inches (203 by 254 mm) minimum size sample of fence panel illustrating design, fabrication workmanship, and selected color coating.
   4. Copy of warranty specified in Paragraph 1.4 for review by Architect.

1.4 WARRANTY

A. Provide in accordance with Section 01 77 00 - Closeout Procedures:
   1. 10-year warranty for factory finish against cracking, peeling, and blistering under normal use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ametco Manufacturing Corporation,
   4326 Hamann Parkway, P.O. Box 1210, Willoughby, Ohio 44096;
   Phone: 800-362-1360.

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

2.2 MATERIALS

A. Extruded aluminum: ASTM B221, Alloy 6063, Temper T-6.

B. Sheet aluminum: ASTM B209, Alloy 6063, Temper T-6.

C. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing additives.

2.3 GATES

A. Provide gates of type and size indicated on Drawings. Equip gates with manufacturer's standard hardware as required for complete functional operation.

B. Type: Hinged swinging double gate.
   1. Construction: Welded frame fabricated from 2 by 2 inches extruded aluminum tubing with aluminum fixed louver panels to match fencing material.
   2. Nominal size: 5’-6” wide by 6’-4” high.
   3. Hardware:
      a. Hinges: Size and type as determined by manufacturer. Provide 2 hinges for each leaf up to [6 feet] [1829 mm] high and 1 additional hinge for each additional [24 inches] [610 mm] in height or fraction thereof.
      b. Latch: [3/4 inch] [19 mm] diameter slide bolt to accommodate padlock.
      c. For double gates provide padlockable, [5/8 inch] [16 mm] diameter center cane bolt assembly and strike.

2.4 ACCESSORIES

A. Fasteners: Stainless steel bolts of type, size, and spacing as recommended by fence manufacturer for specific condition.

2.5 FACTORY FINISH

A. Aluminum fence panels and posts shall receive polyester powder coating.

B. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
   4. Minimum hardness measured in accordance with ASTM D3363: 2H.
   5. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
   6. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than [3/16 inch] [5 mm] undercutting.
   7. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1-year exposure in South Florida with test panels tilted at 45 degrees.

C. Color: Selected by Architect from manufacturer's standard range.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to fabrication, field verify required dimensions.

B. Cast concrete footings Cast-in-Place Concrete as detailed in approved shop drawings.
   1. Minimum footing diameter:
      a. Terminal and gate posts: As indicated in Drawings
   2. Allow 8 inches (203 mm) minimum embedment of posts.
   3. Allow 6 inches (152 mm) minimum concrete beneath post bottom.

3.2 INSTALLATION

A. Install gate in accordance with manufacturer's installation instructions and approved shop drawings.

B. Install gate posts plumb and level [by setting post in hole [cast] [drilled] in concrete and grouting solid.] [by embedding post directly in concrete footing.] Temporarily brace fence posts with 2 by 4 wood supports until [concrete] [grout] is set.

C. Do not install bent, bowed, or otherwise damaged panels. Remove damaged components from site and replace.

D. Gates:
   4. Install gates and adjust hardware for smooth operation.
   2. After installation, test gate [and operator]. Open and close a minimum of five times. Correct deficiencies and adjust.

E. Touch-up damaged finish with paint supplied by manufacturer and matching original coating.

END OF SECTION 32 31 21